Algebra 1 Standards

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Number and Quantity
A1:N-Q.A.1
Item 1

ITEM 1

An engineer computes the ratio of these two measurements.

- fuel efficiency, measured in miles per gallon
- speed, measured in miles per hour

She divides fuel efficiency by speed. What unit will the quotient have?

A. gallons per hour

B. hours per mile

C. gallons per mile

D. hours per gallon

Number and Quantity
A1:N-Q.A.2
Items 2 – 8

ITEM 2

The Louisiana State Capitol Building in Baton Rouge has 34 floors. Which of the following would be a good estimate for the height of the Louisiana State Capitol Building?

A. 170 feet

B. 204 feet

C. 460 feet

D. 680 feet

For a television commercial 20 cars will be parked bumper to bumper to form a line. Which of the following would be the approximate length of the line of cars?

A. 1/2 mile

B. 1/8 mile

C. 800 feet

D. 300 feet

ITEM 4

To honor veterans, Carl has planned a Walking for Vets Program. He has mapped out a 1000 mile path and plans to walk 12 hours per day. If Carl exercises regularly, which is the best approximation of how long the walk will take?

A. 2 days

B. 5 days

C. 20 days

D. 90 days

ITEM 5

The density of tap water varies with temperature as shown in the table below:

Temperature (degrees Celsius)	Density of Water (grams/cm^3)
4	.99999
20	.99823
40	.99225
60	.98389

To determine whether two cylinders contain the same volume of water, each cylinder is weighed. Cylinder 1 is weighed in an enclosed cylinder at 4 degrees Celsius while cylinder 2 is weighed in an enclosed cylinder at 40 degrees Celsius. The results are shown in the table below:

Cylinder #	Temperature	Mass (grams)
1	4	100.0
2	40	99.2

Which of the following would be true about the results?

A. Cylinder 1 and cylider 2 contain the same volume of water.

B. Cylinder 1 contains a larger volume of water than cylinder 2.

C. Cylinder 2 contains a larger volume of water than cylinder 1.

D. There is not enough information to compare the volume of water in cylinder 1 to the volume of water in cylinder 2.

ITEM 6

A stunt motorcycle rider plans to jump over 3 school buses parked side by side using ramps placed on each side of the jump path. Which of the following would be the best estimate for the length of his jump?

A. 10 feet

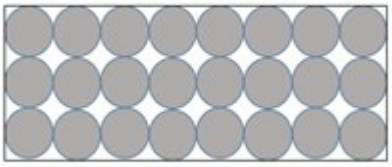
B. 30 feet

C. 80 feet

D. 140 feet

ITEM 7

Sheniqua has a collection of rare dimes in a display case. The diagram for the display case is shown below.



Which of the following would be the best estimate for the dimensions of Sheniqua's display case?

A. 1 inch wide by $1\ \frac{1}{3}$ inches long

B. 2 inches wide by $5\ \frac{1}{2}$ inches long

C. 4 inches wide by 10 inches long

D. 3 inches wide by 8 inches long

ITEM 8

To set up to play a game, 5 chairs are placed side-by-side. Participants hold hands and spread out to form a circle around the chairs such that the line of chairs forms the diameter of the circle. Which of the following would be the minimum number of adults needed to play the game?

A. 3

B. 6

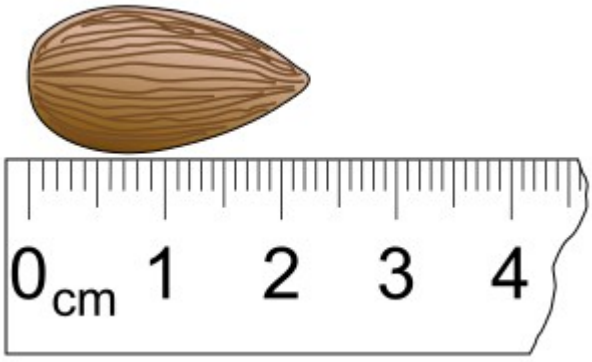
C. 12

D. 31

Number and Quantity
A1:N-Q.A.3
Items 9 – 14

ITEM 9

Use the picture to answer the question.



Rosa measures 100 almonds using the ruler shown. Then she finds the mean length of the almonds.

Which unit is the most appropriate place value for her to report the mean, given the accuracy of her measuring tool?

A. centimeter

B. tenth of a centimeter

C. hundredth of a centimeter

D. thousandth of a centimeter

ITEM 10

Three similar sticks are laid end to end such that the total length is about 13 inches. Which of the following must be true?

A. The length of each stick must be exactly 4.3333333 inches long.

B. The length of each stick must be exactly 4.3 inches long.

C. The length of each stick is approximately 4.3 inches long.

D. The length of each stick is approximately 4 inches long.

ITEM 11

Bald eagles are an endangered species. According to the United States Department of Fish and Wildlife, in 2006 there was an estimated 9800 breeding pairs of bald eagles in the continental United States. If one breeding pair of bald eagles flies into the United States from Canada in May 2006, which of the following would be the best estimate of the population of bald eagle breeding pairs in the continental United States in June 2006?

A. 9801 breeding pairs

B. 9800 breeding pairs

C. 9810 breeding pairs

D. 10,000 breeding pairs

A swimming pool has 4 different sections. The approximate volume of each section is shown in the table below:

Section	Approximate Volume ($ft.^3$)
Diving Area	**3200**
Shallow Area	**1600**
Hot Tub Area	**900**
Step	**0.5**

Based on the data provided, which of the following represents the best estimate for the volume of water needed to fill the pool?

A. 5700 ft^3

B. 6000 ft^3

C. 5700.5 ft^3

D. 5701 ft^3

Carl is using a tape measure with $\frac{1}{16}$ inch divisions to cut a 20 inch long board into three equal sections. Which of the following would be the most accurate measurement for one of the pieces?

A. 6.6666667 inches

B. $6\frac{5}{8}$ inches

C. 6.667 inches

D. $6\frac{11}{16}$ inches

Sponsors have offered to contribute $10 for each mile run by fundraiser marathon runners. Mile markers have been set up to determine the number of miles run by each participant. The table below includes the results of the marathon.

Runner	Miles Run
Mark	8
Ted	12
Carol	16
Jose	15
LaShonda	0.1
Treyveon	0.02
Lauren	18
Jeff	12
Victor	9

Which of the following would be the most accurate measurement for the total number of miles run by the participants?

A. 90.12 miles

B. 90.1 miles

C. 90 miles

D. 100 miles

Algebra
A1:A-SSE.A.1
Items 15 – 21

ITEM 15

A delivery truck takes potatoes and carrots to stores. The total weight of the load, in pounds, can be found using the expression 50 p + 40 c, where p is the number of bags of potatoes and c is the number of boxes of carrots in the load.

What is the meaning of the 50 in the expression?

A. Each bag of potatoes cost $50.

B. The whole load weighs 50 pounds.

C. Each bag of potatoes weighs 50 pounds.

D. There are 50 bags of potatoes in a load.

ITEM 16

The expression $210{,}000(1.02)^{x}$ models the estimated home value after x years. Which statement is the correct representation of the 1.02 in the expression?

A. The house has a starting value of 1.02.

B. The house is decreasing in value by 2 percent each year.

C. The house is increasing in value by 2 percent each year.

D. The value of the house is changing by 0.02 percent each year.

Janie got a loan to help pay for her college tuition. The bank told her that if she paid a certain amount each month her loan value could be modeled by the expression $18{,}000(0.98)^{x}$, where x represents the number of months she has made a payment. Which is the correct representation of the 0.98 in the expression?

A. The loan amount started at 98% of $18,000.

B. The amount owed is decreasing in value by 2 percent each month.

C. The amount owed is increasing in value by 2 percent each month.

D. The amount owed is changing by 0.02 percent each month.

ITEM 18

Omar deposited *d* dollars into a savings account *y* years ago. Now he is going to use a portion of the money in his savings account to buy a bicycle. This expression can be used to find the percentage of the money in the savings account that Omar will use for the bicycle.

$$\frac{342}{d(1.03)^y} \times 100$$

What is the meaning of the denominator in the expression?

A. the amount Omar will pay for the bicycle

B. the amount in Omar's savings account now

C. the yearly interest rate for the savings account

D. the amount originally deposited in the savings account

ITEM 19

Lion Population Estimates- Zimbabwe
The table below shows combined estimates for Chizarira National Park and the Northwestern Population.

Year	Base Year	Estimated Number of Lions
1978	3	4,203
1981	6	4,128
1984	9	4,549
1987	12	4,672

The lion population in northwestern Zimbabwe and Chizarira National Park can be predicted by the expression $3,823(1.34)^b$, where b is the number of years since 1975.

What does the value 3,823 represent?

A. The predicted number of lions in the region in 1975.

B. The predicted increase in the number of lions in the region each year.

C. The year when the lion population is predicted to start increasing.

D. The percentage the lion population is predicted to decrease each year.

ITEM 20

A football was thrown upward into the air. The height, in feet, of the football above the ground *h* seconds after being thrown can be determined by the expression

$-30h^2 + 25h + 5$

What is the meaning of the 5 in the expression?

A. The ball was thrown from a height of 5 feet.

B. The ball reached a maximum height of 5 feet.

C. The ball took 5 seconds to reach its maximum height.

D. The ball took 5 seconds to reach the ground.

Karlena is on an old cell phone plan. The cost of a call depends on the number of minutes the phone call lasts. She can use the expression $0.10 *m* + $3.50 to find the cost of a call. If *m* is the number of minutes, which of the following best describes $3.50?

A. The total cost of a call

B. A fee that is charged per call

C. The cost per minute

D. How long the call lasted

Algebra
A1:A-SSE.A.2
Items 22 – 32

ITEM 22

Determine which of the following is true for the expression $2x^2 + 12x + 18$.

A. The expression is prime.

B. Two can be factored from each term in the trinomial to generate $2(x^2 + 6x + 9)$, and no more factoring can be done.

C. Two can be factored from each term in the trinomial to generate $2(x^2 + 6x + 9)$, and the resulting trinomial can be factored to generate $2(x + 3)^2$.

D. The trinomial $2x^2 + 12x + 18$ is equivalent to $(x + 3)^2$.

Determine which of the following is true for the expression $x^3 + x^2 - 2x$.

A. The equation is prime.

B. x can be factored from each term of the trinomial to obtain $x(x^2 + x - 2)$, which is completely factored.

C. x can be factored from each term of the trinomial to obtain $x(x^2 + x - 1)$, and the resulting trinomial can be factored to obtain $x(x + 2)(x - 1)$, which is completely factored.

D. The trinomial is equivalent to $(x + 2)(x - 1)$.

ITEM 24

Determine which of the following is true for the expression $2x^3 + 10x^2 + 12x$.

A. $2x$ can be factored from each term of the trinomial to obtain $2x(x^2 + 5x + 6)$, which is completely factored.

B. The expression is prime.

C. The trinomial is equivalent to $(x + 2)(x + 3)$.

D. $2x$ can be factored from each term of the trinomial to obtain $2x(x^2 + 5x + 6)$, and the resulting trinomial can be factored to obtain $2x(x + 2)(x + 3)$, which is completely factored.

Which of the following represents the completely factored form of $x^3 - 4x^2 - 12x$?

A. $x(x - 6)(x + 2)$

B. $x(x^2 - 4x - 12)$

C. $x(x + 6)(x - 2)$

D. $x(x - 4)(x + 3)$

ITEM 26

Consider the expression below.

$x^4 - 16$

Which of the following is the correct way to rewrite the expression as a difference of squares?

A. $(x - 4)^2$

B. $(x^2 - 4)^2$

C. $(x^2)^2 - 4^2$

D. $x^4 - 2^4$

ITEM 27

Consider the expression below.

$x^2 + 5x - 4x - 20$

Which **three** of the following expressions is a way to rewrite the above expression?

A. $(x - 4)(x + 5)$

B. $(x + 4)(x - 5)$

C. $x(x + 5) - 4(x - 5)$

D. $x(x + 5) - 4(x + 5)$

E. $x^2 + x - 20$

ITEM 28

Consider the expression below.

$6x^3 - 9x$

Which of the following expressions is **not** a way to rewrite the above expression?

A. $x(6x^2 - 9)$

B. $3x(2x^2 - 3)$

C. $3x(x^2) - 3x(3)$

D. $3x(2x^2) - 3x(3)$

ITEM 29

What is the greatest common factor of $12x^4 – 9x^3 + 15x$?

A. 3

B. x

C. 3x

D. $3x^4$

ITEM 30

Consider the expression below.

$x^4 - 10x^3 + 25x^2$

Which of the following expressions is **not** a way to rewrite the above expression?

A. $x^2(x-5)^2$

B. $x^2(x-5)(x+5)$

C. $x^2(x^2 - 10x + 25)$

D. $x^2(x^2) - x^2(10x) + x^2(25)$

ITEM 31

The length of a square pond in Jaysha's backyard is represented by $6x + 7$ units. Which of the following expressions represents the area of Jaysha's pond in terms of x?

Select the **three** expressions that apply.

A. $36x^2 + 49$ square units

B. $(6x + 7)^2$ square units

C. $24x + 28$ square units

D. $(6x + 7)(6x + 7)$ square units

E. $36x^2 + 84x + 49$ square units

_____ _____ _____

ITEM 32

Select the **completely factored form** of the expression $6x^2 - 21x - 12$.

A. $3x(x + 1)(2x - 4)$

B. $3(2x + 1)(2x - 4)$

C. $3(2x^2 - 7x - 4)$

D. $3(2x + 1)(x - 4)$

Algebra
A1:A-SSE.B.3a
Items 33 – 36

ITEM 33

Which of the following expressions could be used to determine the zeros of the function $f(x)$ when $f(x)$ is defined by the expression $2x^2 + 13x + 15$?

A. $(2x + 5)(x + 3)$

B. $(2x + 3)(x + 5)$

C. $(x + 15)(2x + 1)$

D. $(x + 1)(2x + 15)$

ITEM 34

Which of the following expressions could be used to determine the zeros of the function $g(a)$ when $g(a)$ is defined by the expression $8a^2 + 30a - 27$?

A. $(2a - 3)(4a + 9)$

B. $(8a + 9)(a - 3)$

C. $(4a - 3)(2a + 9)$

D. $(a + 9)(8a - 3)$

ITEM 35

Which of the following shows the correct factorization to reveal the zeros of *f* if f(x) = 5 x ^{2} + 14 x + 3?

A. $(5x + 1)(x - 3)$

B. $(5x - 1)(x + 3)$

C. $(5x - 1)(x - 3)$

D. $(5x + 1)(x + 3)$

ITEM 36

Which of the following can be used to find the zeros of the given function $f(x) = 2x^2 - 11x + 9$?

A. $f(x) = (2x - 9)(x - 1)$

B. $f(x) = (2x + 9)(x + 1)$

C. $f(x) = (2x - 3)(x - 3)$

D. $f(x) = (2x + 3)(x + 3)$

Algebra
A1:A-SSE.B.3b
Items 37 – 39

ITEM 37

Use the function to answer the question.

$f(x) = -6x^2 - 24x - 25$

Which equation could be used to determine the maximum or minimum of this function?

A. $f(x) = -6(x + 2)^2 - 1$

B. $f(x) = -6(x - 2)^2 - 49$

C. $f(x) = -6(x - 12)^2 + 119$

D. $f(x) = -6(x - 12)^2 - 169$

ITEM 38

Which of the following expressions could be used to determine the **maximum** or **minimum** value of the function $t(w)$ when $t(w)$ is defined by the expression $w^2 + 6w - 7$?

A. $(w + 7)(w - 1)$

B. $(w + 3)^2$

C. $(w + 6)^2 - 43$

D. $(w + 3)^2 - 16$

ITEM 39

Given the function $f(x) = x^2 - 6x + 5$, write an equivalent form of the function that reveals the minimum or maximum value of the function and state the minimum or maximum value.

A. $f(x) = (x - 5)(x - 1)$; the minimum value is 3.

B. $f(x) = (x - 5)(x - 1)$; the maximum value is 3.

C. $f(x) = (x - 3)^2 - 4$; the minimum value is –4.

D. $f(x) = (x - 3)^2 - 4$; the maximum value is –4.

Algebra
A1:A-APR.A.1
Items 40 – 50

ITEM 40

Which of the following expressions is equivalent to $(7q^2 – 6q – 6)(- 2q – 4)$?

A. $– 30q^2 + 12q + 24$

B. $7q^2 – 8q – 10$

C. $14q^3 – 16q^2 + 36q + 24$

D. $– 14q^3 – 16q^2 + 36q + 24$

ITEM 41

Which expression is equivalent to $(5x^7 + 7x^8) – (4x^4 – 2x^8)$?

A. $3x^8 + 7x^7$

B. $12x^8 – 2x^4$

C. $5x^8 + 5x^7 + 4x^4$

D. $9x^8 + 5x^7 – 4x^4$

ITEM 42

What is the product?

$(2x^2 – 3x)(x + 1)$

A. $2x^3 – 3x$

B. $2x^3 + 5x^2 - 3x$

C. $2x^3 – x^2 – 3x$

D. $2x^3 – 2x^2 – 3x – 3$

ITEM 43

Which of the following operations when performed on $5xy^2$ will **not** produce a polynomial?

A. Divide by 5

B. Divide by x

C. Divide by x^2

D. Divide by y^2

ITEM 44

What is the product of the following polynomials?

$(2y^2 - 3z^3)(2y^2 + 3z^3)$

A. $4y^4 - 9z^6$

B. $4y^4 - 9z^9$

C. $4y^4 - 12y^2z^3 - 9z^6$

D. $4y^4 + 12y^2z^3 - 9z^6$

ITEM 45

What is the product of the following polynomials?

$(4y-3x)(3y+5x)$

A. $7y^2+2x^2$

B. $12y^2-15x^2$

C. $12y^2-11xy-15x^2$

D. $12y^2+11xy-15x^2$

ITEM 46

Which of the following are equivalent to $x^2 - 4x + 9$? Select four answers.

A. $(x - 3)^2 - 4x$

B. $(3x^2 - 3x + 1) - (2x^2 + x - 8)$

C. $(x - 3)(x + 3) - 2x$

D. $(x - 3)^2 + 2x$

E. $(x - 5)(x + 1) + 14$

F. $(8x^2 + 2x) - (4x^2 + 6x) + (9 - 3x^2)$

_____ _____ _____ _____

ITEM 47

Consider the polynomials below.

$6x^2 - 2$ and $6x^2 + 2$

Which operation when performed on the two polynomials will **not** produce another polynomial?

A. Addition

B. Division

C. Multiplication

D. Subtraction

ITEM 48

What is the result of $(2x – 3y)(2x – 3y)$?

A. $4x^2 + 9y$

B. $4x^2 - 12xy - 9y^2$

C. $4x^2 – 12xy + 9y^2$

D. $4x^2 + 12xy + 9y^2$

ITEM 49

What is the sum of the following polynomials?

$(4x^2y - 3xy + 2y + 7) + (3xy^2 - 2y - 5)$

A. $7x^2y - 3xy - 12$

B. $4x^2y - 3xy^2 - 3xy + 4y - 2$

C. $4x^2y + 3xy^2 - 3xy - 4y - 12$

D. $4x^2y + 3xy^2 - 3xy + 2$

ITEM 50

Which of the following is equivalent to the expression $3(x – 2)(x + 1) – (2x^2 – 5)(x+ 4)$?

A. $2x^3 + 11x^2 – 8x – 26$

B. $-2x^3 – 5x^2 + 4x + 18$

C. $2x^3 + 11x^2 – 6x – 22$

D. $-2x^3 – 5x^2 + 2x + 14$

Algebra
A1:A-APR.B.3
Item 51

ITEM 51

Find **all** the zeros of the polynomial $y = x^3 - 2x^2 - 3x$.

A. -3, 1

B. -3, 0, 1

C. -1, 3

D. -1, 0, 3

Algebra
A1:A-CED.A.1
Items 52 – 57

ITEM 52

Tina puts $3,000 in a savings account. The account earns 3% interest compounded yearly.
Which equation can Tina use to find how many years, y , it will be before there is $4,000 in the account?

A. $4{,}000 = 3{,}000(y^{0.03})$

B. $4{,}000 = 3{,}000(y^{1.03})$

C. $4{,}000 = 3{,}000(0.03^{y})$

D. $4{,}000 = 3{,}000(1.03^{y})$

ITEM 53

The cost of printing business cards is $0.05 per card plus $0.001 per letter on each card. The cost for Paul to print 200 cards is $16.00. Which equation shows how to find the number of letters printed on each card (L)?

A. $L = \frac{0.05(200)}{0.001(200)}$

B. $L = \frac{0.05(16.00)}{0.001}$

C. $L = \frac{16.00 - 0.05(200)}{0.001(200)}$

D. $L = \frac{0.05(16.00) - 200}{0.001(200)}$

ITEM 54

Jamie is measuring the growth of a bean plant in her garden. On the first day, the plant is 2.5 inches tall. On the fourth day, it is 7 inches tall, and on the ninth day, it is 14.5 inches tall. What will be the height of Jamie's plant on the twenty-first day if it continues to grow at the same rate?

A. 29.5 inches

B. 31 inches

C. 32.5 inches

D. 34 inches

ITEM 55

A square with a side length of $x + 6$ has the same perimeter as an equilateral triangle with a side length of $4x$. What is the area of the square?

A. 3 units ^{2}

B. 9 units ^{2}

C. 36 units ^{2}

D. 81 units ^{2}

ITEM 56

A committee at the neighborhood recreation center is planning their annual spring social. They have a budget of $295 to plan the event. They have already spent $225 on various supplies. They still plan to purchase balloons to decorate the room at a cost of $0.65 per balloon. Which of the following inequalities represents the total number of balloons, *b*, they can purchase and not spend over their budgeted amount?

A. $225 + 0.65b >= 295$

B. $225 + 0.65b <= 295$

C. $225.65b >= 295$

D. $225.65b =< 295$

ITEM 57

Emmanuel attends West Lake Heights Science & Technology School. He would like to raise money so that he can purchase new equipment for the STEM department at his school. He decides to reach out to local businesses for their help. Two businesses decided to help.

- **Business A:** Jan's Coffee Shop is donating $300 plus $0.75 for each large coffee ordered over the next 2 weeks.
- **Business B:** Ronnie's Burger Palace is donating $150 plus $2 for every combo meal ordered over the next 2 weeks.

Part A
Create an equation to model each business' contribution to Emmanuel's fundraiser. Define your variables.

__a: the number of large coffee sold from Jan's coffee shop over the next two weeks_____

__b: the number of combo meal sold from Ronnie's Burger Palace over the next two weeks____

__f(a) = 300 + 0.75a, f(b) = 150 + 2b _____

Part B
How many items must each business sell to reach a point where their contributions will be equivalent?

____f(a) = 300 + 0.75a = f(b) = 150 + 2b_____

____150 + 0.75a = 2b_____

____If a = b, then a = b = 120_____

Algebra
A1:A-CED.A.2
Items 58 – 61

ITEM 58

Shauna is getting quotes to print t-shirts for a fundraiser for her cross-country team. Rilee's Printing quoted her a $50 setup fee and a price of $8.75 to print each shirt. Impressive Tees offered to not charge a setup fee, but charge $10.50 per shirt.

Part A

- Write an equation that can be used to calculate the total cost, c, if Shauna uses Rilee's Printing for t T-shirts.
- Write an equation that can be used to calculate the total cost, *c,* if Shauna uses Impressive Tees for t T-shirts.

____c=50+8.75t_____

____c=10.5t_____

_____

Part B
How may shirts would Shauna need to purchase for Impressive Tees to have the better price? Show your work or explain how you found your answer.

_____10.5t<50+8.75t_____

_____t<28.57 _____

Shauna need to buy no more than 28 shirts to have a better price for Impressive Tees.

ITEM 59

Teagan works for a cell phone company. The store manager is offering a bonus incentive for any employee who sells more than 50 lines in a week and makes more than $2000 in sales. Each customer has to buy an initial line for $45 and can then add additional lines for $30.

Part A
Write an inequality to model the total number of lines based on the number of initial lines, *l*, and additional lines, *a*.

____l+a>=50_____

_____

_____

Part B
Write an inequality to model the total sales based on the number of initial lines, *l*, and additional lines, a.

_____45l+30a>=2000_____

_____

_____

Part C
Last week Teagan sold 21 initial lines and 31 additional lines. Did he meet the requirement for the bonus last week? Show your work or explain how you found your answer.

_____21+31=52>50_____

_____45×21+30×31=1875_it's less than 2000._____

_____Teagan didn't meet the requirement for the bonus last week._

ITEM 60

James is placing an order for flour for his bakery. The company he purchases from charges $25 for the first bag and $5 for each additional bag for shipping costs. Each 50 lb bag of the flour he uses is $19.

Part A
Write an equation to model the total cost, *c*, of *b* bags of flour including shipping costs given he orders more than one (1) bag of flour.

__c=19b+25+5(b-1)_____

_____

_____

Part B
James only budgeted $300 for this order, what is the maximum number of bags he can order? Show your work or explain how you got your answer.

____19b+25+5(b-1)<=300_____

_____b<=11.67_____

__He can order at most 11 bags of flour. _____

ITEM 61

Trinh is starting a savings plan at the bank. The bank will automatically transfer any amount she wants from her checking account into a savings account. After the first month, the amount transferred each month will be the first month plus $25.

Part A
Write an equation to model this situation. Clearly identify the variables you are using.

___x: the amount she transferred the first month_, t: the number of months__

___y: the amount in the saving account_____

___y=x+(x+25)(t-1)_____

Part B
Trinh wants to save $1250 total after 15 months to put towards a vacation. Use the equation you wrote in Part A to determine how much money she needs to transfer the first month to achieve this goal. Show your work or explain how you found your answer.

___x+(x+25)(15-1)=1250_____

___x=60_____

_____

Algebra
A1:A-CED.A.3
Items 62 – 71

ITEM 62

Richard owns a restaurant. He needs to buy at least 300 glasses. Tall glasses cost $2.50. Short glasses cost $2.10. He can spend at most $670.

Which system of inequalities can Richard use to find the possible numbers of tall glasses, *t,* and short glasses, *s,* he can buy?

A. $t + s \geq 300$
$2.5t + 2.1s \leq 670$

B. $t + s \leq 300$
$2.5t + 2.1s \geq 670$

C. $t + s \geq 670$
$2.5t + 2.1s \leq 300$

D. $t + s \leq 670$
$2.5t + 2.1s \geq 300$

ITEM 63

Jaden invests in silver and gold. He plans to sell his gold if both of these conditions are met. Let *G* be the price per ounce of gold and *S* be the price per ounce of silver.

- G > $500
- 10S < G

Which situation meets both of Jaden's conditions for selling his gold?

A. Gold costs $600 per ounce and silver costs $75 per ounce.

B. Gold costs $400 per ounce and silver costs $35 per ounce.

C. Gold costs $600 per ounce and silver costs $55 per ounce.

D. Gold costs $400 per ounce and silver costs $65 per ounce.

ITEM 64

A city law states that the area, *x* , of a new building on a lot must be less than $\frac{3}{5}$ of the total area, *y* , of the lot on which it is built. Which inequality shows this relationship?

A. $x < \frac{3}{5}y$

B. $y < \frac{3}{5}x$

C. $x > \frac{3}{5}y$

D. $y > \frac{3}{5}x$

ITEM 65

Ms. Jensen is selling tickets for the prom. The budget was $5000. Tickets cost $45 for an individual and $70 for a couple buying 2 tickets. There are only 150 tickets available. Which system of inequalities represents this situation if x is the number of individual tickets and y is the number of couple tickets?

A. $x + 2y \geq 150$
$45x + 70y \geq 5000$

B. $x + 2y \leq 150$
$45x + 70y \geq 5000$

C. $x + y \leq 150$
$45x + 70y \geq 5000$

D. $x + 2y \geq 150$
$115(x + y) \geq 5000$

ITEM 66

Barry and Karley went to the concession stand before a movie to get drinks and popcorn for their group of friends. Barry bought two drinks and one popcorn for $8.75. Karley bought three drinks and three popcorns for $18.75. Which system of equations can be used to determine the price of a drink and the price of a popcorn?

A. $2d + 2p = 8.75$
$3d + p = 18.75$

B. $d + p = 8.75$
$3d + 3p = 18.75$

C. $2d + p = 8.75$
$3d + 3p = 18.75$

D. $2d + 2p = 18.75$
$3d + 3p = 18.75$

ITEM 67

Marcos is a real estate agent selling condominiums in a new building. There are one-bedroom and two-bedroom condominiums available. The one-bedroom condominiums sell for $150,000. The two bedroom condominiums sell for $210,000. Marcos has a quarterly goal to sell at least 25 condominiums and have sales total at least $4,500,000. Last quarter he sold 16 one-bedroom condominiums and 10 two-bedroom condominium. Which of the following statements is true?

A. He met both requirements.

B. He met neither of the requirements.

C. He only met the requirement for the sales total.

D. He only met the requirements for the number of condominiums sold.

ITEM 68

Elisabeth is comparing prices for a large pizza at Momma Mia's and Roman's pizzerias. Momma Mia's charges $9.50 for a large cheese pizza and each additional topping is $0.95. Roman's charges $8.95 for a large cheese pizza and each additional topping is $1.10. Neither pizzeria allow you to pay for partial toppings. Which of the following statements is true?

A. Roman's pizzas are always most expensive.

B. Momma Mia's pizzas are always most expensive.

C. There is a number of toppings where a pizza from each pizzeria will cost the same.

D. There is not a number of toppings for which the pizza from each pizzeria will cost the same.

ITEM 69

Laisha is responsible for bringing the desserts to a friend's birthday party. She is buying a cake for $25.00 and also cupcakes for $1.25 each. If she has budgeted $60 total, what is the maximum number of cupcakes she can buy?

A. 68 cupcakes

B. 48 cupcakes

C. 28 cupcakes

D. 20 cupcakes

ITEM 70

Gianina is participating in a walk for charity. Two friends pledged $100 each if she completed the walk. Eight other friends pledged $2.50 per mile for every mile she walked. She can walk as far as she wants during the fundraiser.

If her goal is $500, which inequality should she use to calculate the minimum number of miles she should walk?

A. $8x + 100 \geq 500$

B. $20x + 200 \geq 500$

C. $10.5x \geq 500$

D. $8x \geq 200$

ITEM 71

Adrian is having a book sale to raise money for the math department to purchase new calculators. He sold used books and received $2119. Young adult books cost $4 and adult books cost $7. The system of equations below models this situation, where *x* represents the number of young adult books sold and *y* represents the number of adult books sold.

$$\begin{aligned} x + y &= 376 \\ 4x + 7y &= 2119 \end{aligned}$$

Choose the appropriate meaning for the solution (171, 205)

A. 171 young adult books were sold and 205 adult books were sold.

B. $171 was the total sales from young adult books and $205 was the total from adult books.

C. 171 young adult books were sold for $205.

D. 171 adult books were sold and 205 young adult books were sold.

Algebra
A1:A-CED.A.4
Items 72 – 82

ITEM 72

Bayou Town's Firefighter Troy is trying to determine how much water pressure a hose can discharge in hundreds of gallons per minute, *Q,* in the following formula. The formula is used to calculate how much pressure is lost as the water passes through a fire hose of length *L* in hundreds of feet. This loss in pressure is referred to as friction loss, *F.* Each fire hose has a constant, *C*, called a friction loss coefficient that is dependent upon the hose diameter.

$F = CQ^2L$

Firefighter Troy wants to solve this formula for *Q* in order to determine the flow rate of the fire hose in hundreds of gallons per minute. Which of the following is the equation that Troy will use?

A. $\frac{F}{CL} = Q$

B. $\sqrt{\frac{F}{CL}} = Q$

C. $\frac{\sqrt{F}}{CL} = Q$

D. $\sqrt{FLC} = Q$

ITEM 73

What is the formula for the radius of a cone?

A. $r = \sqrt{\frac{3V}{\pi h}}$

B. $r = \frac{\sqrt{3V}}{\pi h}$

C. $r = \sqrt{\frac{V}{3\pi h}}$

D. $r = \pm \sqrt{\frac{3V}{\pi h}}$

ITEM 74

The formula for finding the perimeter, P, of a rectangle with length *l* and width *w* is $P = 2l + 2w$. Which formula shows how the length of a rectangle can be determined from the perimeter and the width?

A. $l = \frac{P-2}{2w}$

B. $l = \frac{P}{2} + w$

C. $l = \frac{P-2w}{2}$

D. $l = \frac{P}{2} - 2w$

ITEM 75

The circumference of a circle with radius *r* is given by $C = 2\pi r$

Which of the following is the result of solving the following equation for *r* in terms of *C*?

A. $r = 2\pi C$

B. $r = \frac{C}{2}$

C. $r = \frac{C}{2\pi}$

D. $r = C - 2\pi$

ITEM 76

In the equation $F = \frac{9}{5}C + 32$, *F* denotes a temperature in degrees Fahrenheit and *C* is the same temperature measured in degrees Celsius.

Which of the following is the result of solving the equation $F = \frac{9}{5}C + 32$ for *C* in terms of *F*?

A. $C = \frac{5}{9}F - \frac{32}{9}$

B. $C = 5F - 32$

C. $C = \frac{5}{9}F - \frac{160}{9}$

D. $C = \frac{1}{9}F - \frac{160}{9}$

ITEM 77

Solve the formula $F = ma$ for m.

A. $m = Fa$

B. $m = F/a$

C. $a = Fm$

D. $a = F/m$

ITEM 78

Solve the formula $T = 0.7(220 - a)$ for a.

A. $a = 220 - T/0.7$

B. $a = T/0.7 - 220$

C. $a = 0.7T - 220$

D. $a = (220 + T)/0.7$

ITEM 79

Solve the formula $k = \frac{1}{2}mv^2$ for m.

A. $m = \frac{k}{2v^2}$

B. $m = \frac{2k}{\sqrt{v}}$

C. $m = \frac{2\sqrt{k}}{v}$

D. $m = \frac{2k}{v^2}$

ITEM 80

Solve the formula $H = \frac{K-E}{t}$ for K.

A. $K = H + \frac{E}{T}$

B. $K = \frac{H+E}{T}$

C. $K = TH + E$

D. $K = T(H + E)$

ITEM 81

Solve for *h* in this formula.

$S = 2\pi rh + \pi r^2$

A. $h = S - \pi r^2 - 2\pi r$

B. $h = S - r^2 - 2r$

C. $h = \frac{S - \pi r^2}{2\pi r}$

D. $h = \frac{S - r^2}{2r}$

ITEM 82

Rewrite the formula $V = \frac{1}{3}\pi r^2 h$ in terms of r.

A. $r = \sqrt{\frac{V}{3\pi h}}$

B. $r = \sqrt{\frac{3V}{\pi h}}$

C. $r = 3\sqrt{\frac{V}{\pi h}}$

D. $r = \frac{1}{3}\sqrt{\frac{V}{\pi h}}$

Algebra
A1:A-REI.A.1
Items 83 – 87

ITEM 83

Use the steps in the table to answer the question.

Initial Equation	$3(x + 2)^2 + 6x - x = 25x + 7x$
Step 1	$3(x + 2)^2 + 5x = 32x$
Step 2	$3(x + 2)^2 = 27x$
Step 3	$(x + 2)^2 = 9x$
Step 4	$x^2 + 4x + 4 = 9x$
Step 5	$x^2 - 5x + 4 = 0$

The table shows the first 5 steps used to solve an equation.

Which statement is an **incorrect** explanation of one step in the process?

A. From step 4, apply the subtraction property of equality to x^2+4x+4 and 9x to get $x^2-5x+4=0$.

B. From step 3, apply the distributive property to $(x+2)^2$ to get in x^2 +4x+4 in step 4.

C. From step 2, apply the distributive property to 3 $(x+2)^2$ and 27x to get $(x+2)^2$ =9x in step 3.

D. From step 1, apply the subtraction property of equality to 5x and 32x to get 3 $(x+2)^2$ =27x in step 2.

ITEM 84

Ben solved an equation as shown below.

Equation: $2(-3x + 1) = 9x - 8$
Step 1: $-6x + 2 = 9x - 8$
Step 2: $-6x + 9x = -8 + 2$
Step 3: $3x = -6$
Step 4: $x = -2$

What mistake did Ben make in solving the equation?

A. In Step 1, Ben did not distribute the two correctly.

B. In Step 2, Ben did not maintain the equality of the equation.

C. In Step 3, Ben made an error adding positive and negative numbers.

D. In Step 4, Ben did not divide correctly.

ITEM 85

Marty solved the equation using the steps shown below.

1	4(2x - 7) = 12
2	8x - 28 = 12
3	8x = 40
4	x = 5

What is the reason for changing the equation from Step 2 to Step 3?

A. Addition Property of Equality

B. Distributive Property

C. Division Property of Equality

D. Subtraction Property of Equality

ITEM 86

Elaine began to solve the equation below.

$3(x - 6) + 2 = 8$

What steps might she use to solve the equation? Write **all** that apply.

A. Addition Property of Equality

B. Combine Like Terms

C. Distributive Property

D. Division Property of Equality

E. Transitive Property of Equality

_____ _____ _____ _____

ITEM 87

Jayla solved the equation as shown below.

$$2(x + 5) - 4 = 5(x - 3)$$
$$2x + 10 - 4 = 5x - 15$$
$$2x + 6 = 5x - 15$$
$$6 = 3x - 15$$
$$21 = 3x$$
$$7 = x$$

What properties did she use to solve the equation? Select **all** that apply.

A. Addition Property of Equality

B. Combine Like Terms

C. Distributive Property

D. Division Property of Equality

E. Subtraction Property of Equality

F. Substitution Property of Equality

G. Transitive Property of Equality

_____ _____ _____ _____

Algebra
A1:A-REI.B.3
Items 88 – 96

ITEM 88

Use the inequality below to answer this question.

$320 + 12(h - 40) \geq 440$

What values of h make this inequality true?

A. $h \leq 30$

B. $h \geq 30$

C. $h \leq 50$

D. $h \geq 50$

ITEM 89

Which of the following expression represents the solution to the equation p(m + qx) = rx + n when solved for x?

A. $\frac{n-m}{q-r}$

B. $\frac{rx+n-m}{pq}$

C. $\frac{n-pm}{pq-r}$

D. $\frac{n-pm}{q-r}$

ITEM 90

What is the solution to the inequality shown below?
$7 - 3x > -x + 5$

A. $x < 1$

B. $x > 1$

C. $x < -1$

D. $x > -1$

ITEM 91

What is the solution to this inequality?

$-26 < 4x - 2 < 10$

A. $-6 < x < 3$

B. $-6 > x > 3$

C. $-7 < x < 2$

D. $7 > x > 2$

ITEM 92

What is the solution to $3x - 6 > 5x + 10$?

A. $x < -8$

B. $x > -8$

C. $x < 2$

D. $x > 2$

ITEM 93

What value of *a* will make the solution to the following equation be $x = 6$?

$$ax + 5 = 35$$

A. 5

B. 7

C. 24

D. 30

ITEM 94

Which of the following values are possible solutions for the inequality: $-3(g+4) > -15$? Select **three** solutions.

A. 15

B. 11

C. 9

D. 0

E. -3

F. -7

_____ _____ _____

ITEM 95

Which of the following inequalities has the solution set $t \geq 15$? Select **two** inequalities.

A. $-3t + 5 \leq -40$

B. $-2(t + 3) \geq -9$

C. $2(t - 2) \geq 28$

D. $4t - 3 \leq -3$

E. $6t - 10 \geq 80$

_____ _____

ITEM 96

Find the solution for the equation $\frac{1}{2}x - \frac{3}{5} = \frac{3}{5}x - 5$.

__44__

Algebra
A1:A-REI.B.4a
Items 97 – 108

ITEM 97

Keisha is trying to use the method of completing the square to solve the quadratic equation $x^2 + 4x = 1$. Which of the following equations represents a step in transforming Keisha's equation using the method of completing the square?

A. $x(x + 4) = 1$

B. $x^2 + 4x + 16 = 1 + 16$

C. $x^2 + 4x + 4 = 1 + 4$

D. $x^2 + 4x + 2 = 1 + 2$

ITEM 98

Find the equation that is equivalent to the quadratic equation shown.

$x^2 - 8x - 8 = 0$

A. $x(x - 4) = 32$

B. $(x - 8)^2 = 64$

C. $(x - 4)^2 = 24$

D. $(x - 2)^2 = 8$

ITEM 99

Josh is solving a quadratic equation by completing the square. The first few steps of his work are shown below.

Equation: $x^2 + 8x - 3 = 0$
Step 1: $x^2 + 8x = 3$
Step 2: $x^2 + 8x + a = b$

To finish completing the square correctly, what number should go in place of the b in Step 2?

A. 16

B. 19

C. 64

D. 67

ITEM 100

Isabella is using the process of completing the square to solve the equation $-26 = 2x^2 - 12x$. Her first steps are shown below:

$-26 = 2x^2 - 12x$
$-26 = 2(x^2 - 6x)$
$-13 = x^2 - 6x$
$-13 +$ _____ $= x^2 - 6x +$ _____

What number will Isabella put in both blanks as she continues the process of completing the square?

A. 7

B. 9

C. 13

D. 36

ITEM 101

What will the values of p and q be when the equation $(x+6)(x+4)=48$ is transformed into a perfect square equation in the form of $(x+p)^2 = q$?

A. p = 5, q = 1

B. p = 5, q = 49

C. p = 10, q = 76

D. p = 10, q = 124

ITEM 102

What is the resulting equation when $(x-6)(x+2)=9$ is transformed by completing the square?

A. $(x-2)^2 = 25$

B. $(x-2)^2 = 9$

C. $(x-2)^2 = 3$

D. $(x-2)^2 = 1$

ITEM 103

What value needs to be added to both sides of the equation $x^2 - 16x + 3 = 12$ to create and equation in the form $(x - p)^2 = q$?

A. 5

B. 61

C. 64

D. 256

ITEM 104

Which two of the following equation are equivalent to $x^2 - 6x = -5$?

A. $(x - 3)^2 = 25$

B. $(x - 3)^2 = 4$

C. $(x - 5)(x - 1) = 0$

D. $(x - 6)(x + 1) = 0$

E. $x^2 = 13$

F. $x^2 = 25$

_____ _____

ITEM 105

Mariah completed the square to solve the equation $b^2 - 12b + 20 = 0$ and rewrote it as $(b - 6)^2 = p$. What is the correct value of *p*?

A. 4

B. 6

C. 16

D. 36

ITEM 106

What is the correct equation for $x^2 + 10x = -9$ after completing the square?

A. $(x + 5)^2 = -9$

B. $(x + 10)^2 = -9$

C. $(x + 5)^2 = 16$

D. $(x + 10)^2 = 91$

ITEM 107

What is the correct equation for $x^2 - 14x = 15$ after completing the square?

A. $(x - 7)^2 = 15$

B. $(x - 7)^2 = 64$

C. $(x - 14)^2 = 15$

D. $(x - 14)^2 = 211$

ITEM 108

Rachel and Tomas are solving the equation below.

$x^2 + 16x = -48$

Part A

Rachel decides to use completing the square to solve the equation and starts using the following equivalent equation.

$x^2 + 16x + k = -48 + k$

What number should she replace k with to create a perfect square trinomial?

__64___

Part B

Thomas says that there are no real solutions because of the – 48 in the equation and that $\sqrt{-48}$ is a complex number. Is he correct? Explain your answer.

No._____

_____

Part C

How many real solutions does the equation have?

__2___

Algebra
A1:A-REI.B.4b
Items 109 – 119

ITEM 109

Solve for h : $0 = 2(h - 7)(2h + 3)$

A. $h = -14$ or $h = 12$

B. $h = -7$ or $h = 3$

C. $h = 7$ or $h = -\frac{3}{2}$

D. $h = -14$ or $h = \frac{3}{2}$

ITEM 110

Find all values of x that make the following equation true:

$3x^2 - 12x = 0$

A. $x = 4$

B. $x = 0$

C. $x = 0, 4$

D. $x = 0, \frac{1}{3}$

ITEM 111

Determine which of the following equations has two unique, real solutions. Select all that apply.

I. $x^2 = -9$
II. $x^2 = -7$
III. $x^2 = 0$
IV. $x^2 = 13$
V. $x^2 = 16$

A. V only

B. IV and V only

C. III, IV, and V only

D. I, III, and V only

ITEM 112

Keevan is solving the following equation by factoring. Which two equations will he end up solving to get the solutions?

$20 = 6x^2 - 7x$

A. $20 = 6x^2$ and $20 = -7x$

B. $20 = x$ and $20 = 6x - 7$

C. $0 = x$ and $0 = 6x - 7$

D. $0 = 3x + 4$ and $0 = 2x - 5$

ITEM 113

Which of the following is the solution to the equation $4 + 10x = 6x^2 + 2x$?

A. $x = \frac{2 \pm \sqrt{10}}{3}$

B. $x = \frac{-2 \pm \sqrt{10}}{3}$

C. $x = \frac{-3 \pm \sqrt{15}}{3}$

D. No real solutions

ITEM 114

Given the quadratic equation $5 = 2x^2 + 3x - 1$, which of the following expressions is equivalent to the value of x?

A. $\frac{-3 \pm \sqrt{9+8}}{4}$

B. $\frac{-3 \pm \sqrt{6+8}}{2}$

C. $\frac{-3 \pm \sqrt{9+48}}{4}$

D. $\frac{-3 \pm \sqrt{6+48}}{2}$

ITEM 115

If c_1 and c_2 are roots of $c^2 - 5c - 14 = 0$, find $|c_1 - c_2|$.

A. -5

B. -9

C. 5

D. 9

ITEM 116

Part A

Show your steps to solve the following equation using the quadratic formula.

$-3x^2 = -12x + 9$

__a=3, b=-12, c=9_____

_ $x = \frac{12 \pm \sqrt{(-12)^2 - 4 \times 3 \times 9}}{2 \times 3}$ _____

_x_1=3, x_2=1_____

Part B

Explain in words how you know if a solution to a quadratic equation is complex. Determine a value or values for c that would make the solution(s) to this quadratic equation complex.

$-3x^2 = -12x - c$

__$\sqrt{(-12)^2 + 4 \times 3 \times c}$_is complex. For example, c=-8_____

ITEM 117

Find the solution(s), if any, for the equation, $y = 2x^2 - 6x + 4$.

A. $x = 2, x = 1$

B. No real solutions

C. $x = 4$

D. $x = -1, x = -2$

ITEM 118

At which points does the graph of $y = x^2 + x - 6$ intersect the *x*-axis?

A. (-3, 0) and (2, 0)

B. (-2, 0) and (2, 0)

C. (-3, 0) and (3, 0)

D. (0, -6) and (0, 6)

ITEM 119

Which **three** statements are true about the equation $(x + 2)^2 = 4$?

A. A solution to the equation is $x = 0$.

B. A solution to the equation is $x = 4$.

C. This equation can be solved by solving the equivalent equation $x + 2 = 2$.

D. A solution to the equation is $x = -4$.

E. The equation can be solved by solving the equivalent set of equations $x + 2 = 2$ and $x + 2 = -2$.

F. The equation can be solved by solving the equivalent set of equations $x - 2 = 2$ and $x + 2 = -2$.

Algebra
A1:A-REI.C.6
Items 120 – 123

ITEM 120

Solve the following system of equations:

$3x + y = 7$
$-x + 2y = -14$

What is the *x*-value of the solution to this system of equations?

A. (12, –1)

B. (–1, 10)

C. (4, –5)

D. (5, –8)

ITEM 121

Solve the following system of equations:

$6x + 2y = 18$
$-3x + 2y = 9$

A. (–1, 3)

B. (1, 6)

C. (3, 0)

D. (9, –18)

ITEM 122

Use this system of equations to answer the question.

$2x - 3y = 7$
$-4x + y = -5$

What is the x-value of the solution to this system of equations?

A. $-\frac{9}{5}$

B. $-\frac{6}{5}$

C. $-\frac{4}{7}$

D. $\frac{4}{5}$

ITEM 123

Use the system of equations to answer the question.

$$2x + 3y = -4$$
$$-x + 2y = 3$$

What is the solution to this system of equations?

A. $\left(-\frac{23}{7}, -\frac{1}{7}\right)$

B. $\left(-\frac{17}{7}, \frac{2}{7}\right)$

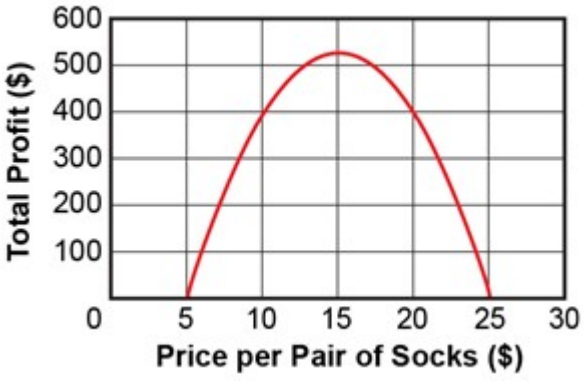
C. $\left(-\frac{17}{7}, \frac{19}{7}\right)$

D. $\left(\frac{1}{7}, \frac{2}{7}\right)$

Algebra
A1:A-REI.D.10
Items 124 – 132

ITEM 124

Tara has designed sports socks. She is trying to decide what price she should charge for the socks to optimize her profit. If the price is set too low she will not be able to cover her costs to make the socks. If the price is too high nobody will purchase her socks. The graph shown below indicates what profit she can expect per week for different possible sock prices.



Based on the data shown, which of the following would **not** be true?

A. The sets of ordered pairs on the equation graphed above that would approximately represent optimized profit would be (5, 25) and (25, 25).

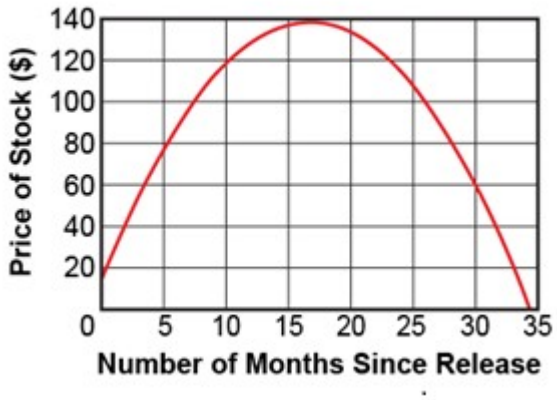
B. The set of ordered pairs on the equation graphed above that would approximately represent the price to charge for a pair of socks to optimize weekly profits would be (15, 520).

C. The ordered pairs (7, 200) and (23, 200) on the equation graphed above represent approximately the same weekly profit for two different potential prices of a pair of socks.

D. The point (10, 400) is a solution for the equation shown graphed above.

ITEM 125

Stock for a new company is released for sale on the stock market. The price of this stock over time is shown in the graph below.



Which of the following would **not** be true for the stock described above?

A. The stock reached its highest price of $139 about 17 months after release.

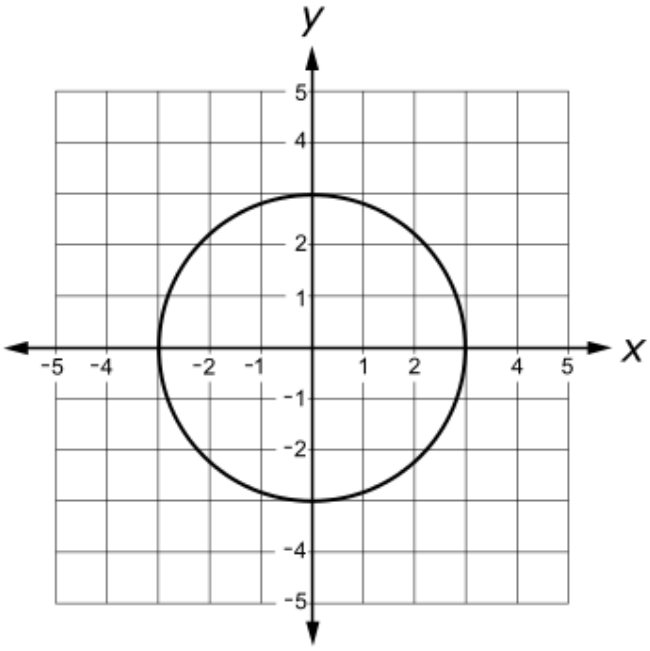
B. The price of the stock when it was first released was about $19.

C. The ordered pairs (7.5, 100) and (26, 100) on the equation graphed above indicate that the cost of the stock was the same at 7.5 and 26 months.

D. 0 and 34.2 would both be approximate solutions to the equation graphed above.

ITEM 126

Use the graph to answer the question.



The graph shows the set of all the solutions to the equation $x^2 + y^2 = 9$.

Which statement is **true** about the solutions to the equation?

A. The points (0, 3) and (0, 0) are both solutions.

B. The points (2, 2) and (1, 1) are both solutions.

C. The point (1, 1) is a solution and the point (3, 3) is not a solution.

D. The point (3, 0) is a solution and the point (1, 2) is not a solution.

ITEM 127

Consider the equation: $y = 2x^2 - 3x + 4,$.

Part A
Identify two coordinates that would be on the graph of the equation. Explain why your answers are correct.

_____(0, 4)_____

_____(1, 3)_____

_____

Part B
Conner stated that the coordinate (2, 14) will be on the graph of the equation. Explain whether or not he is correct.

__2×2×2-3×2+4=6_not 14_____

__Conner is wrong._____

_____

Part C
Stella graphed $y = 4x - 1$ and stated that the solution to $2x^2 - 3x + 4 = 4x - 1$ is $\{1,3\}$. Explain why she is correct.

__4×1-1=3_____

__2×1×1-3×1+4=3_____

_____

ITEM 128

Which points are solutions of $y = |x - 2| + 3$?

A. (-4, 3)

B. (-2, 7)

C. (-1, 0)

D. (0, 1)

E. (1, 4)

F. (3, 4)

G. (6, -1)

_____ _____ _____

ITEM 129

Which points are solutions of $y = 4x + 3$?

Select the **three** correct answers.

A. $(-3, -9)$

B. $(-1, 6)$

C. $(0, 7)$

D. $(0.5, 5)$

E. $(1, 7)$

F. $(2.5, 22)$

_____ _____ _____

ITEM 130

Which points are solutions of $y = -2x^2 + 3x$? Select the **three** correct answers.

A. $(4, 4)$

B. $(3, -27)$

C. (1, 1)

D. (0, 0)

E. (- 1, -1)

F. $(-2, -14)$

_____ _____ _____

ITEM 131

Which point is **not** a solution of $y = 3x^2 + x - 8$?

A. (-2, -20)

B. (-1, -6)

C. (1, -4)

D. (4, 44)

ITEM 132

Which three points are on the graph of $y = -x^2 - 6x + 9$?

A. (2, -1)

B. (1, 2)

C. (-2, 17)

D. (0, -9)

E. (-1, 14)

F. (-1, 16)

G. (1, 4)

_____ _____ _____

Algebra
A1:A-REI.D.11
Items 133 – 138

ITEM 133

$y = x^2 - 4x - 3$
$y = x^3 - 4x^2 - 6x - 7$

When the two equations shown are graphed in the coordinate plane, what is the approximate value of the *x*-coordinate of the point of the intersection?

Enter your answer below.

_5.5____

ITEM 134

Which of the following identifies the number of solutions to the system of equations below?

$$y = 2x + 6$$
$$y = 2^x$$

A. No solutions

B. One solution

C. Two solutions

D. Infinitely many solutions

ITEM 135

What is a reasonable estimate for the *x*-value of the point of intersection for the functions in the table below?

x	*f(x)*	*g(x)*
0	-4	5
5	-3	2.5
10	-2	0
15	-1	-2.5
20	0	-5
25	1	-7.5

A. 3

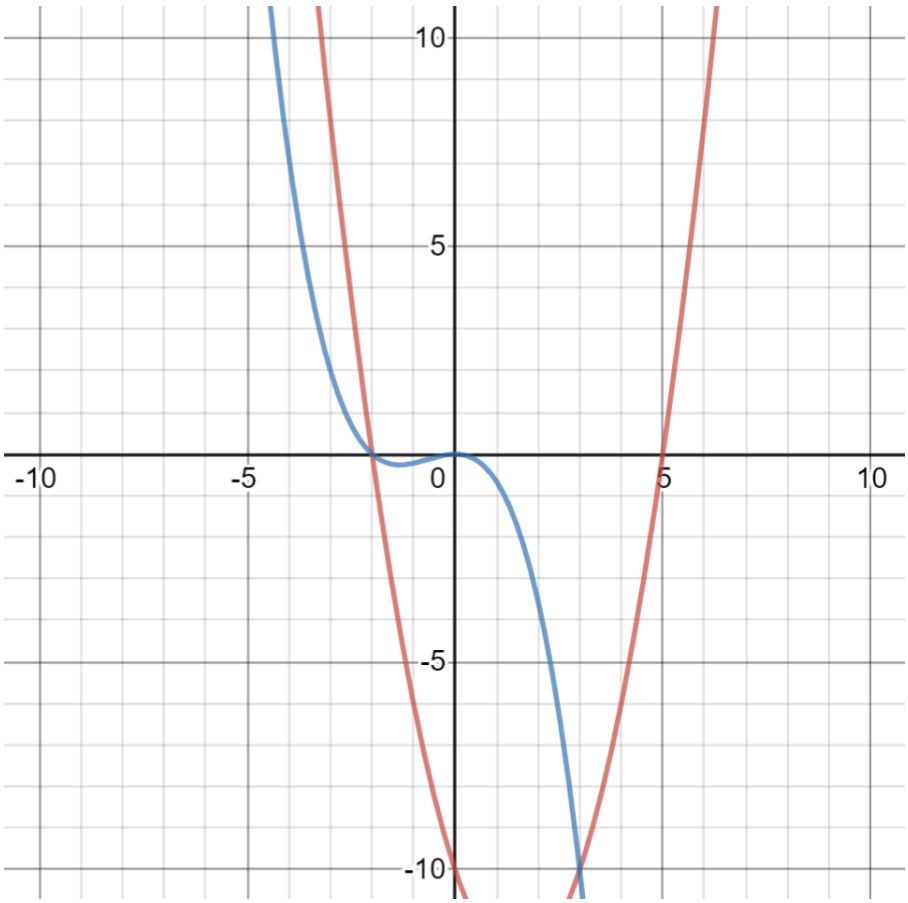
B. 10

C. 13

D. 15

ITEM 136

Consider the graph below. It shows $f(x) = -\frac{2}{9}x^3 - \frac{4}{9}x^2$ and $g(x) = x^2 - 3x - 10$.



Which of the following is a solution to the equation $-\frac{2}{9}x^3 - \frac{4}{9}x^2 = x^2 - 3x - 10$?

A. -2

B. 0

C. 5

D. - 10

ITEM 137

Which **two** of the following are solutions to the system of equations below?

$y = x^2 - 2x - 3$
$y = x + 1$

A. $(0, -3)$

B. $(0, 1)$

C. (- 1, 0)

D. $(3, 0)$

E. (4, 5)

F. $(1, -4)$

_____ _____

ITEM 138

Mrs. Riley wrote the equation $y = 4x - 5$ on the board and challenged students to write a second equation that would form a system with no solution.

Part A

Miguel wrote the equation $3y = 12x - 15$. Will this equation form a system with the original equation that has no solution? Explain your reasoning.

_No._____

_Miguel's equation is identical to the original equation, which can be written as y = 4x - 5.

_____

Part B

Jaliyah wrote the equation $4x - y = 1$. Will this equation form a system with the original equation that has no solution? Explain your reasoning.

_Yes._____

_Jaliyah's equation can be written as y = 4x -1.____

_When combined with the original equation "y = 4x - 5", there is no solution._____

Part C

Carlie wrote the equation $y = 2x - 5$. Will this equation form a system with the original equation that has no solution? Explain your reasoning.

_No._____

_When combined Carlie's equation with the original, there is one unique solution: _____

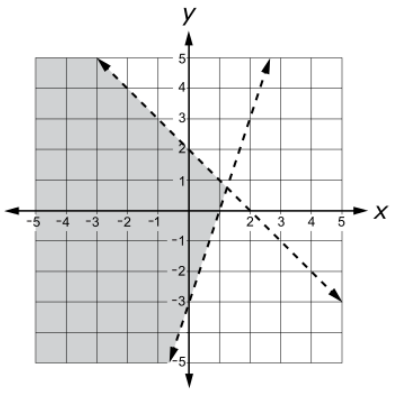
_x=0, y=-5._____

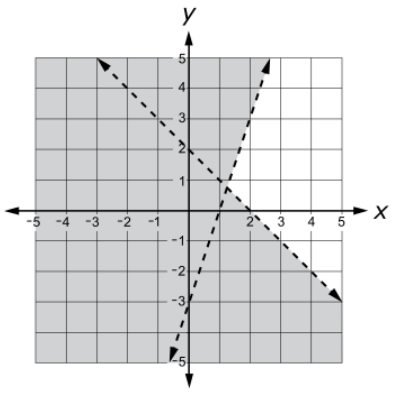
Algebra
A1:A-REI.D.12
Items 139 – 148

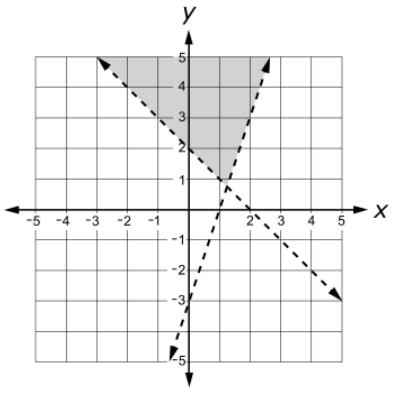
ITEM 139

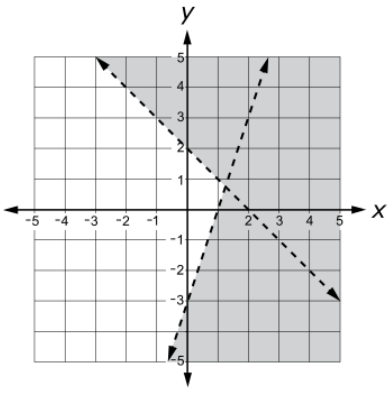
Which graph shows the solution to this system of inequalities?

$y > 3x - 3$
$y < -x + 2$

A. 

C. 

B. 

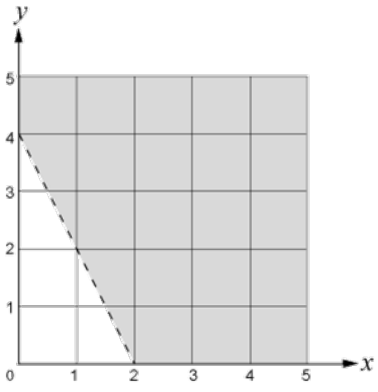
D. 

ITEM 140

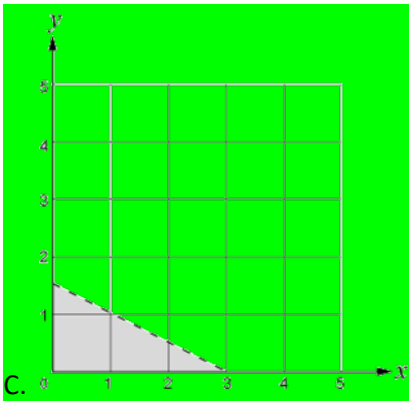
Which graph models the inequality below?

$2x + 4y < 6$

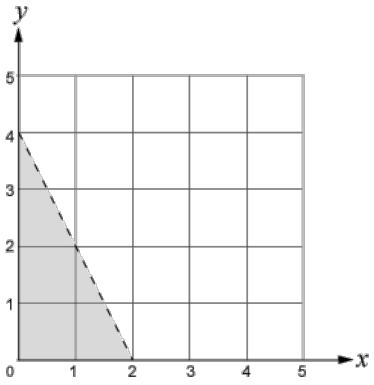
A.



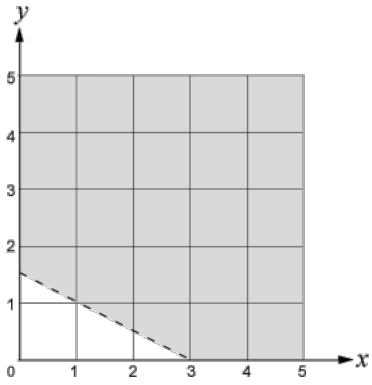
C.



B.



D.

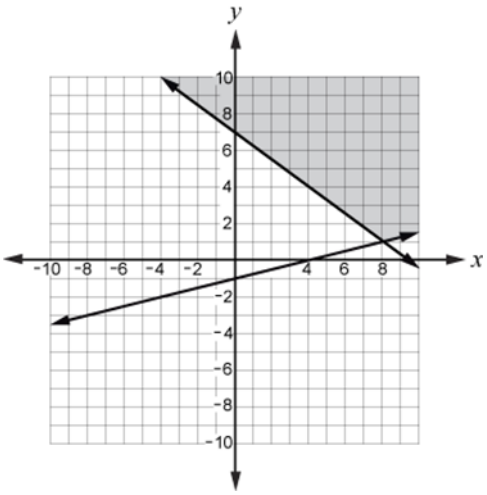


ITEM 141

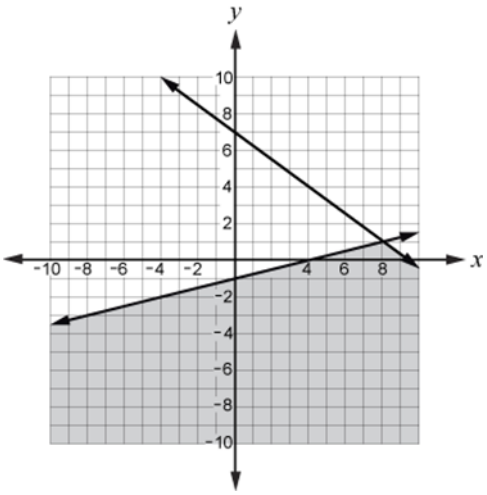
Which graph shows the solution to this system of inequalities?

$$\begin{cases} y < -0.75x + 7 \\ y < 0.25x - 1 \end{cases}$$

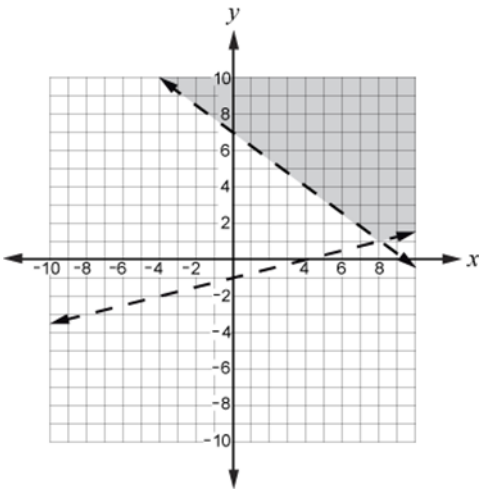
A.



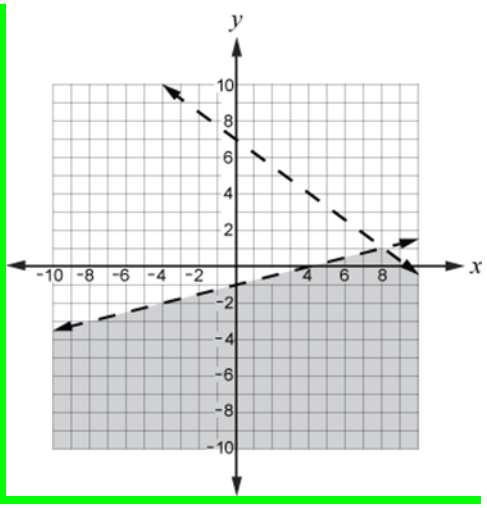
C.



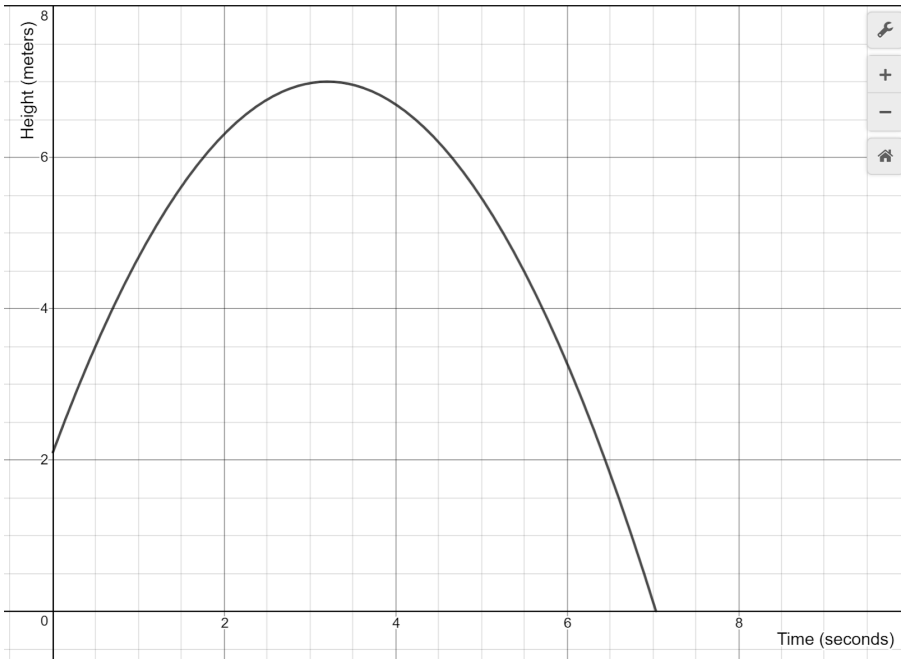
B.



D.



ITEM 142



Select the **three** statements below that are true based on the graph above.

A. The initial height of the rock was approximately 2 meters.

B. The maximum height of the rock was 3 meters.

C. The rock landed 7 meters from the original position.

D. The rock took approximately 7 seconds to hit the ground.

E. The greatest height of the rock was 7 meters.

F. The total length of the path of the rock is 12 meters.

_____ _____ _____

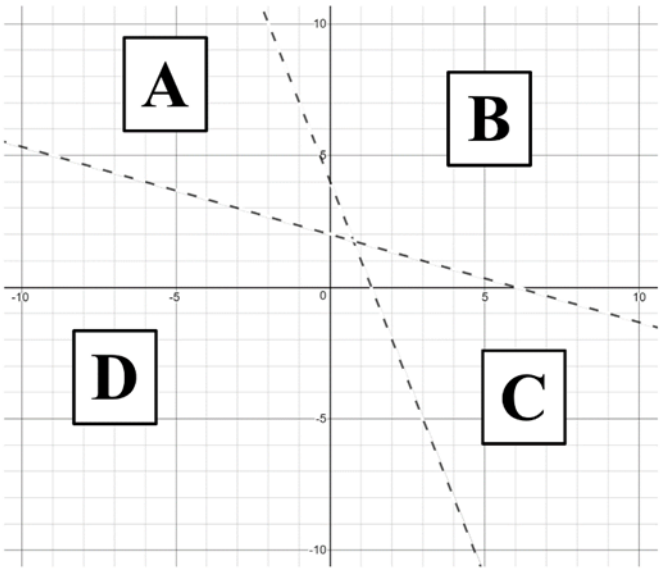
ITEM 143

Consider the system on inequalities below.

$y > -3x + 4$

$x + 3y < 6$

The coordinate plane below shows the boundary lines for the system.



Which region of the graph should be shaded to show the solution to the system?

A. Region A

B. Region B

C. Region C

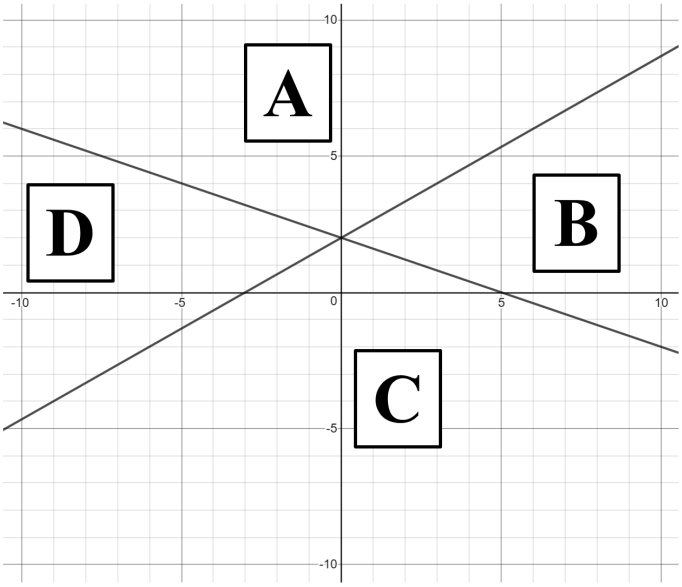
D. Region D

ITEM 144

Consider the system of inequalities below.

$$2x + 5y \geq 10$$
$$-2x + 3y \leq 6$$

The graph below shows the boundary lines for the system.



Which region of the graph should be shaded to show the solution to the system?

A. Region A

B. Region B

C. Region C

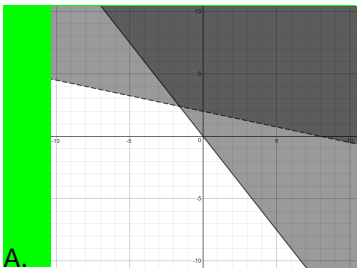
D. Region D

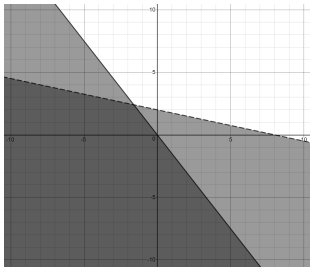
ITEM 145

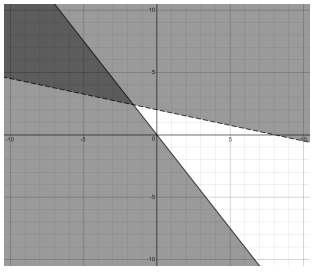
Consider the system on inequalities below.

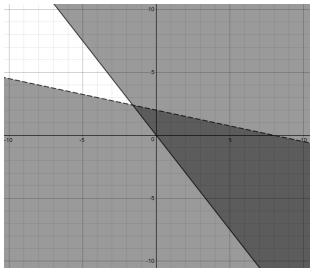
$3x + 2y \geq 0$
$x + 4y > 8$

Which of the graphs below represents the solution to the system?

A. 

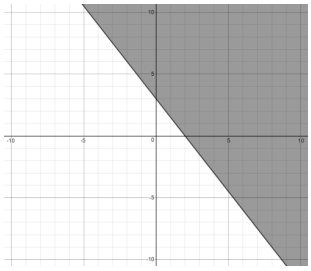
B. 

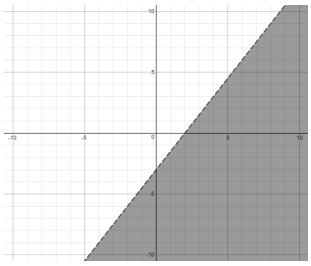
C. 

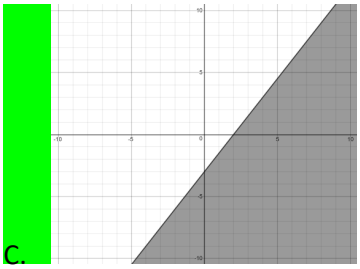
D. 

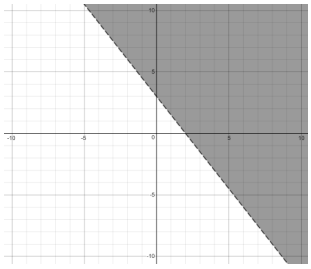
ITEM 146

Which of the graphs below is the graph of $3x - 2y \geq 6$?

A. 

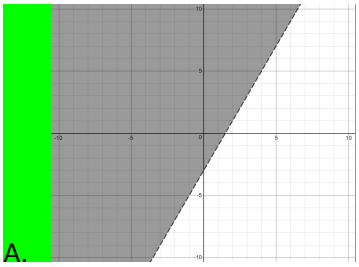
B. 

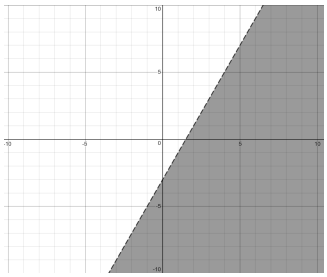
C. 

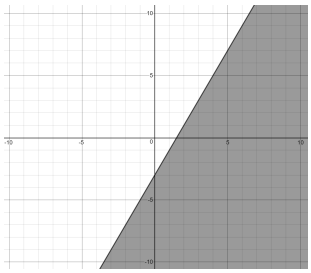
D. 

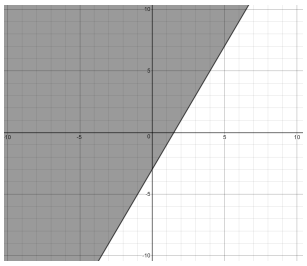
ITEM 147

Which of the graphs below is the graph of $y > 2x - 3$?

A. 

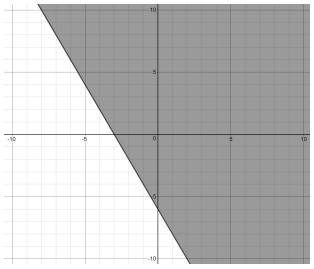
B. 

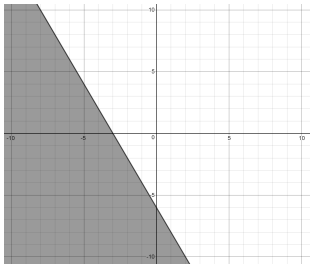
C. 

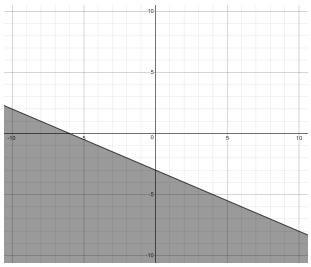
D. 

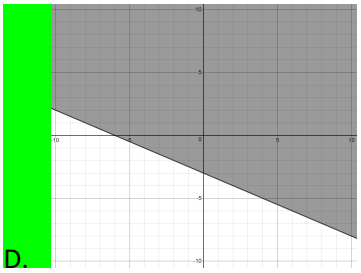
ITEM 148

Which of the graphs below is the graph of $2x + 4y \geq -12$

A. 

B. 

C. 

D. 

Functions
A1:F-IF.A.1
Items 149 – 154

ITEM 149

The cost to manufacture *x* tires can be represented by a function, C(x). If it costs $502 to manufacture 2 tires, which of the following is true? Select the correct equation.

A. $C(2) = 251$

B. $C(251) = 2$

C. $C(502) = 2$

D. $C(2) = 502$

ITEM 150

The range of which function is all real numbers?

A. $y = x^2$

B. $y = -x^2$

C. $y = |x|$

D. $y = x^3$

ITEM 151

What is the range of the function shown below?

$$f(x) = -2x^2$$

A. all real numbers

B. all real numbers less than or equal to 0

C. all real number less than or equal to -2

D. all real numbers greater than or equal to 0

ITEM 152

Which of the following coordinates is a point on the graph $g(x)$, if $12 = g(-3)$?

A. (12, -3)

B. (-3, 12)

C. (3, -12)

D. (-12, -3)

ITEM 153

Teasha recorded the total number of T-shirts sold after she printed a new slogan shirt for her store. The data for the number of T-shirts, t, sold each day, d is shown below.

d	5	6	7	8	9	10	11
t	34	45	57	88	104	128	165

What was the first day when was *t(d)* greater than 100?

__9___

ITEM 154

Laniecia is working a part time job after school. The table models the amount of Laniecia's paycheck, p, after the number of hours, h, worked. If p is a function of h, what is the value of h(3)?

h	1	2	3	4
p	9	18	27	36

__27___

Functions
A1:F-IF.A.2
Items 155 – 166

ITEM 155

Kyle is filling his 17-inch tall fish tank with water. He decides to record the height of the water in the tank at various times while the tank is filling. Let $f(t)$ represent the height of the water in the tank in inches t minutes after turning on the water. Which of the following statements **best** describes the meaning of the statement $f(3) < f(5)$ in this situation?

A. When the height of the water is 3 inches it is less than the height after 5 minutes of filling the fish tank.

B. After 3 minutes of filling the fish tank less time has passed than after 5 minutes of filling the fish tank.

C. The height of the water is recorded to be 3 inches after 3 minutes which is less than the height of the water recorded after 5 minutes.

D. The height of the water recorded after 3 minutes of filling the tank is less than the height of the water recorded after 5 minutes of filling the tank.

ITEM 156

Vincent goes to the gym for 30 minutes every day. He starts a new exercise routine on Monday. Vincent uses a function to model the number of calories he has burned $f(d)$, as a function of the number of days, d, he has exercised with the new routine.

Which statement represents a correct interpretation of $f(d)$?

A. $f(5) = 150$ means Vincent has exercised for a total of 150 minutes after the fifth day of exercising with his new routine.

B. $f(10) = 3{,}500$ means Vincent will burn 3,500 calories on day 10 of exercising with his new routine.

C. $f(15) = 5{,}250$ means after 15 days of exercising with his new routine, Vincent has burned 5,250 calories.

D. $f(30) = 10{,}500$ means the number of calories Vincent has burned times 30 is equal to 10,500.

ITEM 157

Jose is selling pencils. He sells a total of 100 pencils. Let $f(x)$ represent the amount of money Jose collects for selling x pencils.

Which answer choice correctly explains the meaning of $f(26) = 13$?

A. Jose collected $13 for selling 26 pencils.

B. Jose collected $26 for selling 13 pencils.

C. Jose sold each pencil for $13, and he collected $26.

D. Jose sold 26 pencils and 13 pencils for the same amount.

ITEM 158

In October of 2009, men who completed the Ironman World Championship triathlon had an average bike speed of 18.68 miles per hour.

The function $d(t)$ is the distance traveled as a function of the time, t, spent traveling. What is the meaning of $d(2) = 37.36$?

A. Two men traveled 37.36 miles.

B. The average man traveled 37.36 miles in 2 hours.

C. The average man traveled 2 miles in 37.36 minutes.

D. Two men finished the race in 37.36 minutes.

ITEM 159

A botanist is studying the growth of a species of plant. She writes a function describing the growth of the plant, where y is the age of the plant in years and $d(y)$ is the diameter of the plant stem in centimeters.

Which statement represents the correct description of $d(4) = 10$?

A. When the plant is 4 years old, the diameter is 10 centimeters.

B. When the plant is 10 years old, the diameter is 4 centimeters.

C. Multiply the diameter of the plant by 4 to find the age of the plant.

D. Multiply the age of the plant by 4 to find the diameter of the plant.

ITEM 160

For a specific science experiment, the temperature in an incubator must be exactly 55°C. This function represents the percentage of error in the resulting data that occurs when the temperature, t, changes.

$f(t) = 5|t - 55| + 10$

What is the percentage of error in the resulting data if the temperature in the incubator is 54.5°C?

A. 0.5%

B. 2.5%

C. 7.5%

D. 12.5%

ITEM 161

This function represents the profits, P , that the circus will make per day from selling a certain number of tickets, x .

$$P(x)\begin{cases} 3.50x - 100; 0 \leq x \leq 150 \\ 3.00x - 200; 150 < x \leq 300 \\ 2.75x - 300; 300 < x \leq 450 \end{cases}$$

The circus sold 300 tickets on Monday, 407 tickets on Tuesday, and 90 tickets on Wednesday. How much profit did the circus make for the three days?

A. $1,559.25

B. $1,734.25

C. $1,891.75

D. $2,689.50

ITEM 162

What is the value of $f(-1)$ for this function?

$f(x) = -x^3 + 2x^2 + 5x$

A. -2

B. -4

C. -6

D. -8

ITEM 163

The function below models the cost, in dollars, of buying *b* books from a book club.

$f(b) = 6b + 3$

Jacob buys 5 books. What is his total cost?

A. $14

B. $33

C. $68

D. $90

ITEM 164

There's a new local company offering affordable international phone service with a connection fee of $16 and $0.33 per minute the customer talks on the phone. Jnea wants to make a call using this service while her father is in Brazil but she only has $20 to spend at the moment. Which function can be used to determine the maximum number of minutes Jnea is able to afford to talk?

A. $C(m) = 16 + 0.33m$, *and find* $C(20)$

B. $C(m) = 16 + 0.33m$, *and solve* $C(m) = 20$

C. $C(m) = 0.33 + 16m$, *and solve* $C(m) = 20$

D. $C(m) = 0.33 + 16m$, *and find* $C(20)$

ITEM 165

Janie purchases a new car for $12,000, but over time its value in dollars decreases and is modeled by the function $f(x) = 12000(0.85)^x$ where x represents time in years. Based on this equation, what would be the approximate value of the car after 8 years from the purchase date?

A. $8,160

B. $11,320

C. $6,150

D. $3,270

ITEM 166

Kaleb's flooring company sells carpet that is resistant to stains for $2.30 per square foot, and will complete the installation of carpet for $75 labor fee. A function to model this scenario is $f(x) = 2.30x + 75$. What is the variable that is dependent in this scenario?

A. The number of square feet of carpet being purchased

B. The length and width of the room being carpeted

C. The cost for carpet and installation

D. The $75 labor fee

Functions
A1:F-IF.A.3
Items 167 – 173

ITEM 167

Consider the sequence 32, 8, 2, 0.5, 0.125, ...
Which type of function could be used to write a rule for the sequence?

A. Linear

B. Quadratic

C. Exponential

D. Absolute Value

ITEM 168

Consider the sequence 16, 9, 2, -5, -12, ...
Which type of function could be used to write a rule for the sequence?

A. Linear

B. Quadratic

C. Exponential

D. Absolute Value

ITEM 169

Consider the sequence 10, 20, 40, 80 ….
Which function describes the sequence?

A. $f(n) = 2n + 3$

B. $f(n) = 8n$

C. $f(n) = 2^n + 7$

D. $f(n) = 5(2^n)$

ITEM 170

Consider the sequence 81, 27, 9, 3….Which function describes the sequence?

A. $f(n) = \frac{1}{3}n$

B. $f(n) = n^3 + 80$

C. $f(n) = (\frac{1}{3})^n$

D. $f(n) = (\frac{1}{3})^{n-5}$

ITEM 171

Consider the sequence 1, 2, 4, 8, 16, ... Which function describes the sequence?

A. $f(n) = 2n$

B. $f(n) = n^2$

C. $f(n) = 2^n$

D. $f(n) = 2^{(n-1)}$

ITEM 172

Consider the sequence 51, 43, 35, 27, 19, ... Which function describes the sequence?

A. $f(n) = 8n - 51$

B. $f(n) = n - 8$

C. $f(n) = 8n + 19$

D. $f(n) = 8(1 - n) + 51$

ITEM 173

Consider the sequence 4, 7, 10, 13, 16, ... Which function describes the sequence?

A. $f(n) = 4n$

B. $f(n) = n^2$

C. $f(n) = n + 3$

D. $f(n) = 3n + 1$

Functions
A1:F-IF.B.4
Items 174 – 181

ITEM 174

The growth of Trevor's lawn can be modeled by the equation $y = 0.4x + 7$, where y is the height of the grass in centimeters, and x is the number of days since the lawn was last mowed.

What is the meaning of the y -intercept of the equation?

A. Trevor mows the lawn once every 7 days.

B. The lawn grows at a rate of 0.4 centimeters per day.

C. Right after the lawn is mowed, it is 7 centimeters tall.

D. The lawn grows 0.4 centimeters before each mowing.

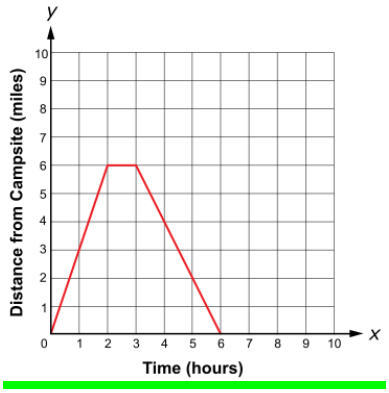
ITEM 175

A camper goes on a hike, starting from his campsite.

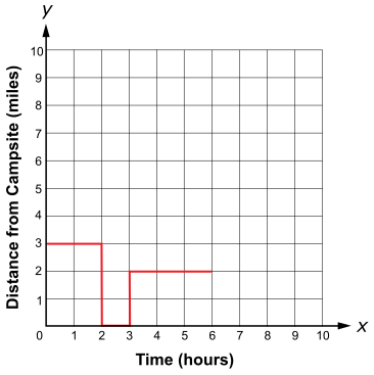
- He hikes for 2 hours at a speed of 3 miles per hour.
- He stops and rests for an hour.
- He walks back to the campsite at a speed of 2 miles per hour.

Which graph shows the camper's distance from the campsite as a function of time in hours?

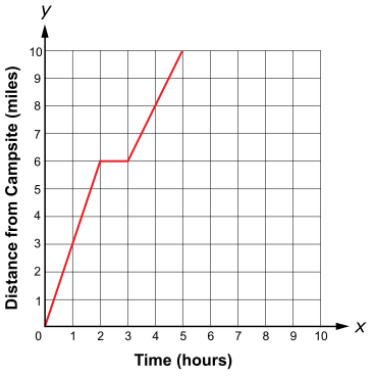
A.



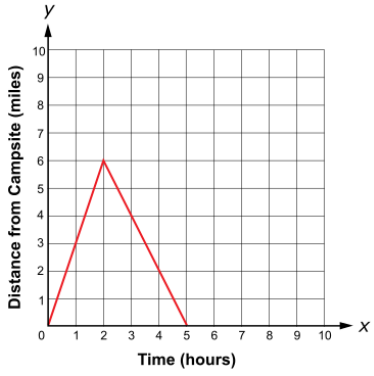
C.



B.

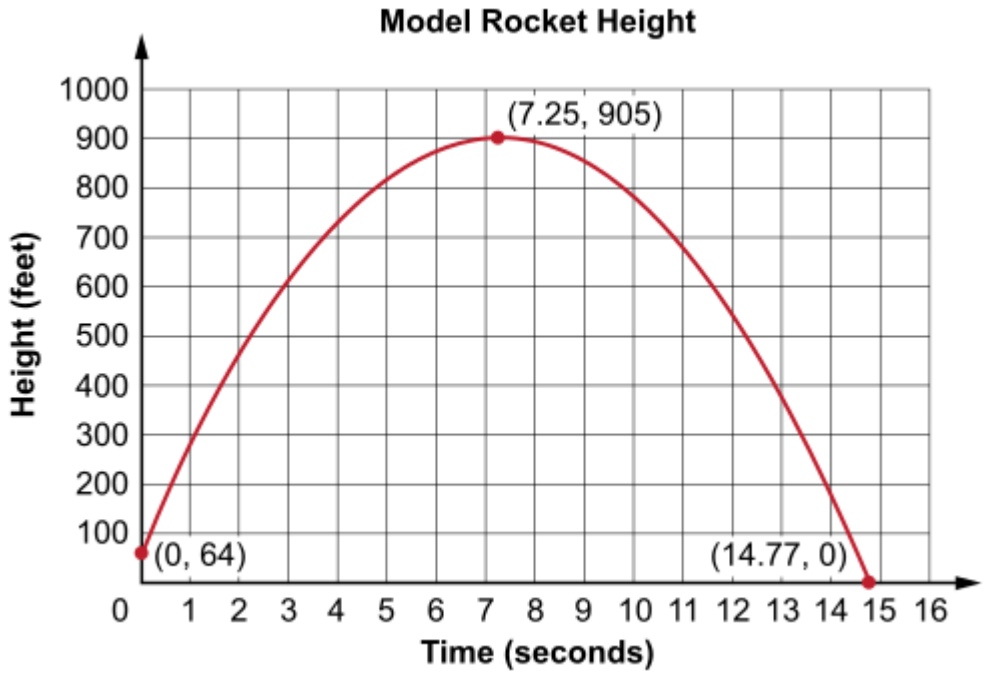


D.



ITEM 176

Gary set off a model rocket from the roof of a building. The height of the rocket as a function of time is shown in the graph.



How many seconds was the rocket in the air?

A. 7.25

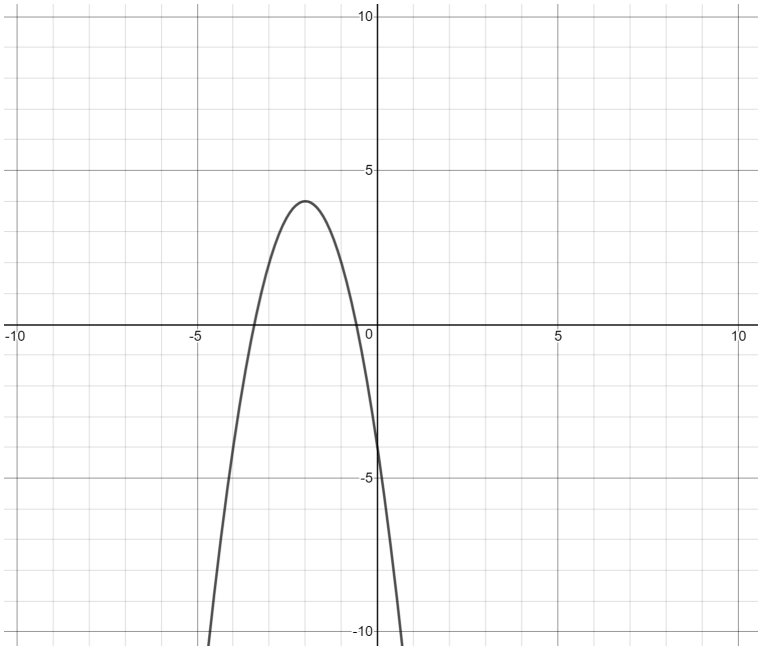
B. 7.52

C. 14.77

D. 905.00

ITEM 177

Select the **three** true statements based on the graph below.



A. The graph is increasing over all domain values.

B. There is no constant segment.

C. The maximum of the graph is (-2,3).

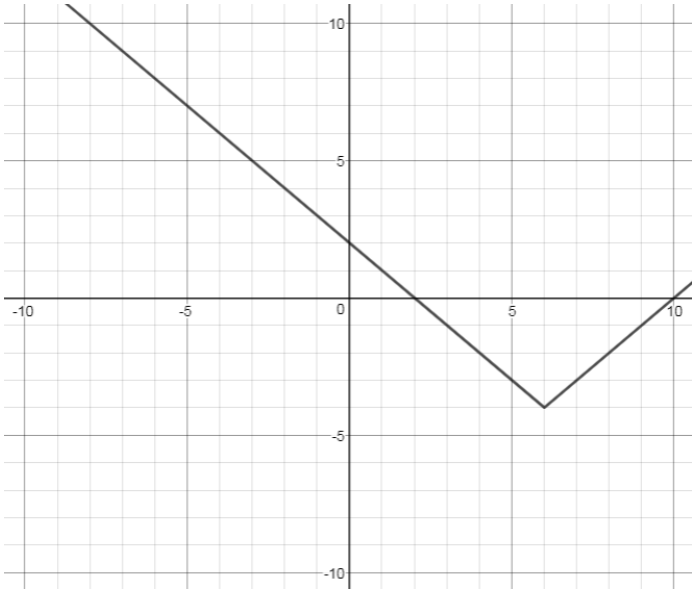
D. There are two *x*-intercepts.

E. The *y*-intercept is negative.

_____ _____ _____

ITEM 178

Select the **three** statements below that are true based on the graph.



A. The graph has a maximum.

B. There is no constant interval.

C. The graph has a minimum.

D. The graph is increasing for all positive numbers.

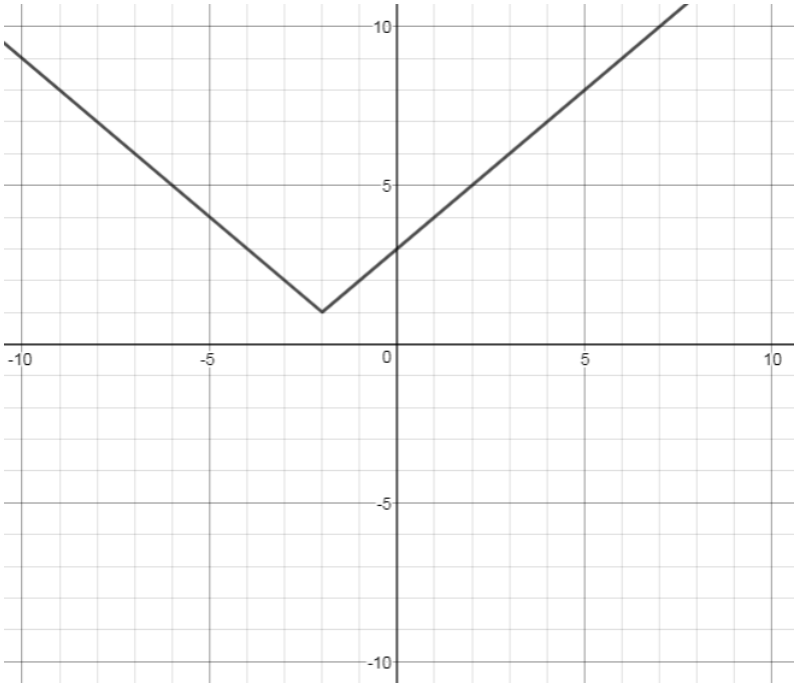
E. The *y*-intercept is (0,2).

F. There is only one *x*-intercept.

_____ _____ _____

ITEM 179

Select the **four** statements that are true based on the graph below.



A. The graph has a minimum.

B. There is no increasing interval.

C. The graph is positive for all domain values.

D. The graph has no *y*-intercept.

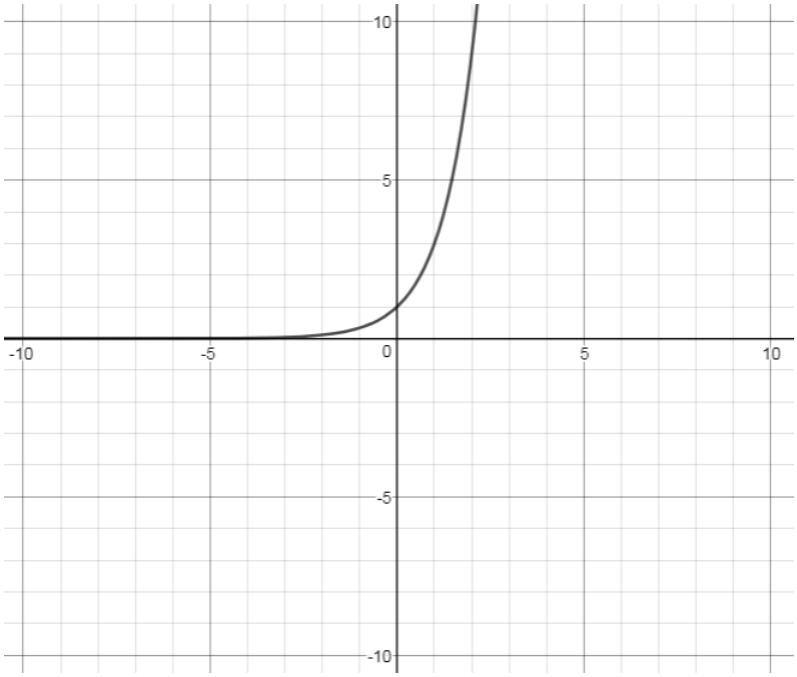
E. The y-intercept is (0,3).

F. The graph has no *x*-intercept.

_____ _____ _____ _____

ITEM 180

Look at the graph below.



Which statement **not** true about the graph?

A. The graph is always increasing.

B. There graph is always positive.

C. The graph has no *x*-intercept.

D. The graph has no *y*-intercept.

ITEM 181

Bryce stood at the top of his treehouse and threw a tennis ball in the air and the ball eventually hit the ground. The function that models the height, in feet, in respects to time, in seconds, is below. Find the amount of time, in seconds, that it took for the ball to reach its maximum height.

$h(t) = 16t^2 + 64t + 40$

$t = 2$

Functions
A1:F-IF.B.5
Items 182 – 191

ITEM 182

Ben, the basketball superstar, is called to the free throw line. During a free throw the height, *h*, in feet of the basketball at *t* seconds after being thrown can be represented by the equation $h(t) = -16t^2 + 20t + 6.83$. What is the most reasonable domain for this function?

A. All real numbers.

B. $t >= 0$

C. $0 <= t <= 1.53$

D. $0 <= t <= 13.1$

ITEM 183

A local theater sells admission tickets for $7.50 on Sunday nights. At capacity, the theater holds 80 customers. The function $M(c) = 7.5c$ represents the amount of money the theater takes in on Sunday nights, where c is the number of customers. What is the domain of $M(c)$ in this context?

A. All whole numbers.

B. All non-negative rational numbers.

C. All non-negative integers that are multiples of 7.5.

D. All non-negative integers less than or equal to 80.

ITEM 184

Ms. Green writes a function $e(h)$ that can be used to predict the number of eggs that will be laid daily by 1,000 chickens when exposed to h hours of light per day.
What is the domain of $e(h)$?

A. the integers from 0 to 24

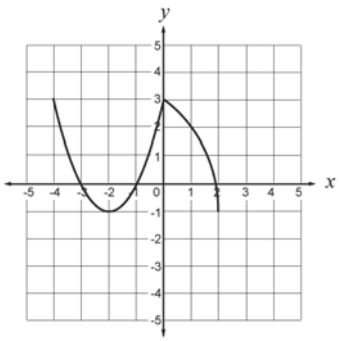
B. the integers from 0 to 1,000

C. the real numbers from 0 to 24

D. the real numbers from 0 to 1,000

ITEM 185

What is the domain of the function graphed below?



A. $y \geq 3$

B. $x \geq -4$

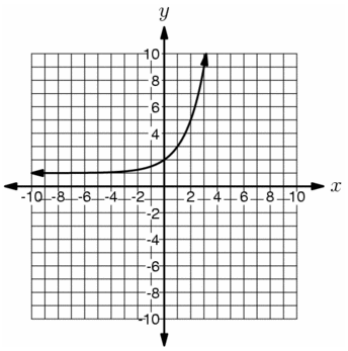
C. $-1 \leq y \leq 3$

D. $-4 \leq x \leq 2$

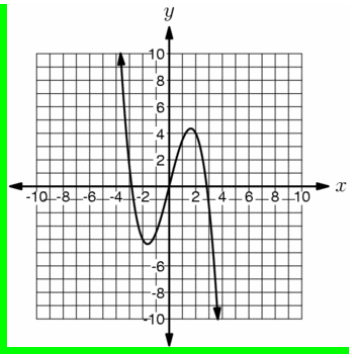
ITEM 186

Which graph has a domain and range of all real numbers?

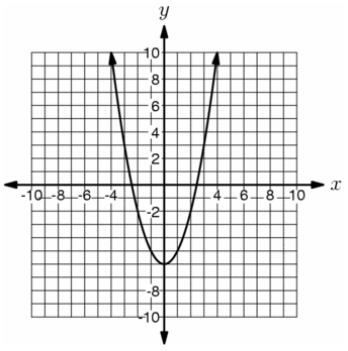
A.



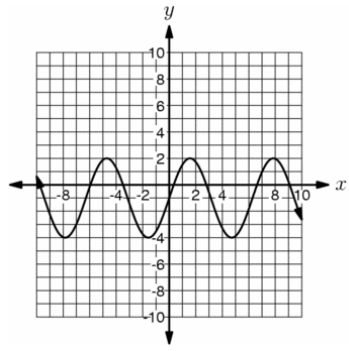
C.



B.

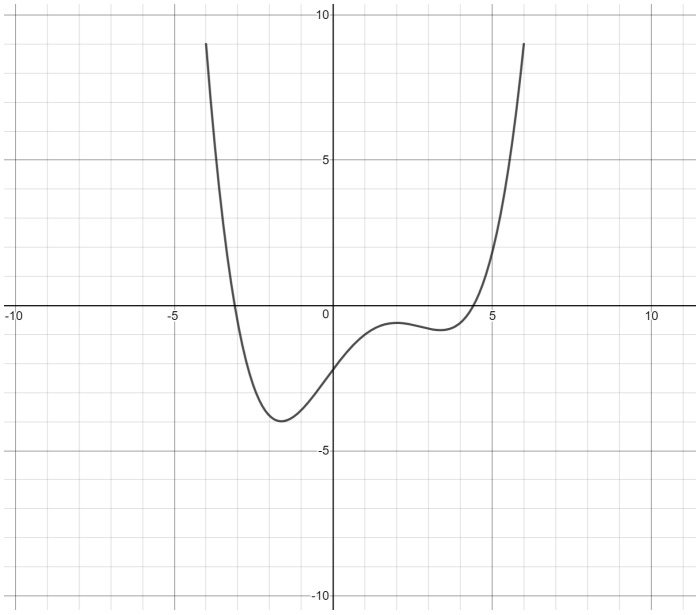


D.



ITEM 187

Look at the function graphed below.



What is the domain of the function?

A. $(-\infty, \infty)$

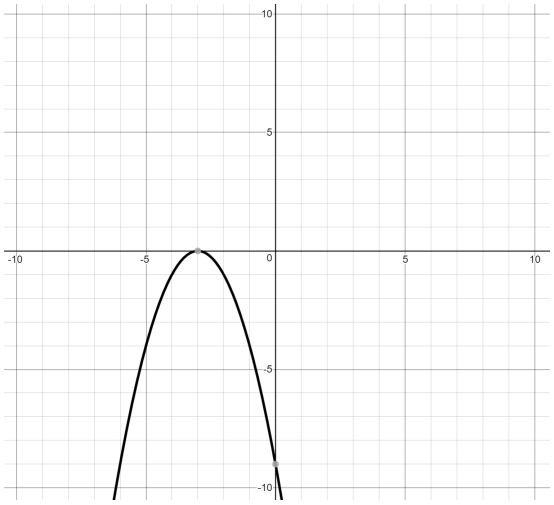
B. $[-4, 6]$

C. $[-5, 8]$

D. $(-5, \infty)$

ITEM 188

Look at the function graphed below.



What is the domain of the function?

A. $(-\infty, \infty)$

B. $(-\infty, 0)$

C. $(-\infty, 0]$

D. $(-\infty, 3]$

ITEM 189

The function $p(y)$ is used to calculate pay based on the number of years of experience for a staffing company. What are the appropriate values to use for y?

A. All integers

B. All non-negative real numbers

C. All whole numbers

D. All positive integers

ITEM 190

A company uses the formula $p(t) = -3t^2 + 15t + 25$ to calculate the profit based on the number of tons of steel manufactured at the plant. What are appropriate values to use for *t*?

A. All real numbers

B. All non-negative real numbers

C. All positive real numbers

D. All positive integers

ITEM 191

Tristen is on the football team of his middle school. This week, Tristen's mom is responsible for ensuring the team has food for after the game on Friday. Tristen's mom decides to order pizza. She will need to order 10 pizzas to have enough for the players and the coaches to have 2 slices each. She found a special at a local pizza place where a large pizza will cost $8 each. The total amount needed for the pizzas is represented by a function $C(p)=8p$, p is the number of pizzas purchased. What is the domain of this function?

A. All non-negative multiples of 8

B. All non-negative numbers including 0

C. All non-negative integers less than or equal to 10

D. All non-negative integers less than or equal to 80

Functions
A1:F-IF.B.6
Items 192 – 201

ITEM 192

Tom, the basketball superstar, is called to the free throw line. During a free throw the height, *h*, in feet of the basketball at *t* seconds after being thrown can be represented by the equation:

$h(t) = -16t^2 + 20t + 6.83$.

What is the average rate of change of the basketball from the time Tom shoots the free throw until the time the ball reaches the hoop at $t = 1.06$?

A. 0.33 feet per second

B. 2.99 feet per second

C. -2.99 feet per second

D. -16 feet per second

ITEM 193

Jake is studying a small insect population for his science fair project. In the mornings before school he records the insect population in his insect habitat. A portion of his data is presented in the following function table.

x	number of days	0	30	40	50	60
$f(x)$	number of insects	12	20	24	30	32

Which of the following represents the average rate of change of this function over the interval of time from 30 days to 60 days?

A. 0.4 insects per day

B. 0.4 days per insect

C. 0.9 insects per day

D. 2.5 days per insect

ITEM 194

Greg graphed the function $y = -\frac{1}{2}x^2 + 2x$.

What is the average rate of change of Greg's graph between $x = \frac{1}{2}$ and $x = 1$?

A. $\frac{5}{8}$

B. $\frac{7}{8}$

C. $1\frac{1}{4}$

D. $1\frac{1}{2}$

ITEM 195

Maureen recorded the weekly average price of gasoline in the table below.

Week	1	2	3	4	5	6	7	8	9	10
Cost per Gallon ($)	2.58	2.64	2.68	2.53	2.55	2.41	2.46	2.48	2.44	2.42

What is the average rate of change from Week 2 to Week 7? Round to the nearest thousandth, if necessary.

A. -0.036

B. -0.018

C. 0.036

D. 0.054

ITEM 196

Larenz recorded the weekly average high temperature in the table below.

Week	1	2	3	4	5	6	7	8	9	10
High Temperature in degrees F	68	71	65	66	68	67	72	73	70	75

Over which interval is the rate of change the greatest?

A. Week 1 to 5

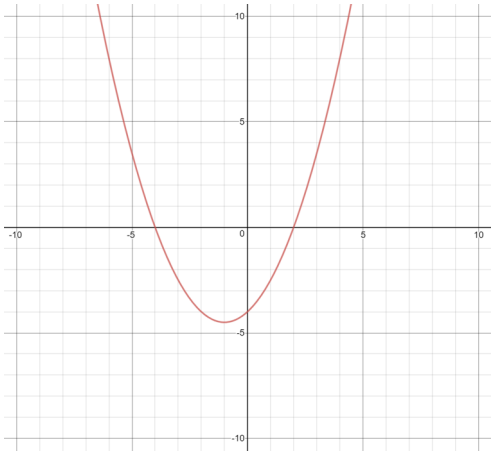
B. Week 1 to 8

C. Week 2 to 9

D. Week 5 to 7

ITEM 197

Look at the graph below.



Which is the best estimate of the rate of change over the interval [-1, 2]? Round to the nearest tenth, if necessary.

A. 4.5

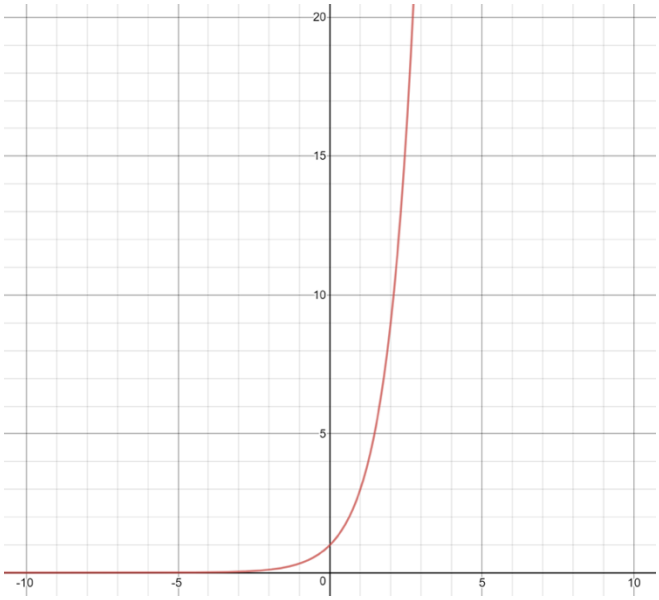
B. 2.5

C. 1.5

D. 0.3

ITEM 198

Look at the graph below.



Which is the best estimate of the rate of change over the interval [0, 2]? Round to the nearest tenth, if necessary.

A. 3

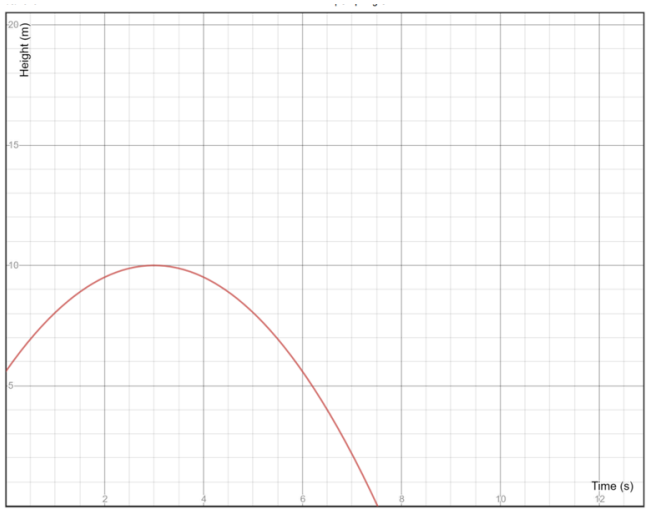
B. 4

C. 4.5

D. 7

ITEM 199

The graph below shows the height of a rock thrown from a tree.



Over which interval is the average rate of change for height the greatest?

A. 0 to 3 seconds

B. 1 to 4 seconds

C. 1 to 5 seconds

D. 3 to 5 seconds

ITEM 200

Look at the function below.

$f(x) = 2x^2 - 3x + 5$

What is the average rate of change from $x = -1$ to $x = 3$?

A. 1

B. 6

C. 10

D. 12

ITEM 201

Look at the table below.

Week	1	2	5	8	10	14	15	20
Income ($)	13	29	77	125	157	221	237	317

What is the average rate of change from week 2 to week 10?

A. $18.60 per week

B. $16.00 per week

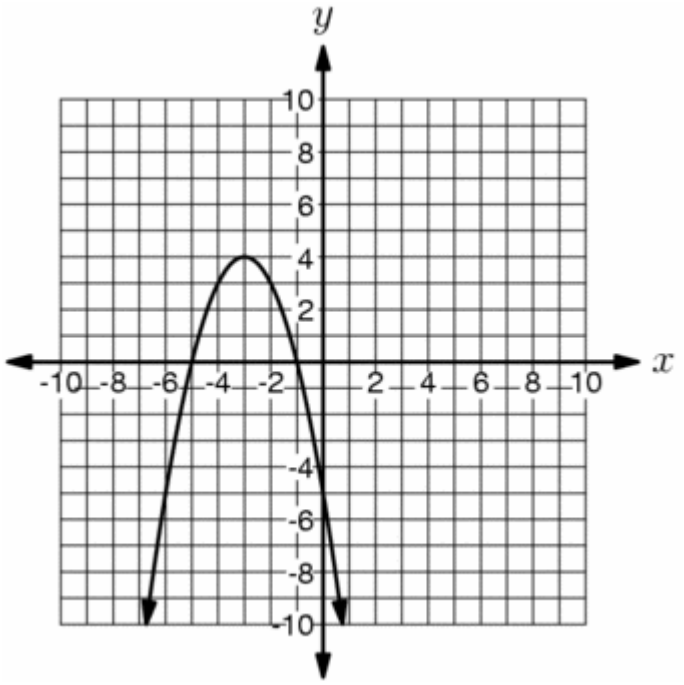
C. $15.70 per week

D. $14.50 per week

Functions
A1:F-IF.C.7a
Items 202 – 204

ITEM 202

Which equation does this graph represent?



A. $y = x^2 + 6x + 5$

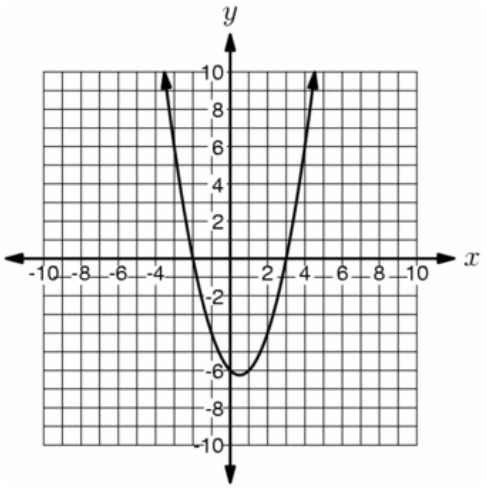
B. $y = x^2 - 6x + 5$

C. $y = -x^2 - 6x - 5$

D. $y = -x^2 + 6x - 5$

ITEM 203

The graph of the equation $y = x^2 - x - 6$ is shown.



What is the solution to the equation when $y = 0$?

A. $x = -3$ or -2

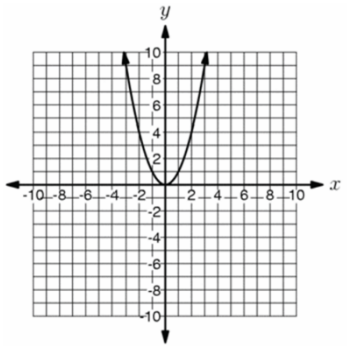
B. $x = -3$ or 2

C. $x = -2$ or 3

D. $x = 2$ or 3

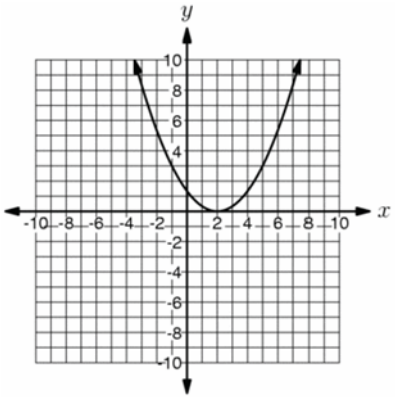
ITEM 204

The graph of the function $y = x^2$ is shown.

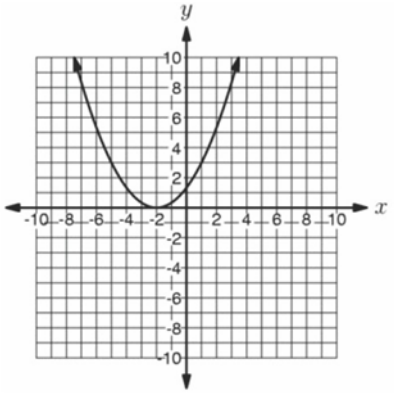


Which graph shows the function $y = 3(x + 2)^2$?

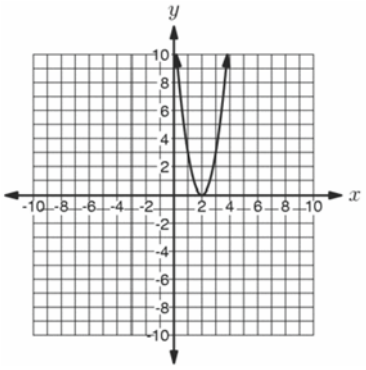
A.



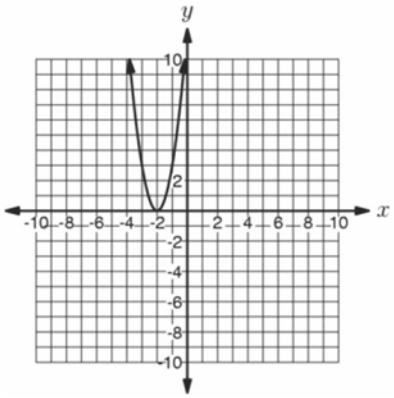
C.



B.



D.



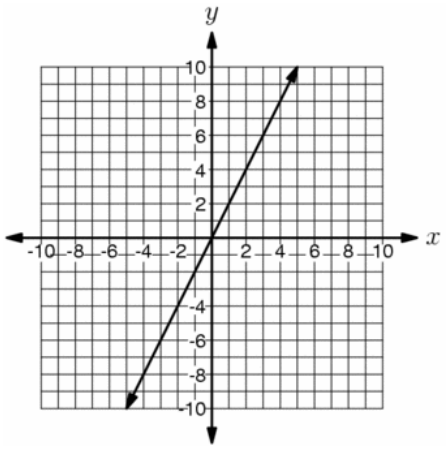
Functions
A1:F-IF.C.7b
Item 205

ITEM 205

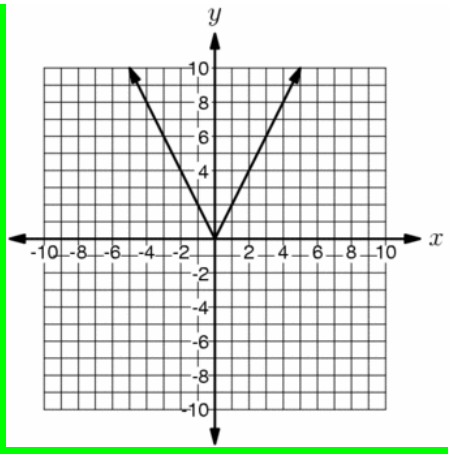
Which graph models the function?

$y = |2x|$

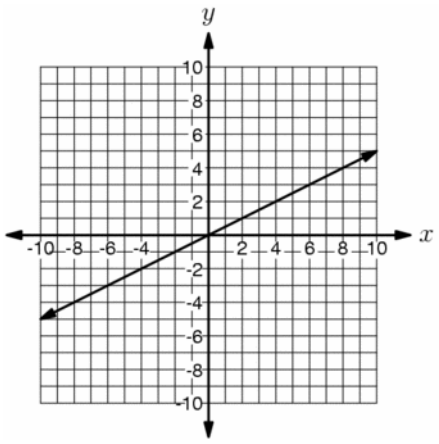
A.



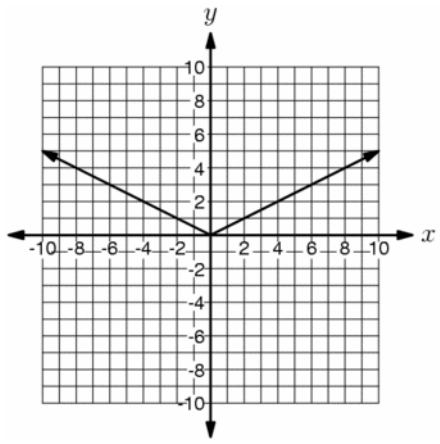
C.



B.



D.



Functions
A1:F-IF.C.8a
Items 206 – 207

ITEM 206

Find all the zeros of the function $f(x) = x^2 - 169$.

A. $x = 13$

B. $x = -13$

C. $x = \pm 13$

D. $x = \pm \sqrt{13}$

ITEM 207

Ryan and Tahj were both trying to graph $f(x) = x^2 - 6x + 8$.

Part A
Ryan wanted to use the zeros to start the graph. What is a method he could use to find the zeros? Explain why you selected this method. Then find the zeros using this method.

___f(x)=(x-4)(x-2)_____

__x_1=2, x_2=4_____

_____

Part B
Tahj decided to start graphing with the vertex and rewrote the equation in the following form.
$f(x) = (x - 3)^2 - 1$
Where is the vertex located? Explain how you know if it is a minimum or a maximum.

___(3, -1)_____

___It's a minimum._____

_____

Functions
A1:F-IF.C.9
Item 208

ITEM 208

Use the equation and the table to answer the question.

$r(x) = -3(2.5)^{x-1}$

x	$p(x)$
3	0
6	1
9	2

Which statement **most** accurately compares $p(x)$ to $r(x)$?

A. The y-intercept of $p(x)$ is slightly greater than the y-intercept of $r(x)$

B. The y-intercept of $r(x)$ is slightly greater than the y-intercept of $p(x)$

C. The y-intercept of $p(x)$ is less than twice the y-intercept of $r(x)$

D. The y-intercept of $r(x)$ is less than twice the y-intercept of $p(x)$

Functions
A1:F-BF.A.1
Item 209

ITEM 209

Jalea has a camera that automatically takes pictures of hummingbirds visiting her hummingbird feeder. The camera takes 4 pictures on the first day and 10 pictures every day after that.

Which function models the total number of hummingbird pictures, $f(d)$, the camera has taken after d days?

A. $f(d) = 4d + 10$

B. $f(d) = 4(d + 1) + 10$

C. $f(d) = 10d + 4$

D. $f(d) = 10(d - 1) + 4$

Functions
A1:F-BF.A.1a
Items 210 – 212

ITEM 210

For some medicines, the concentration of the medication must be monitored to be sure there is an effective amount in a patient's bloodstream. One way to check is to determine the parts per million (PPM) of the medicine and the time in hours that has passed. For one patient, the results of testing are shown below.

Hour	PPM present
1	46,000
3	38,400
4	34,600
6	27,000

- Write a function for the data in the table that could be used to represent the time in hours, *t*.
- Give a description of the process used to determine your function.
- The medicine is deemed ineffective if the parts per million falls below 15,000 PPM, so the medicine needs to be repeated approximately one hour before it falls below that value. Using your function, after how many hours should the patient receive a second dose? Show your work.

Enter your function, your description, and your work below

f(t) = a(t-1) + b

t = 1, f(t) = 46,000 and t = 3, f(t) = 38,400 → f(t) = -3800(t-1) + 46,000

f(t) < 15,000 → t = 10 → The patient should receive a second dose after 9 hours

ITEM 211

A printing machine at a press is set to print labels. At the beginning of the run, the machine operator runs 20 mL of ink through the line to flush it and prime the machine. After printing 100 sheets, another 200 mL of ink have been used.

Assuming 100 sheets must be printed prior to each run with 200mL of ink being used, write a function *f(s)* to represent the amount of ink used per run.
Explain the process you used to create the function *f(s)*.
A customer makes an order for 750 label sheets. How many total mL of ink are used to print the order?
Enter your function, your explanation, and your answer in the box below.

f(s) = as + b

s = 0, f(s) = 20 and s = 100, f(s) = 220 → f(s) = 2s + 20

s =750 → f(s) = 1520

ITEM 212

The city of Baker has averaged a 1.6% increase in population each year for the past four years. Assume the city population continues to grow at this particular rate for the upcoming 10 years, and the current population is about 63,000 residents. Let *x* represent the number of years from now. So, the current population is represented by *x*=0.

Write the function rule for the population,
Calculate the population after 10 years. Round your answer to the nearest person. Show all your work.

Enter your function rule, the population, and your work below.

$f(x) = 63{,}000 \times 1.016^x$_____

$x = 10$, $f(x) = 73837.6 \approx 73837$_____

_____

Functions
A1:F-BF.B.3
Items 213 – 219

ITEM 213

Which equation represents the line $y = x$ shifted 4 units to the right?

A. $y = 4x$

B. $y = -4x$

C. $y = x + 4$

D. $y = x - 4$

ITEM 214

Eli graphed this function on a coordinate grid.

$f(x) = (x - 3)^2$

Tony then graphed the function shifted 5 units to the left on the same coordinate grid. What is the equation of the function Tony graphed?

A. $f(x) = (x - 8)^2$

B. $f(x) = (x + 2)^2$

C. $f(x) = (x - 3)^2 - 5$

D. $f(x) = (x - 3)^2 + 5$

ITEM 215

DeMarco graphs the function $f(x) = (x - 6)^2$. Which sentence **best** describes how DeMarco's graph compares to the graph of $f(x) = x^2$?

A. DeMarco's graph is translated 6 units to the right.

B. DeMarco's graph is translated 6 units to the left.

C. DeMarco's graph is translated 6 units down.

D. DeMarco's graph is translated 6 units up.

ITEM 216

Daryl drew the graph of the function $y = x^2$. Then he drew the graph of the function $y = (x + 3)^2 + 4$. How is the location of the vertex of the second function different from the location of the vertex of the first function?

A. The vertex is in the same location.

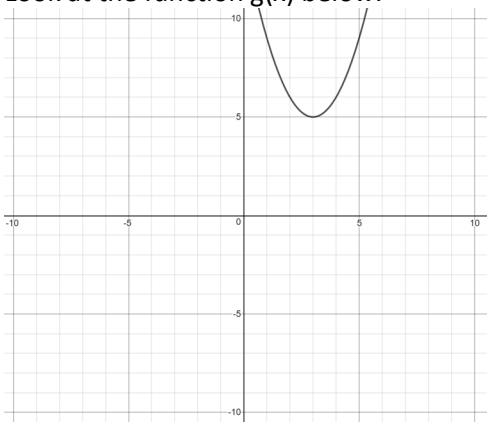
B. The vertex is translated from (0, 0) to (3, 4).

C. The vertex is translated from (0, 0) to (-3, 4).

D. The vertex is translated from (0, 0) to (-3, -4).

ITEM 217

Look at the function g(x) below.



Part A

Describe how the vertex changed from the parent function $f(x) = x^2$. Be sure to include specific number values.

The vertex is translated from (0, 0) to (3, 5)

_____

_____

Part B

A new function is being created using $g(x)$ by transforming it into $h(x) = -2g(x+6) - 2$. Describe how the graphed function $g(x)$ transformed. Be sure to include specific number values.

Enter your responses below. Be sure to label each part.

$g(x) = (x-3)^2 + 5 \rightarrow h(x) = -2(x+3)^2 - 12$

The vertex is translated to (-3,-12)

_____

ITEM 218

JaMarcus is studying for a test and comes across the function $f(x) = \frac{3}{2}(x+7)^2 + 2$.

What is the parent function for this function?
Describe each transformation and give its effect on the graph of the parent function.

Enter the parent function, the description and effect of each transformation below

$f(x) = x^2$_____

$f(x) = x^2 \rightarrow f(x) = (x+7)^2 \rightarrow f(x) = \frac{3}{2}(x+7)^2 \rightarrow f(x) = \frac{3}{2}(x+7)^2 + 2$_

_____

ITEM 219

Carolyn is instructed by her algebra teacher to translate the graph of $f(x) = x^2 - 5$ to $f(x) = x^2 + 3$. Which of the following describes the translation?

A. The original graph is translated up 8 units.

B. The original graph is translated down 2 units.

C. The original graph is translated up 3 units.

D. The original graph is translated to the right 8 units.

Functions
A1:F-LE.A.1
Items 220 – 226

ITEM 220

Jose posted a picture to his social media account and recorded the total number of "likes" on the picture after 1 minute intervals. The data Jose collected is shown in the chart below.

Minutes Since Picture Was Posted	Total Number of "Likes" on Picture
1	2
2	4
3	8

Which type function would best model Jose's data set?

A. The data set can be represented by an exponential expression because the number of "likes" increases by a factor of 2 for each 1 minute time interval.

B. The data set can be represented by an exponential expression because the number of "likes" increases by a factor of 4 for each 1 minute time interval.

C. The data set can be represented by a linear expression because the number of "likes" increases by a value of 2 for each 1 minute time interval.

D. The data set can be represented by a linear expression because the number of "likes" increases by a value of 4 for each 1 minute time interval.

ITEM 221

Mrs. Juarez has been documenting the membership growth of the math club over the past decade. The data obtained are shown in the table below.

Years	Number of Members
1	6
2	10
5	22
10	42

Which type function would best model the data?

A. The data would best be modeled by a linear function since the number of members increases by an equal value over each one year interval.

B. The data would best be modeled by a linear function since the number of members increases by an equal factor over each one year interval.

C. The data would best be modeled by an exponential function since the number of members increases by an equal value over each one year interval.

D. The data would best be modeled by an exponential function since the number of members increases by an equal factor over each one year interval.

ITEM 222

A biologist is monitoring the number of flies inside a screened area over the course of four weeks. The data obtained are shown in the table below.

Weeks	Number of Flies
1	4
2	16
3	64
4	256

Which type function would best model the data?

A. The data would best be modeled by a linear function since the number of flies increases by an equal value over each one week interval.

B. The data would best be modeled by a linear function since the number of flies increases by an equal factor over each one week interval.

C. The data would best be modeled by an exponential function since the number of flies increases by an equal quantity over each one week interval.

D. The data would best be modeled by an exponential function since the number of flies increases by an equal factor over each one week interval.

ITEM 223

Which scenarios are **best** modeled by an exponential function?

I. A bank pays 2.5% interest per year on the initial deposit.
II. The population of a city increases by 5% each year.
III. Every hour, ½ of a medication remains in the body.
IV. 250 mL of water drips from a leaky faucet every hour.
V. The value of a car depreciates by 15% every year.
VI. A credit union offers 3% annual interest compounded daily on the available balance.
VII. The number of colonies of bacteria in a petri dish double every 8 hours.

A. I and IV only

B. III and V only

C. I, II, VI, and VII only

D. II, III, V, VI, and VII only

ITEM 224

Whiteflies are tiny white flies that can infest citrus trees, damaging the trees and reducing fruit yield. Natural treatments include spraying the trees with solutions that contain mineral oil multiple times. The chart below shows the estimated population of whiteflies before mineral oil treatment and after each successive treatment.

Number of Treatments	Estimated Number of Whiteflies
0	9,800,000
1	390,000
2	15,600
3	620
4	25

Which of the following types of functions would be the best model for the relationship between the number of treatments and estimated number of whiteflies?

A. a linear function with a negative slope

B. a quadratic function

C. an exponential function

D. a linear function with a positive slope

ITEM 225

This table represents the relationship between the number of DVDs, *x* , a movie maker produces and the average cost per DVD, *y* .

DVD Production

Number of DVDs	500	1,000	1,500	2,000	2,500
Cost per DVD ($)	100	50	25	12	6

Which type of function **best** models the data in the table?

A. cubic

B. linear

C. quadratic

D. exponential

ITEM 226

The value of an antique clock doubles every 10 years. Which type of function **best** represents this situation?

A. linear

B. quadratic

C. cubic

D. exponential

Functions
A1:F-LE.A.1a
Items 227 – 228

ITEM 227

Rosa is blowing up a balloon. She decides to record the volume of the air in the balloon after given numbers of breaths used to blow it up. The data are shown in the table below.

Number of Breaths	Volume of Air in Balloon (cm^3)
2	5,800
5	14,500
7	20,300
11	31,900
16	46,400

Rosa realizes there is a linear relationship between the volume of air in the balloon and the number of breaths used to blow it up. Which of the following would prove that there are equal differences in the volume of air in the balloon for equal number of breaths?

A. Blowing up the balloon from empty to a volume of 46,400 cm^3 requires 16 breaths, so the rate for blowing up a balloon is 46,400 cm^3/ 16 breaths, which equals 2900 cm^3 per breath.

B. The data for blowing up the balloon indicates that the differences in number of breaths for the data points are:
   5 breaths – 2 breaths = 3 breaths
   7 breaths – 5 breaths = 2 breaths
   11 breaths – 7 breaths = 4 breaths
   16 breaths – 11 breaths = 5 breaths

C. The data for blowing up the balloon indicates that the differences between the volume of air in the balloon at the given number of breaths are:
   46,400 cm^3 – 31,900 cm^3 = 14,500 cm^3
   31,900 cm^3 – 20,300 cm^3 = 11,600 cm^3
   20,300 cm^3 – 14,500 cm^3 = 5,800 cm^3
   14,500 cm^3 – 5800 cm^3 = 8,700 cm^3

D. The data for blowing up the balloon indicates that the ratios for volume of air in the balloon to number of breaths are:
   (46,400 cm^3 – 31,900 cm^3) / (16 – 11 breaths) = 2,900 cm^3/ breath
   (31,900 cm^3 – 20,300 cm^3) / (11 – 7 breaths) = 2,900 cm^3 / breath
   (20,300 cm^3 – 14,500 cm^3) / (7 – 5 breaths) = 2,900 cm^3 / breath
   (14,500 cm^3 – 5,800 cm^3) / (5 – 2 breaths)= 2,900 cm^3 / breath.

ITEM 228

Roneisha considered the table below.

x	*y*
-2	3
-1	5
1	7
5	257

She determined that the function describing the table had to be linear.

Part A
Based on Roneisha's claim, estimate the slope of graph for the linear function from the table. Show your work and explain your answer in the space provided.

___(5-3)/(-1+2)=2_____

____(7-5)/(1+1)=1_____

_____

Part B
Explain if you agree with Roneisha's claim.

_No. There is no constant slope.

_____

_____

Functions
A1:F-LE.A.1c
Item 229

ITEM 229

Single-celled organisms usually reproduce by splitting into 2 identical organisms. In each generation, there are twice as many cells as in the previous generation. There is 1 cell in the first generation. Which expression shows how many cells will be produced in the 4^{th} generation?

A. 1^4

B. 2^3

C. 2^4

D. 3^2

Functions
A1:F-LE.A.2
Items 230 – 234

ITEM 230

A certain type of flower is growing in a pond in such a way that the number of flowers is growing exponentially. The number of flowers, *F*, in the pond at the time *t* is modeled by the function $F(t) = cd^t$, where *c* and *d* are constants and *t* is measured in months. The table shows two values of the function.

t	$N(t)$
0	250
1	1,000

Which equation can be used to find the number of flowers in the pond at time *t* ?

A. $N(t) = 250(1)^t$

B. $N(t) = 1000(1)^t$

C. $N(t) = 250(4)^t$

D. $N(t) = 1{,}000(4)^t$

ITEM 231

Suzie put $1,000 in a savings account that pays 4% interest per year based on the amount at the end of the previous year. Which equation could be used to find m_y, the amount of money in the account at the beginning of year y?

A. $m_y = \$1{,}000 + 0.04^{y-1}$

B. $m_y = (\$1{,}000)(0.04^{y-1})$

C. $m_y = \$1{,}000 + 1.04^{y-1}$

D. $m_y = (\$1{,}000)(1.04^{y-1})$

ITEM 232

This table shows Theo's salary for the last five years.

Theo's Salary

Year	Salary ($)
1	24,000.00
2	25,200.00
3	26,460.00
4	27,783.00
5	29,172.15

Which function can be used to model this data?

A. $f(x) = 1{,}200 + 24{,}000^{x}$

B. $f(x) = 24{,}000\, x^{1.05}$

C. $f(x) = 24{,}000(1{,}200)^{x}$

D. $f(x) = 24{,}000(1.05)^{x-1}$

ITEM 233

A furniture store is having a going-out-of-business sale. One of their items is a dining room set that normally costs $100. Each week the price of the dining room set is reduced by 15% of the previous week's price. Which equation **best** models the price of the dining room set during the sale?

A. $p = 100 - 15w$

B. $p = 100(0.85)^w$

C. $p = 85^w$

D. $p = 0.15w$

ITEM 234

In 1907, there were 20 houses with telephones in a rural town. Each year, two more houses in the town got telephones. Let T be the number of house with telephones, and y be the number of years after 1907. Which equation can be used to find the total number of houses with telephones after 1907?

A. $T = (20)\, y^{2}$

B. $T = (20)2\, y$

C. $T = 2y + 20$

D. $T = y^{2} + 20$

Functions
A1:F-LE.B.5
Items 235 – 240

ITEM 235

Ezra leaves a flask of water outside for *d* days for a science experiment. The number of milliliters of water in the flask can be modeled using the function $w(d) = -30d + 450$.

What is the meaning of the –30 in this function?

A. Each day, the number of milliliters of water in the flask decreases by 30.

B. Each day, the rain adds 30 milliliters of water to the flask.

C. After 30 days, there is no water left in the flask.

D. When Ezra first puts the flask outside, it contains 30 milliliters of water.

ITEM 236

Laniqua trains for the long jump each week. She writes this function to model the relationship between the number of weeks, w, she trains and the distance, $f(w)$, in inches, she can jump.

$f(w) = 2w + 180$

What does the slope of this function represent?

A. the number of inches Laniqua can jump when she begins training

B. the number of weeks it takes Laniqua to improve her jumping

C. the number of weeks it takes Laniqua to increase her jump distance by 1 inch

D. the number of inches Laniqua's jump distance increases per week of training

ITEM 237

Nate buys a goldfish. Based on information from the Internet, he expects the goldfish to continue to grow at a steady rate for a couple of years. The function $f(m) = 2.5m + 20$ models the length of the goldfish, in millimeters, after m months.

What is the meaning of 2.5 in this function?

A. Nate has owned the goldfish 2.5 months.

B. The goldfish grows 2.5 millimeters each month.

C. After 2.5 months, the goldfish is 20 millimeters long.

D. The goldfish is 2.5 millimeters long when Nate buys it.

ITEM 238

Marty studies computer viruses to understand their rate of spread to different computers. He determines that the number of computers affected by the Ralphie virus over several weeks can be modeled by the expression $v = 8^w$ where v is the number of computers affected by the virus and w is the number of weeks since the virus was introduced. Select which of the following would be true for the studied Ralphie virus.

A. For week 0, the week the Ralphie virus is first introduced, there are 8 computers affected by the virus.

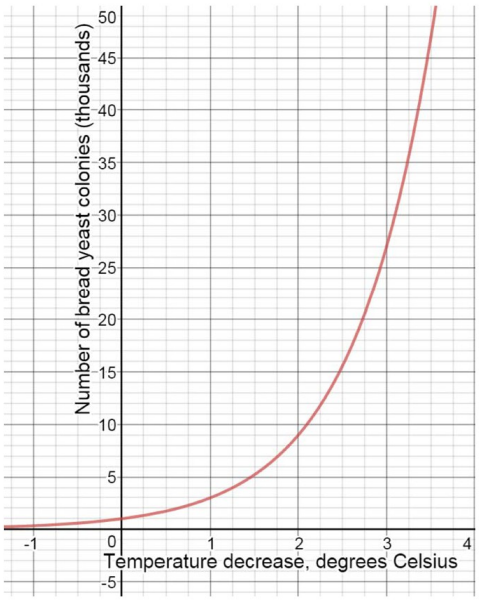
B. Each week 8 additional computers become affected by the Ralphie virus.

C. Each week the number of computers affected by the Ralphie virus increases by a factor of 8.

D. The total number of computers affected by the Ralphie virus 8. The number of computers affected does not increase each week.

ITEM 239

Rick conducted an experiment to determine how the increase in temperature would affect the growth of bread yeast colonies. His results are graphed below.



Rick started with 1000 bread yeast colonies. Which of the following experimental results would match the graph shown above?

A. The number of bread yeast colonies tripled for each one degree increase in temperature.

B. The number of bread yeast colonies increased by 3000 for each degree increase in temperature.

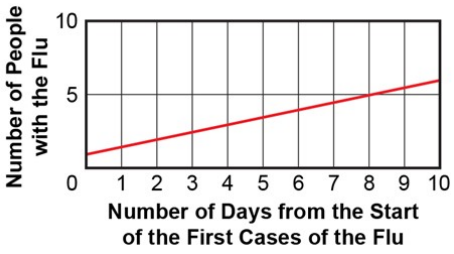
C. Each time the temperature was increased by one degree, the number of bread yeast colonies decreased by a factor of 1/3.

D. Each time the temperature was increased by one degree, the number of bread yeast colonies decreased by 3000.

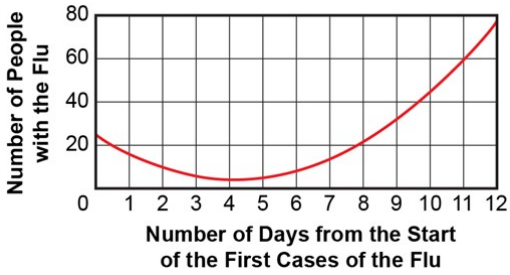
ITEM 240

The flu virus is spreading. It started out with just a few cases and each day the number of people with the flu doubled from the previous day. Select the graph shown below that represents the data for the number of people with the flu vs. the number of days from the start of the first cases of flu.

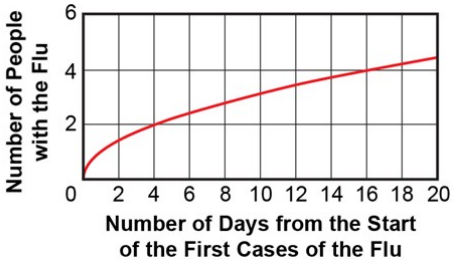
A.



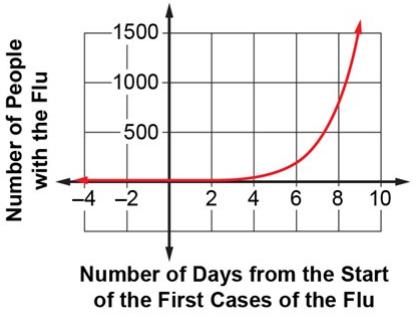
B.



C.



D.



Statistics and Probability
A1:S-ID.B.5
Items 241 – 244

ITEM 241

Use the table to answer the question.

New Park Survey

	Support the Park	Against the Park	Undecided
East Side	346	125	201
West Lake	349	250	252

A community has to decide whether to raise taxes to create a new park. Voters in two neighborhoods are surveyed about the issue. The results are shown in the table.

Which conclusion is **best** supported by the data?

A. More than 50% of the people surveyed support the park.

B. About the same percentage of East Side and West Lake voters support the park.

C. About the same percentage of East Side and West Lake voters are undecided about the park.

D. The percentage of West Lake residents who are against the park is about twice the percentage of East Side residents who are against the park.

ITEM 242

Use the two-way frequency table to answer the question.

Preferred Subject Survey Results

Do you play sports?	Preferred Subject			Totals
	Math	English	Other	
Yes	41	28	21	90
No	42	59	19	120
Totals	83	87	40	

Janice asked students in her school to identify their preferred subject and whether or not they played sports. The results of the survey are shown in the table.

Which statement accurately summarizes the information in the table?

A. More than 50% of students who do **not** play sports prefer English.

B. More than 50% of students who prefer English do **not** play sports.

C. Approximately 40% of the students surveyed prefer other subjects besides math and English.

D. Students who do **not** play sports are more likely to prefer math than students who do play sports.

ITEM 243

Use the relative frequency table to answer the question.

Grade	Non-Honor Roll	"A/B" Honor Roll	Total
6th grade	40	70	110
7th grade	34	52	86
8th grade	28	46	74
Total	**102**	**168**	**270**

What is the approximate relative frequency that a student on the "A/B" Honor Roll is in the eighth grade?

A. 17%

B. 27%

C. 38%

D. 62%

ITEM 244

Eastview Junior High students order sweatshirts and T-shirts in either purple or gold. Of the students who ordered a sweatshirt, the relative frequency of ordering a gold one is half of the relative frequency of ordering a purple one. Which two-way table could show the data from the orders?

A.

Sweatshirt and T-Shirt Orders

	Sweatshirt	T-Shirt
Purple	12	18
Gold	24	15

B.

Sweatshirt and T-Shirt Orders

	Sweatshirt	T-Shirt
Purple	28	26
Gold	22	44

C.

Sweatshirt and T-Shirt Orders

	Sweatshirt	T-Shirt
Purple	70	17
Gold	35	93

D.

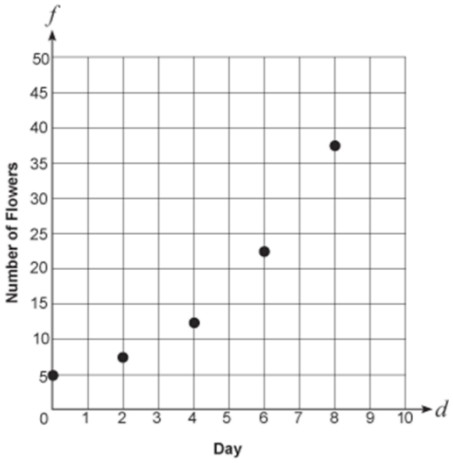
Sweatshirt and T-Shirt Orders

	Sweatshirt	T-Shirt
Purple	45	50
Gold	25	25

Statistics and Probability
A1:S-ID.B.6a
Item 245

ITEM 245

Steve graphed the number of flowers (f) blooming on a tree on different days (d).



Which equation **best** matches the data in the graph?

A. $f = d + 5$

B. $f = d^2 + 5$

C. $f = 2d + 5$

D. $f = \frac{1}{2}d^2 + 5$

Statistics and Probability
A1:S-ID.B.6b
Item 246

ITEM 246

Use the function to answer the question.

$h(x) = 9x$

Wendy found this formula predicting h , height in inches, from x , hand length in inches.

Wendy is 63 inches tall, and her hands are 6.5 inches long. If Wendy uses herself as a data point, what is the residual?

A. –4.5

B. –0.5

C. 0.5

D. 4.5

Statistics and Probability
A1:S-ID.B.6c
Items 247 – 250

ITEM 247

This table shows the weight (*w*) and active memory (*m*) of some laptop computers.

Weight (pounds)	Active Memory (megabytes)
8	500
10	1,000
6	2,000
4	1,500
4	2,000
8	1,000
10	500
6	1,500

Which equation represents the line of best fit for the data?

A. $m = -83w + 1{,}833$

B. $m = -250w + 3{,}000$

C. $m = -375w + 3{,}500$

D. $m = -750w + 6{,}500$

ITEM 248

Grove City has been installing energy-efficient lights in their stoplights over a five-year period. Each year the city records the percentage of stoplights with energy-efficient lights (*L*) and the cost (*C*) to run the stoplights.

Year	Percentage of Stoplights (*L*)	Cost of Electricity (*C*)
1	0	$2,483
2	10	$2,371
3	30	$2,059
4	70	$1,432
5	80	$1,310

Which equation represents the most reasonable line of best fit for the information in the table?

A. $C = \$2{,}483 + 11L$

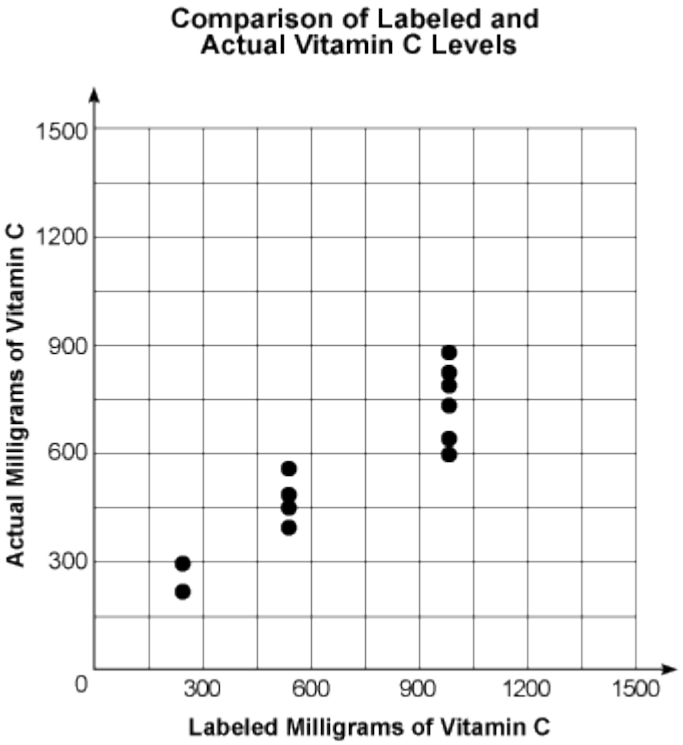
B. $C = \$2{,}483 - 11L$

C. $C = \$2{,}500 + 15L$

D. $C = \$2{,}500 - 15L$

ITEM 249

This graph shows the amount of vitamin C, *x* , given on the label of a vitamin bottle. The graph also shows the actual amount of vitamin C in a tablet, *y* , for different brands.



What is the equation of the line of best fit for this data?

A. $y = 0.6x$

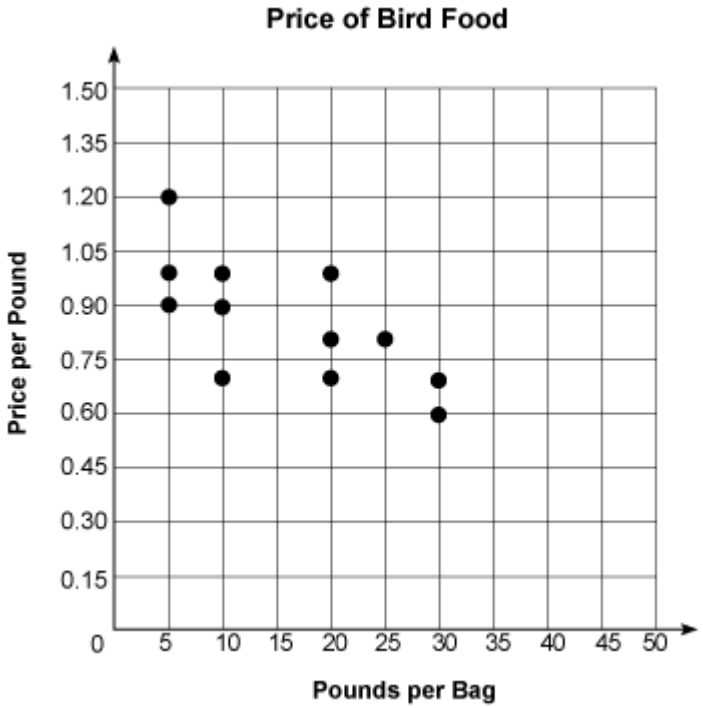
B. $y = 0.8x$

C. $y = 1.0x$

D. $y = 1.25x$

ITEM 250

David wants to compare the prices of three brands of bird food. He uses this graph to record the price per pound of different brands of bird food.



Let *b* represent the pounds per bag, and *p* represent the price per bag. What is the equation for the line of best fit for this data?

A. $p = 0.60 + 0.015\ b$

B. $p = 0.90 + 0.15\ b$

C. $p = 1.00 - 0.15\ b$

D. $p = 1.10 - 0.015\ b$

Statistics and Probability
A1:S-ID.C.7
Items 251 – 260

ITEM 251

Miguel was selling snacks at a basketball game. Each item cost the same amount. He tallied the total items sold and the total money in the box every 30 minutes and recorded the data here.

Number of Items	25	82	108	125
Money in Box	$300	$414	$466	$500

Which **two** of the following statements below are correct?

A. Each item costs $12.

B. Each item costs $4.

C. Each item costs $2.

D. Miguel did not have any money to start.

E. Miguel had $275 to start.

F. Miguel had $250 to start.

_____ _____

ITEM 252

Wagner wrote the following equation to use to calculate the total cost of renting a moving truck, *C*, based on the numbers of miles driven, *m*, before tax.

$C = 0.45m + 19.95$

What does 0.45 represent in the equation?

A. The number of miles driven

B. The cost per mile

C. The cost for the first mile only

D. The fee to rent the truck

ITEM 253

After completing a scientific experiment with different plant foods, Julia determined the following equations could be used to show the height, h, of the tomato plants she used over w weeks.

- Food A: $h = 0.5w + 3$
- Food B: $h = 0.38w + 4.5$
- Food C: $h = 0.4w + 2.6$
- Food D: $h = 0.25w + 3.8$

Which food had the greatest rate of growth?

A. Food A

B. Food B

C. Food C

D. Food D

ITEM 254

MaryAnn tracked her laptop battery life based on the number of minutes she was using it.

Number of Minutes	30	45	60	90	120
Percent Charge	63	60	56	50	43

Which is the best estimate for the percent of charge when she began using the battery?

A. 13%

B. 50%

C. 70%

D. 93%

ITEM 255

Joseph was tracking the number of pilings that were driven per hour at a construction site near his home.

Number of Hours	3	5	8	10
Number of Pilings	22	36	58	71

Which is the best estimate for the number of pilings per hour?

A. 2

B. 7

C. 12

D. 18

ITEM 256

Najah was supposed to record her mileage when she uses the vehicle, but forgot to write it down when she started a trip. The gas tank was full when she started driving. She recorded the mileage in the car based on the amount of gas tank gauge.

Gauge Level	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{4}$
Miles on Odometer	1796	1830	1866	1901	1971

What is the best estimate of her mileage when she started the trip?

A. 1621 miles

B. 1760 miles

C. 1820 miles

D. 1883 miles

ITEM 257

Leila recorded the number of ice cream cones sold in a day given the high temperature. The results are shown in the table below.

Daily High (°F)	46	50	64	84
Cones Sold	25	40	84	102

If she uses a linear model to represent the data, which **three** of the following statements are true?

A. The rate of change will be positive.

B. The rate of change will be negative.

C. The absolute value of the slope will be less than 1.

D. The absolute value of the slope will be greater than 1.

E. The *y*-intercept will be positive.

F. The *y*-intercept will be negative.

_____ _____ _____

ITEM 258

Damien repairs furniture. He recorded the total fee for renting a truck and the number of miles he drove for the last 5 times he rented a moving van for deliveries in the table below.

Total Fee	$55.60	$53.22	$51.16	$54.97	$52.38
Miles Driven	80	46	23	71	34

What is the best description of the fees he is charged for renting or the cost per mile?

A. He is charged about $0.70 per mile.

B. He is charged an initial rate of $55.60 for renting the van.

C. He is charged $50 for renting the van and $0.07 per mile.

D. He is charged $80 for renting the van and $0.30 per mile.

ITEM 259

The weights of an emu egg during incubation are shown below.

Days of incubation	1	3	5	8	10
Weight (g)	571	567	562	558	551

What is the best estimate for the initial weight of the egg in grams?

A. 546 g

B. 549 g

C. 561 g

D. 574 g

ITEM 260

Marissa collected the following data based on the fees she had been charged on overdue books based on the number of days the books were overdue.

Days late	1	5	6	8	10	14
Fee for one book	$0.75	$1.75	$2.00	$2.50	$3.00	$4.00

What is the best estimate of the late fee per day?

A. $0.25

B. $0.29

C. $0.50

D. $0.75

Statistics and Probability
A1:S-ID.C.8
Items 261 – 264

ITEM 261

Nina collects data on the age (in years) and selling price of two types of used cars. She creates linear functions modeling the relationship for each type.

- The correlation coefficient for the function for Type 1 is 0.37.
- The correlation coefficient for the function for Type 2 is 0.52.

What is the meaning of these correlation coefficients?

A. Type 2 cars lose value more quickly than Type 1 cars.

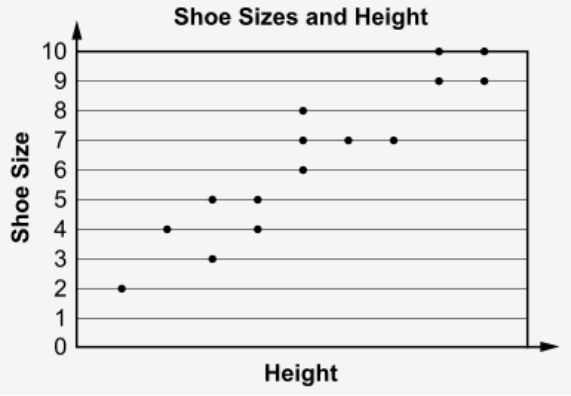
B. Type 1 cars cost less when new than Type 2 cars.

C. The functions model the data for Type 1 better than for Type 2.

D. The functions model the data for Type 2 better than for Type 1.

ITEM 262

This scatterplot shows the data from a study comparing a person's height to his or her shoe size.



The correlation coefficient for this relationship is 0.8. What does this mean in terms of the context?

A. There is a strong relationship between a person's height increasing and their shoe size decreasing.

B. As a person's height increases, their shoe size decreases by 80%.

C. There is a strong relationship between a person's height increasing and their shoe size increasing.

D. As a person's height increases, their shoe size increases by 80%.

ITEM 263

Sachi read this statement in a scientific journal.

"Surprisingly, our study did reveal a very weak relationship between shoe size and heart rate. As shoe size increased, heart rate tended to decrease slightly."

Based on this statement, which number could be the correlation coefficient between shoe size and heart rate?

A. -0.90

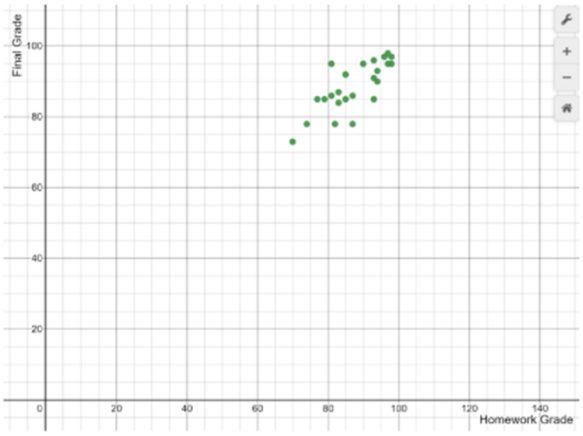
B. -0.30

C. 0.30

D. 0.90

ITEM 264

Mrs. Marion made the following graph to compare her students' homework grades to their final grades.



What is the best description of the correlation between the two sets of data?

A. Strong positive correlation

B. Weak positive correlation

C. Weak negative correlation

D. Strong negative correlation

Statistics and Probability
A1:S-ID.C.9
Items 265 – 267

ITEM 265

Eduardo notices he gets no mosquito bites when he wears a certain kind of sunscreen. He forms two possible conclusions.

1. The sunscreen causes mosquitoes to stay away from him.
2. There is a correlation between wearing sunscreen and getting no mosquito bites, but one does not cause the other.

Which observation would provide the **best** evidence to support conclusion 2?

A. Eduardo's friend gets mosquito bites when he goes out without sunscreen.

B. Eduardo's friend wears the same sunscreen and also gets no mosquito bites.

C. Eduardo gets no mosquito bites when he goes out at the same time of day without sunscreen.

D. Eduardo tries a new kind of sunscreen and goes out at a different time of day and gets mosquito bites.

ITEM 266

Use the table to answer the question.

Presence or Absence of Plants

Plants Found	Number of Sites
Both Plant 1 and Plant 2	69
Plant 1 but not Plant 2	2
Plant 2 but not Plant 1	6
Neither Plant 1 nor Plant 2	123

A biologist is studying the relationship between two species of plants. She surveys 200 sites. Her results are shown in the table.

What does this study demonstrate about the relationship between the plant species?

A. Plant 1 can only grow in the presence of plant 2.

B. Plant 2 can only grow in the presence of plant 1.

C. A third plant is necessary for both plant A and plant B to grow.

D. There is a correlation between the presence of plant 1 and plant 2.

ITEM 267

Larissa collected data about students' math ACT score and their height. What type of results should she expect?

A. Strong correlation with causation

B. Strong correlation with no causation

C. Weak correlation with causation

D. No correlation with no causation