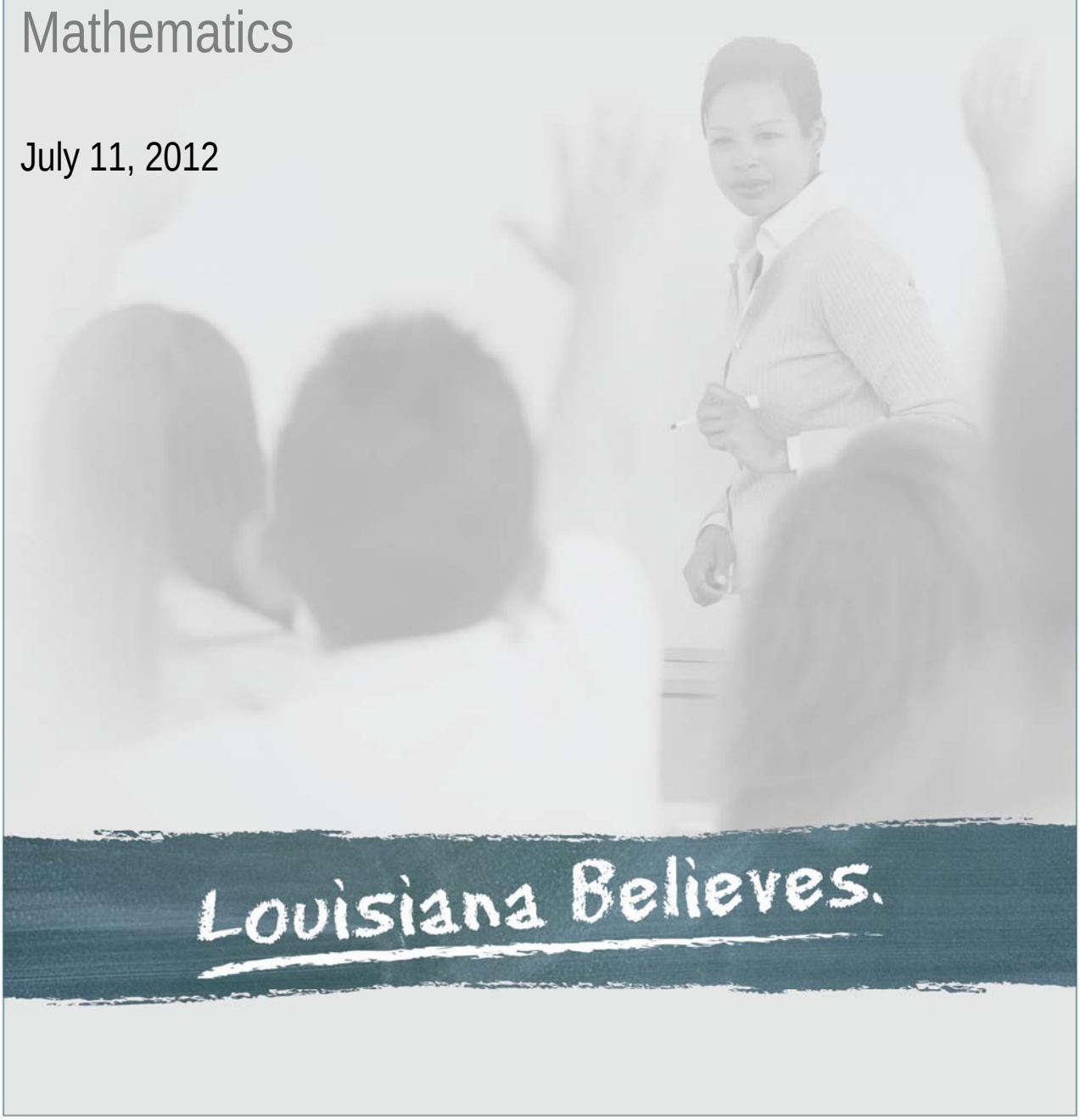
Preview of Common Core State Standards Sample EAGLE Items

Grade 6

Mathematics

July 11, 2012



Grade 6

Technology-enabled, multiple-part, constructed-response item types use a common context and contain several prompts that increase in difficulty or cognitive complexity and guide students to a culminating activity. This type of item can show where a student is within the difficulty or cognitive complexity ranges within a particular standard. It can also be a very effective item type to connect content and practices and assess both conceptual and procedural skills.

The first item in this set assesses fluency expectations given by 6.NS.2. This item asks students to do multi-digit division problems. The format of the item greatly reduces the probability that students can obtain credit by guessing.

The second item utilizes drag-and-drop to offer a rich assessment of identifying equivalent expressions in 6.EE.4. It provides substantially more evidence than a typical multiple-choice item that gives an expression and then asks students to identify an equivalent expression from four answer choices. The format of the item also greatly reduces the probability that students can obtain credit by guessing.

The third item offers an in-depth assessment of representing 3-dimensional figures with nets made of rectangles and triangles and using the net to find the surface area (6.G.4, MP.4). The item uses a graphing tool to enable students to draw the net. This assesses a higher order of cognitive ability than a typical multiple-choice item that asks students to identify a net from four choices. The item seeks further evidence of student understanding by asking students to explain the process (MP.3) they used for calculating the surface area.

The fourth item illustrates a technology-enhanced box plot that enables students to create a box plot that matches a given set of data (MP.4).

The fifth item is an in-depth assessment of 6.RP.3 that strongly connects content with many of the practices (MP.1, MP.2, MP.3, MP.5, MP.8). Students can apply rate and ratio reasoning in several ways to create the table of equivalent ratios (MP.1, MP.2, MP.8). Students then use the graphing tool technology enhancement to plot the pairs of data. Next, students solve a problem that requires the same ratio and rate reasoning applied to two different rates (MP.8). Students then use tools strategically (MP.5) by using either the table or the graph to support (MP.3) the reasonableness of their answer to part C.

UIN:	E16001	Subject:	Math	Grade:	6	Item Type:	SA
CCSS:	6.NS.2	Fluently divide multi-digit numbers using the standard algorithm.					
Practice Standards:							

MC Key:	NA	Item Name:	Fluency with dividing multi-digit numbers	Calculator:	NC	Est. Difficulty:	E	DOK	1
Points:	0–2	Accommodations:		Scoring Method:		AS			
Passage Title(s):									
Source info:									

Enter numbers into the boxes to complete the division facts.

$\frac{88}{4} = \square$

$\frac{288}{18} = \square$

$\frac{2{,}160}{135} = \square$

Rubric

Exemplary Response

$\frac{88}{4} = \boxed{22}$

$\frac{288}{18} = \boxed{16}$

$\frac{2,160}{135} = \boxed{16}$

Points Assigned

- 1 point for each correct division fact

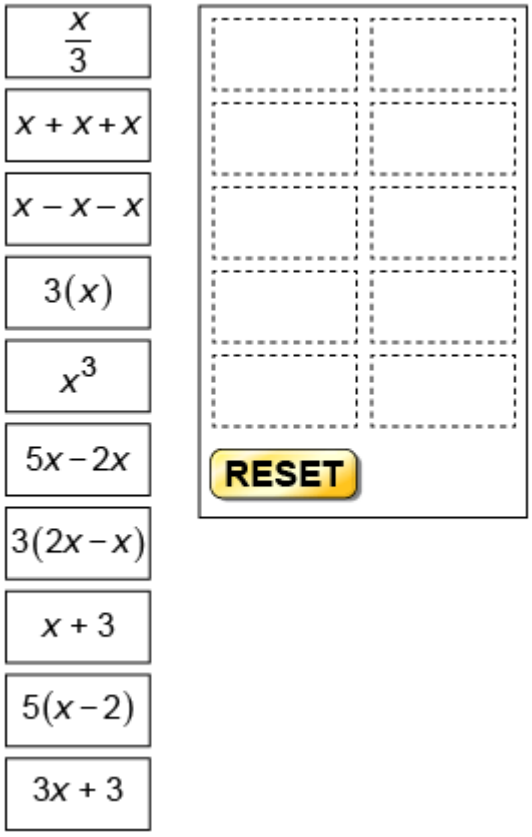
Scoring Rubric

Score	Description
2	3 points
1	1 to 2 points
0	The student's response is incorrect, irrelevant, or blank.

UIN:	E16002	Subject:	Math	Grade:	6	Item Type:	CR
CCSS:	6.EE.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.					
Practice Standards:		7. Look for and make use of structure.					

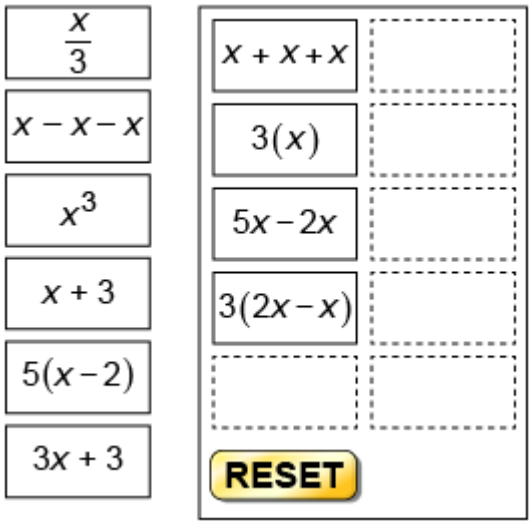
MC Key:	NA	Item Name:	Equivalent expressions	Calculator:	CN	Est. Difficulty:	M	DOK	1
Points:	0–2	Accommodations:			Scoring Method:		AS		
Passage Title(s):									
Source info:									

Drag all of the equivalent expressions into the box. To clear your work, click the Reset button.



Rubric

Exemplary Response



Points Assigned

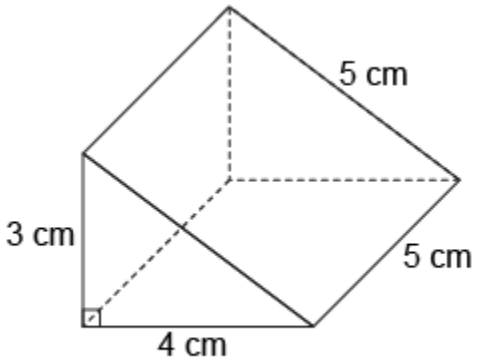
- 1 point for each expression either correctly in or out of the box

Scoring Rubric

Score	Description
2	10 points
1	8 to 9 points
0	The student's response is incorrect or blank.

UIN:	E16003	**Subject:**	Math	**Grade:**	6	**Item Type:**	CR			
CCSS:	6.G.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.								
Practice Standards:		3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics.								
MC Key:	NA	**Item Name:**	Using nets to find surface area	**Calculator:**	CN	**Est. Difficulty:**	H	**DOK**	3	
Points:	0–5	**Accommodations:**			**Scoring Method:**		Mixed			
Passage Title(s):										
Source info:										

Use the right triangular prism to answer the question.



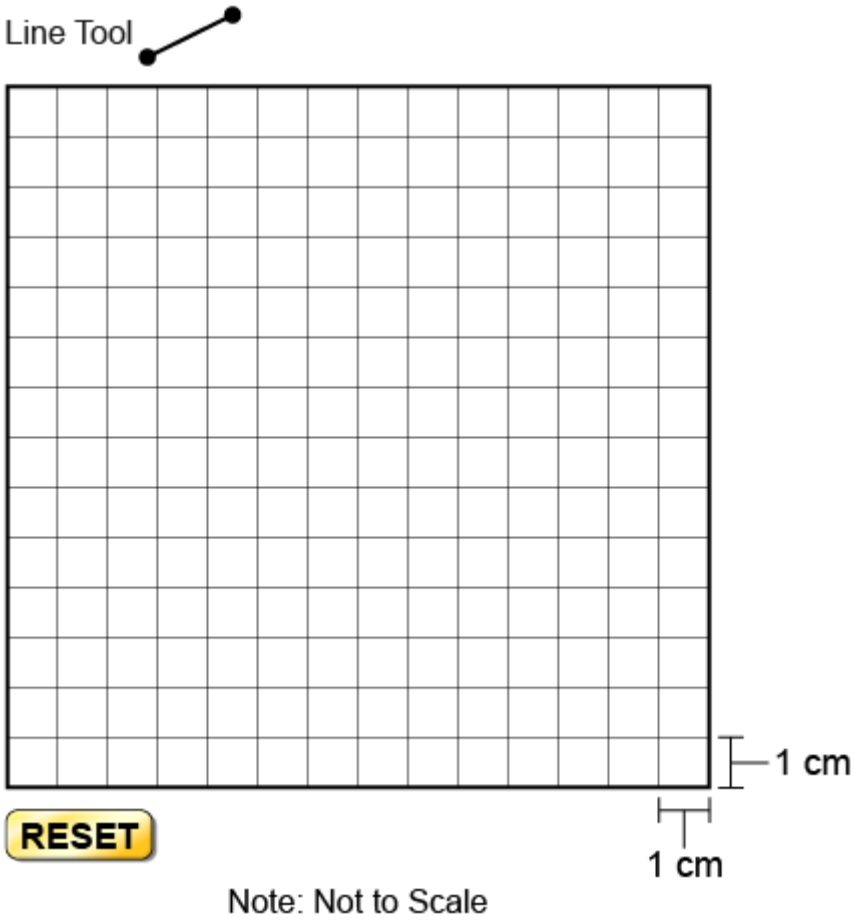
Note: Not to Scale

Part A

Use the line tool to draw a net of the right triangular prism.

To draw a line, drag the line tool to the grid. Rotate the line by clicking and dragging the points near the ends of the line.

To remove a single line, drag the line outside of the grid. To remove all lines, click the Reset button below the grid.



Part B

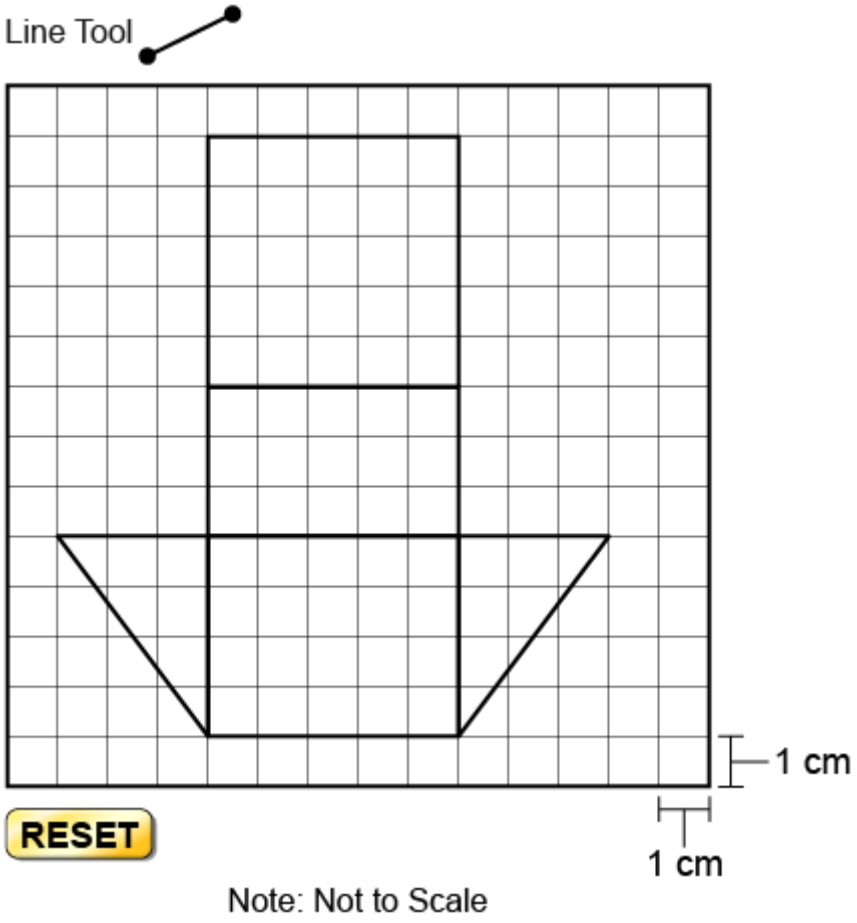
What is the surface area of the right triangular prism?

Explain how you calculated the surface area.

Rubric

Exemplary Response

Part A



Note: Not to Scale

Part B

72 square centimeters

I used the net to find the surface area of the shape. The net is made up of a 5 by 5 square, a 3 by 5 rectangle, a 4 by 5 rectangle, and two 3 by 4 triangles.

I found the area of each part:

5 by 5 square: 5 x 5 = 25 square centimeters
3 by 5 rectangle: 3 x 5 = 15 square centimeters
4 by 5 rectangle: 4 x 5 = 20 square centimeters
3 by 4 triangle: (3 x 4) / 2 = 6 square centimeters
3 by 4 triangle: (3 x 4) / 2 = 6 square centimeters

Then, I added up all of the parts to find the total surface

area.

25 + 15 + 20 + 6 + 6 = 72 square centimeters

Points Assigned

- 1 point for drawing all of the faces of the right prism with the correct dimensions
- 1 point for drawing all of the faces of the right prism connected to each other with the correct orientations
- 1 point for correctly finding the areas of the rectangular shapes based on the net given in part A
- 1 point for correctly finding the areas of the triangular shapes based on the net given in part A
- 1 point for the correct surface area based on the net given in part A

Note: The exemplary response shows one of many possible nets that can be drawn. The other possible nets show the same shapes, but with the triangles connected to the sides of the other rectangles. In part B, a student can earn up to 3 points by providing the correct surface area and a correct explanation of how to find the surface area without using a net in part A.

Scoring Rubric

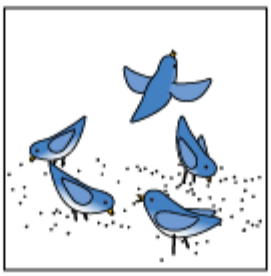
Score	Description
5	5 points
4	4 points
3	3 points
2	2 points
1	1 point
0	The student's response is incorrect, irrelevant, incomplete, or blank.

UIN:	E16004	Subject:	Math	Grade:	6	Item Type:	CR
CCSS:	6.SP.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.					
Practice Standards:		4. Model with mathematics.					

MC Key:	NA	Item Name:	Box Plot	Calculator:	NC	Est. Difficulty:	H	DOK	2
Points:	0–3	Accommodations:		Scoring Method:		AS			
Passage Title(s):									
Source info:									

Mike takes pictures of birds. Click on the camera button to see Mike's pictures.

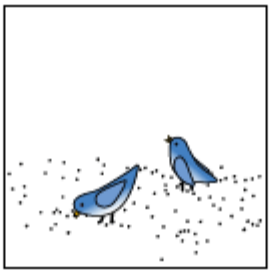
Picture 1



Picture 2

Picture 3

Picture 4



Picture 5

Picture 6

Picture 7

Picture 8

Picture 9

Part A

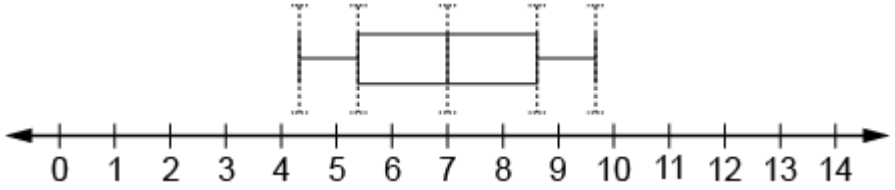
Count the number of birds in each of Mike's pictures and enter the numbers into the table.

Mike's Pictures

Picture	Numbers of Birds
1	
2	
3	
4	
5	
6	
7	
8	
9	

Part B

Drag any of the dashed lines to create a box plot that represents the data in part A.



Rubric

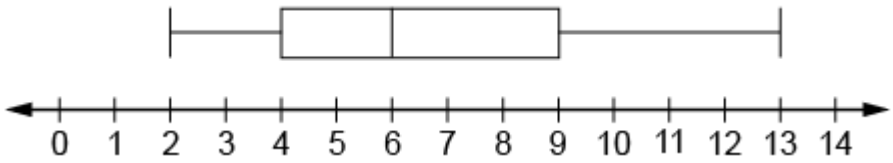
Exemplary Response

Part A

Mike's Pictures

Picture	Numbers of Birds
1	8
2	5
3	3
4	5
5	2
6	6
7	10
8	13
9	7

Part B



Points Assigned

- 1 point for entering the correct number of birds from each photo
- 1 point for 3 to 4 correct values represented on the box plot
- 1 point for 5 correct values represented on the box plot

Note: The extreme values and quartiles are calculated based on the data given in part A. The student receives full credit for part B if the box plot matches the data they provided in part A.

Scoring Rubric

Score	Description
3	3 points
2	2 points
1	1 point
0	The student's response is incorrect, incomplete, or blank.

UIN:	E16005	Subject:	Math	Grade:	6	Item Type:	ER
CCSS:	6.RP.3a	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.					
Practice Standards:		1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 5. Use appropriate tools strategically. 8. Look for and express regularity in repeated reasoning.					

MC Key:	NA	Item Name:	Ratio reasoning	Calculator:	CN	Est. Difficulty:	H	DOK	3
Points:	0–8	Accommodations:		Scoring Method:		Mixed			
Passage Title(s):									
Source info:									

A copy machine has two options for printing. Printing to the front side of a piece of paper is called 1-sided printing. Printing to the front and back of a piece of paper is called 2-sided printing.

Printer Model ARX–6

Estimated Printing Rates

Options	Ratio
1–sided	30 pages : 45 seconds
2–sided	30 pages : 60 seconds

Part A

These tables show the amount of time needed to print different numbers of pages using 1-sided and 2-sided printing. Complete the tables by filling in the blank boxes.

1–sided

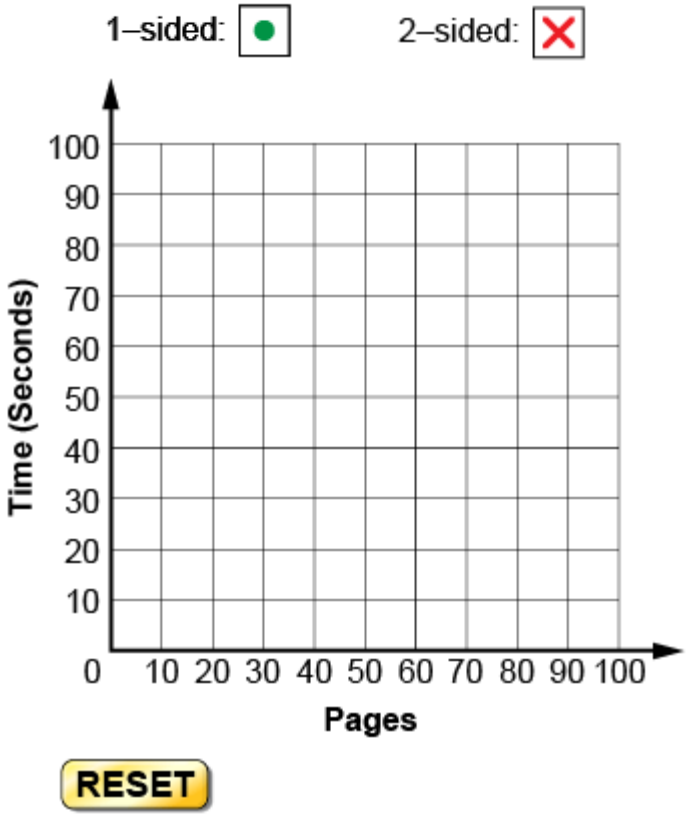
Pages	Time (Seconds)
10	
30	45
	75

2–sided

Pages	Time (Seconds)
10	
30	60
	100

Part B

Graph **all** of the pairs of pages and times that you found in part A from both the 1-sided and 2-sided tables. Drag the dot to plot the pairs of pages and times from the 1-sided table. Drag the X to plot the pairs of pages and times from the 2-sided table. To remove a single pair, drag the dot or X outside of the graph. To remove all pairs from the graph, click the Reset button below the graph.



Part C

How many seconds longer does it take to print 24 pages using 2-sided printing than it does using 1-sided printing?

Show your work.

Explain how the tables in part A or the graph in part B supports the reasonableness of your answer.

Rubric

Part A

Exemplary Response

1–sided

Pages	Time (Seconds)
10	15
30	45
50	75

2–sided

Pages	Time (Seconds)
10	20
30	60
50	100

Points Assigned

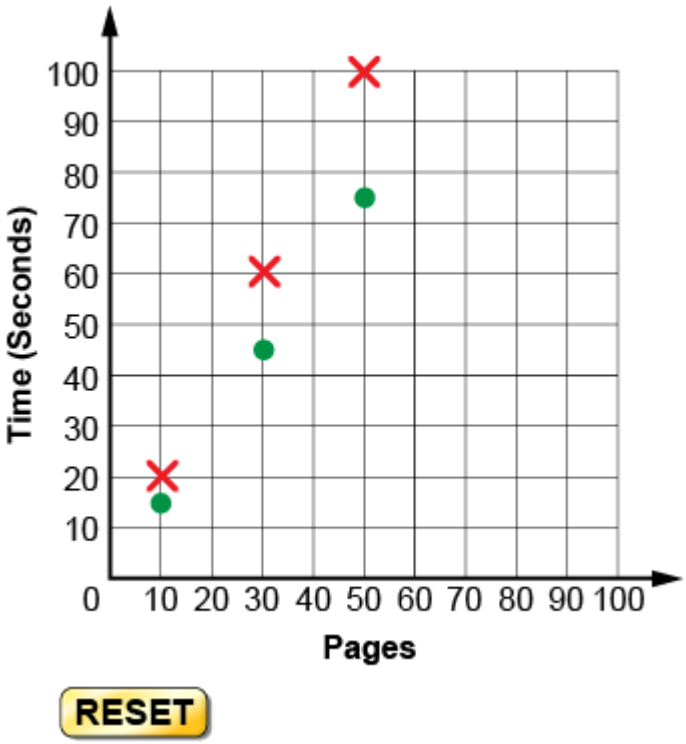
- 1 point for each correct value entered into the table

Scoring Rubric

Score	Description
2	4 points
1	2 to 3 points
0	The student's response is incorrect, incomplete, or blank.

Part B

Exemplary Response



Points Assigned

- 1 point for each pair correctly plotted on the graph

Scoring Rubric

Score	Description
2	6 points
1	5 points
0	The student's response is incorrect, incomplete, or blank.

Part C

Exemplary Response

12 seconds

The 1-sided option can print 1 page in 1.5 seconds, so it can print 24 pages in 24 x 1.5 = 36 seconds.

The 2-sided option can print 1 page in 2 seconds, so it can print 24 pages in 24 x 2 = 48 seconds.

Then, 48 – 36 = 12 seconds.

The table shows that for 30 pages, the time difference between 1-sided and 2-sided printing is 15 seconds. Since 24 is close to, but less than 30, it is reasonable that the time difference should be close to, but less than 15 seconds.

Points Assigned

- 1 point for 12 seconds
- 1 point for showing correct work to find the 1-sided printing time
- 1 point for showing correct work to find the 2-sided printing time
- 1 point for using a lower bound or an upper bound given in the table or graph to support the reasonableness of the answer

Scoring Rubric

Score	Description
4	4 points
3	3 points
2	2 points
1	1 point
0	The student's response is incorrect, irrelevant, too brief to evaluate, or blank.