Louisiana Believes

Supporting Students Who Struggle in Mathematics (Part 2 of 3)

Supervisor Collaborations - January/February 2019

DEPARTMENT of EDUCATION

Objectives

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- Understand LDOE's beliefs about and strategy for supporting students who persistently struggle
- Analyze findings from November collaboration "next steps"
- Experience the approach
- Prepare for March collaborations

Agenda

Agenda

- Supporting Students: Beliefs and Strategy
- Findings from your experiences
- From the students' perspective
- Next Steps

Supporting Students who Struggle in Math: Beliefs and Strategy

Beliefs About Students

The Louisiana Department of Education believes that all students, including students with disabilities, English learners, and students who persistently struggle, can achieve grade-level standards. To ensure that this vision is realized for all students, the following things have to be true.

Strategy to Support Students

1. All students should access on-grade-level instruction every day through a high quality curriculum in the least restrictive environment.

2. Intervention should supplement instruction and accelerate student progress by preparing students for new learning.
   a. With students who need additional support to achieve grade-level standards, teachers should employ the supports within the curriculum that scaffold learning during core instruction.
   b. With students who persistently struggle, teachers should employ more intensive intervention; this should supplement, not replace, the high quality curriculum and embedded supports.

3. All teachers who support struggling learners, including but not limited to general education, special education, English learners, and intervention teachers, should be trained on the curriculum and should plan in a coordinated way to ensure all students are prepared for Tier 1 content during core instruction.

Supporting Students in Math
Within that Overarching Strategy

Math instruction for students who persistently struggle should help students access the Tier 1 curriculum content. This requires teachers to:

1. Identify the standard(s) being targeted during core instruction.
2. Identify the pre-requisite standards using the Remediation Guides.
3. Engage students in components of previous grade levels of the Tier 1 curriculum and/or other aligned resources during small group or individualized instruction.

This additional content can be delivered by the general education, special education, and/or intervention teacher. It will be most effective when delivered by a teacher who is trained in the curriculum and engaged in that student's core math classroom.

Supporting Students in Math
Within that Overarching Strategy

Intensive Math Support

HIGH-QUALITY CURRICULUM

APPROPRIATE RESOURCES
(targeted diagnostics, coherent supports)

EXTENDED TIME

Findings from your Experiences

Supporting Students in Math
Within that Overarching Strategy

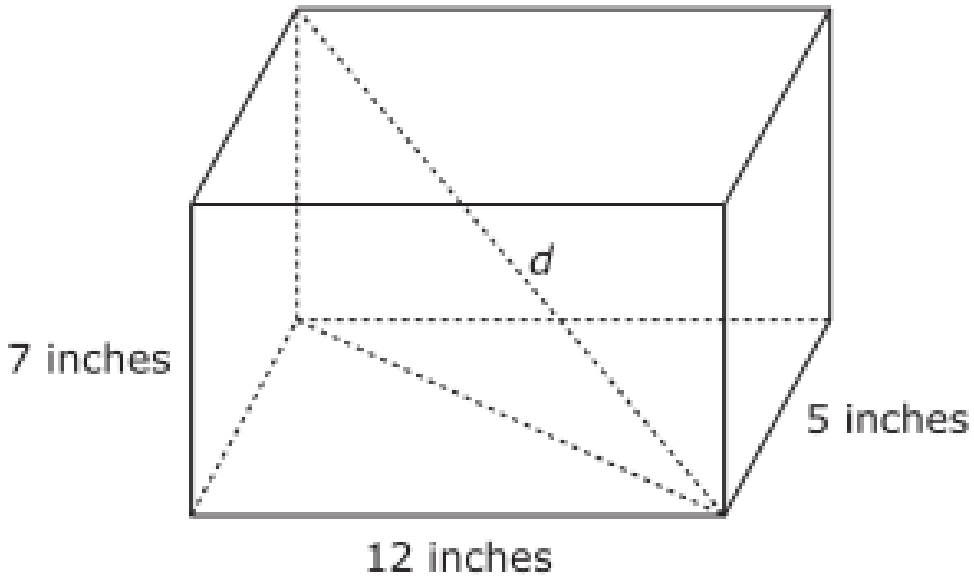
The “next steps” from the November collaboration asked you to conduct classroom walk-throughs:

- Approximately how many walk-throughs of math classrooms have you done since November?
- Approximately how many times did you observe students engaging in remedial work, any math work from previous grades?
- How does/do your school(s) appropriate time for students to engage in prerequisite work as needed?
- Who specifically (e.g., the student’s math teacher, an intervention specialist) provides supports to students who persistently struggle in math?
- How does that teacher determine “what math” to engage students with?

Experience the Math Approach that Prepares Students for Upcoming Learning

8th Grade “Core Instruction”

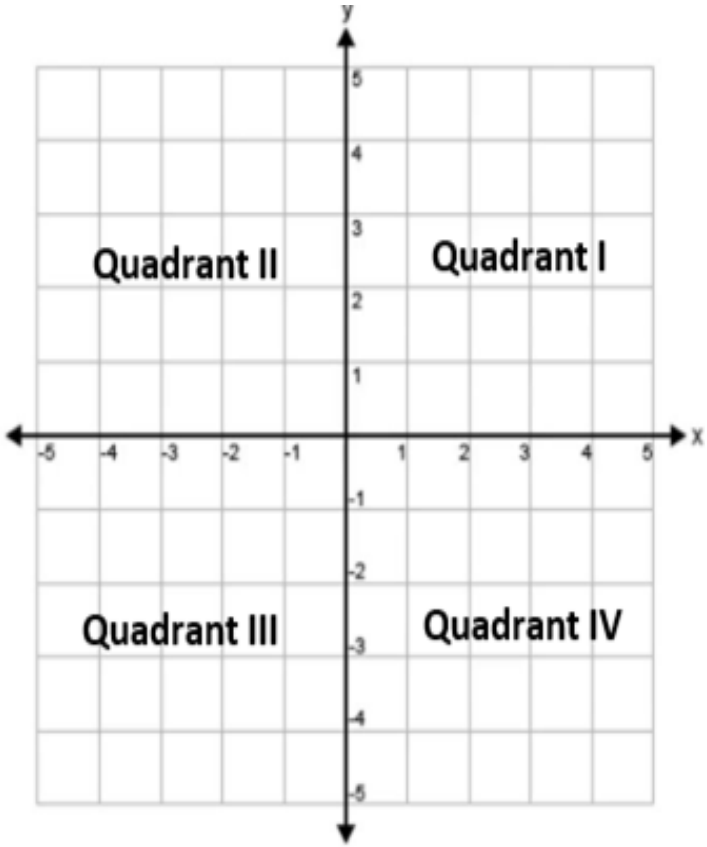
A toy company would like to know the diagonal length of the box below to determine if their new model of toy car will fit into it. Find the diagonal length of the box in inches.



Standard: 8.G.B.7

8th Grade "Intervention": Approach 1

Plotting Points on the Coordinate Plane: 6.NS.C.6.b, 6.NS.C.6.C



Review:

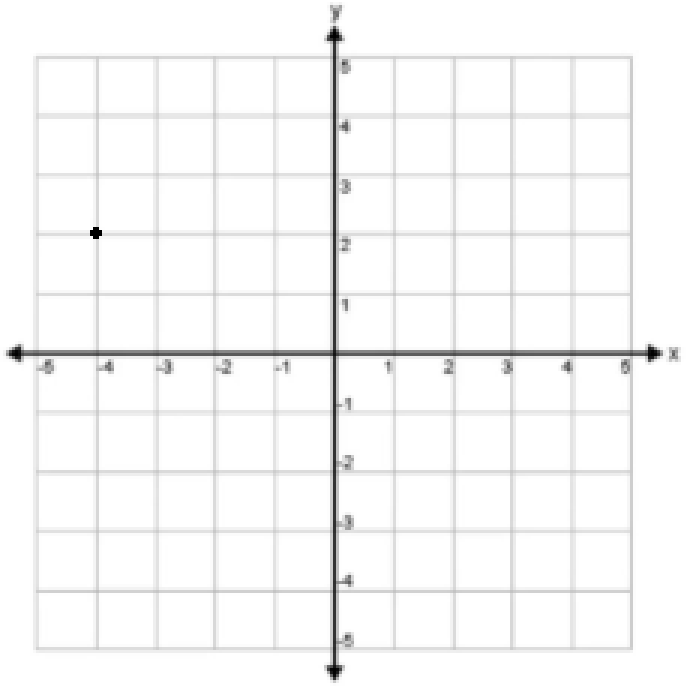
The coordinate plane is made up of the horizontal **x-axis** and the vertical **y-axis**. Each section of the coordinate plane is called a **quadrant**.

We describe points on the coordinate plane using positive and negative numbers as the *x*- and *y*-coordinates called **ordered pairs**.

- Ordered pairs are written in the form of (x, y).

8th Grade "Intervention": Approach 1

Plotting Points on the Coordinate Plane: 6.NS.C.6.b, 6.NS.C.6.c



Practice:

1) The point (-4, 2) is plotted on the graph in quadrant II. Which quadrant would the point (2, -4) be in?

2) Plot and label the following points:

   A (1, 3), *B* (-1, 3), *C* (-1, -3), and *D* (1, -3).

1) If a point has a negative *x*-coordinate, which quadrants could it be in?

8th Grade "Intervention": Approach 1

Plotting Points on the Coordinate Plane: 6.NS.C.6.b, 6.NS.C.6.c

Practice:

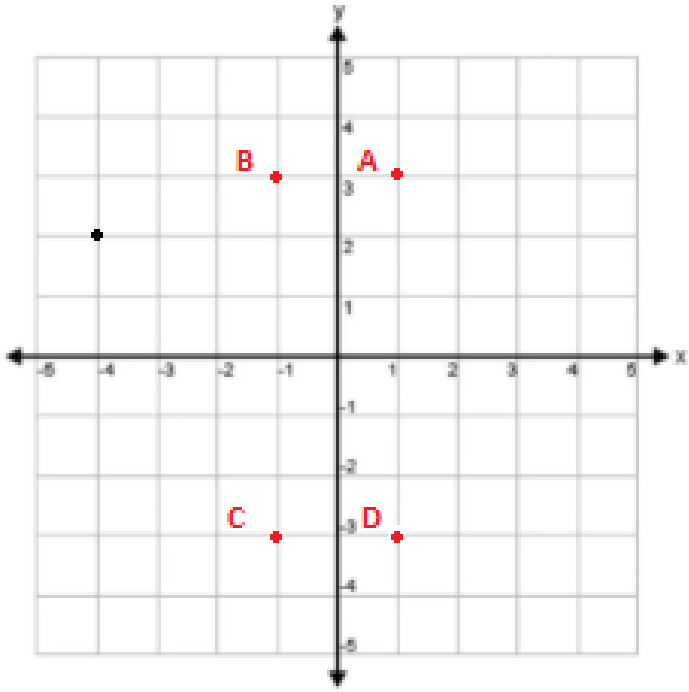
1) The point (-4, 2) is plotted on the graph in quadrant II. Which quadrant would the point (2, -4) be in? **Quadrant IV**

2) Plot and label the following points:

   A (1, 3), *B* (-1, 3), *C* (-1, -3), and *D* (1, -3).

1) If a point has a negative *x*-coordinate, which quadrants could it be in?

   Quadrant II or III



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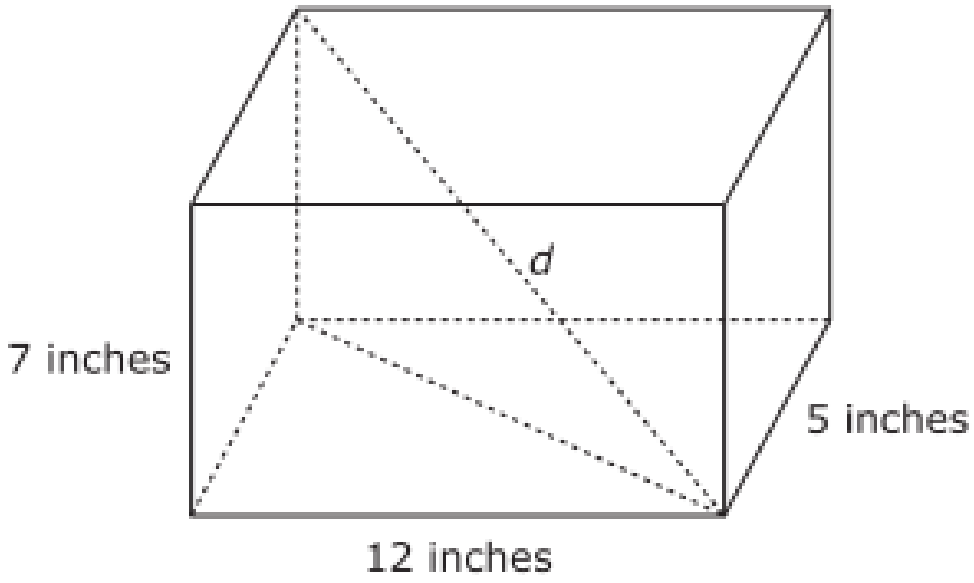


Standard: 8.G.B.7

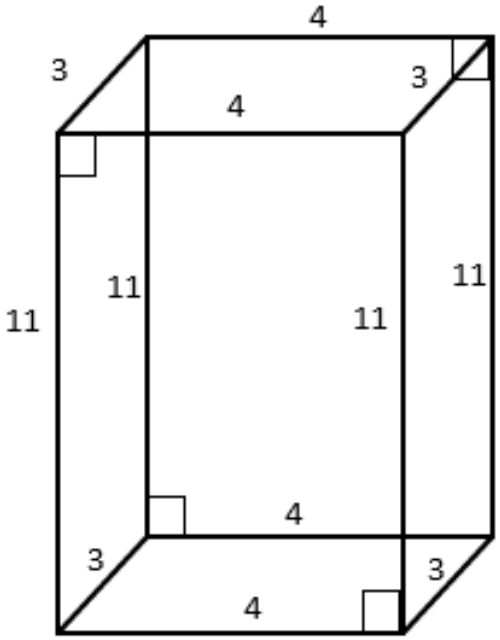
8th Grade “Intervention” (Approach 2)

Definition and properties of three dimensional figures

Review:

A right rectangular prism is a prism with rectangular bases.

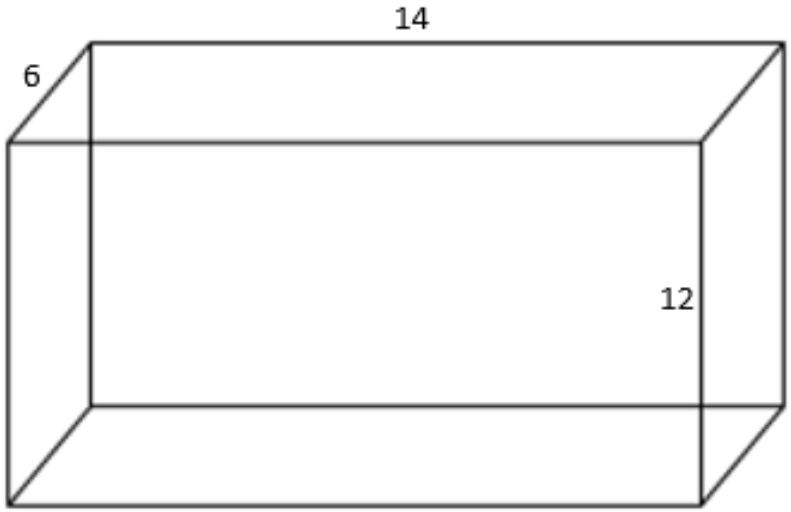
- There are six faces.
- All faces meet at 90 degrees.
- Opposite faces are parallel.
- Opposite sides lengths are congruent.



8th Grade “Intervention” (Approach 2)

Definition and properties of three dimensional figures

Practice: Label the missing side lengths of the right rectangular prism.

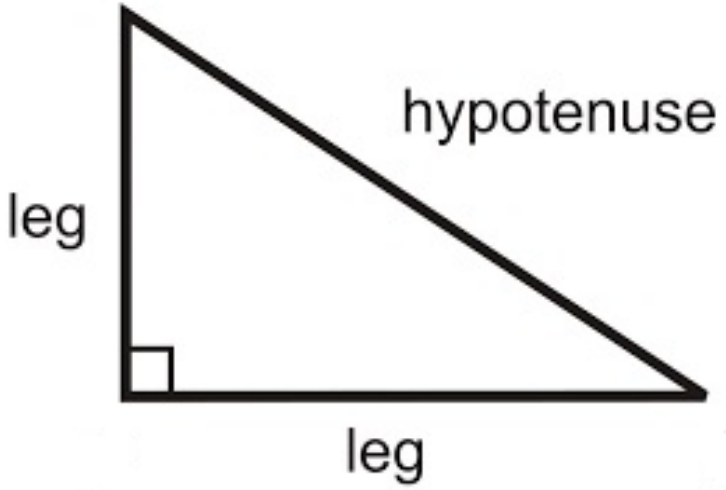


8th Grade “Intervention” (Approach 2)

Using the Pythagorean Theorem to find side lengths of right triangles

Review:

A right triangle is made up of three sides: two legs that meet at 90° and the hypotenuse.



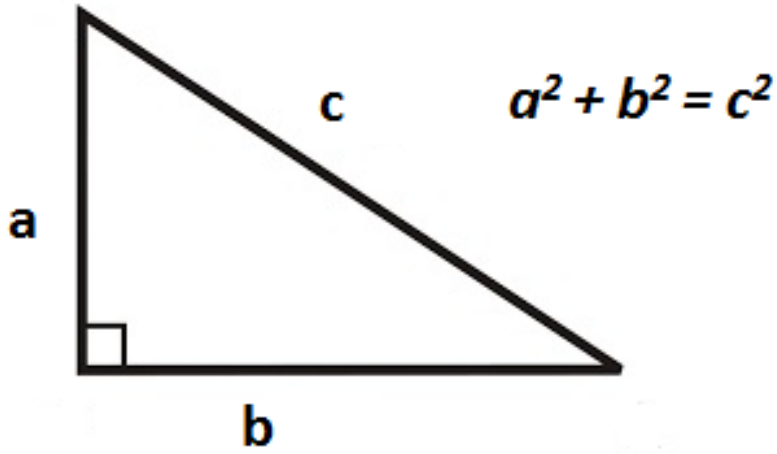
8th Grade "Intervention" (Approach 2)

Using the Pythagorean Theorem to find side lengths of right triangles

Review:

The Pythagorean Theorem is a name for the property of all right triangles that the square of the hypotenuse is equal to the sum of the squares of the legs.

- It is expressed as $a^2 + b^2 = c^2$, where a and b are the legs of the right triangle and c is the hypotenuse.

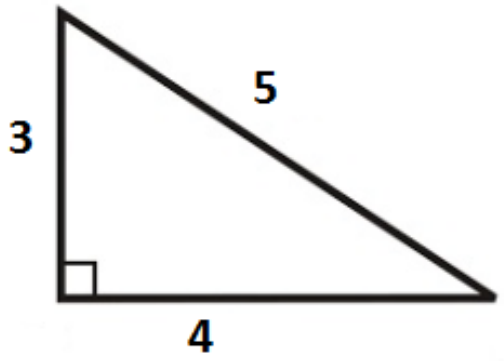


8th Grade “Intervention” (Approach 2)

Using the Pythagorean Theorem to find side lengths of right triangles

Practice:

1) Is the triangle below a right triangle? Why or why not?



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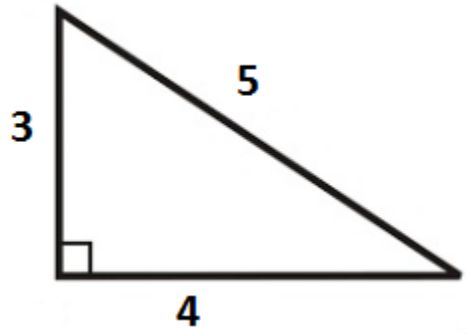


Answer: Yes the triangle is a right triangle because $a^2 + b^2 = c^2$.

$a^2 + b^2 = c^2$

$3^2 + 4^2 = 5^2$

$9 + 16 = 25$

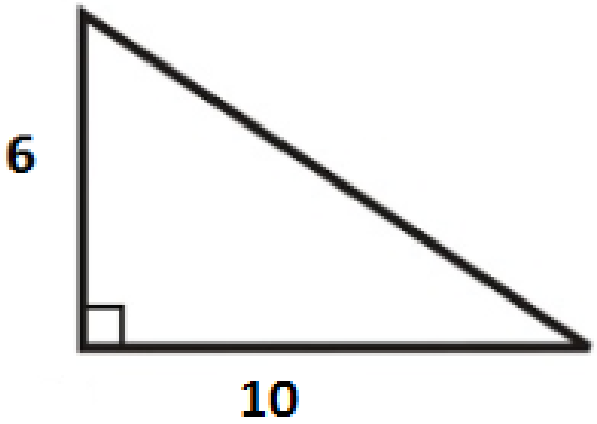
$25 = 25$

8th Grade "Intervention" (Approach 2)

Using the Pythagorean Theorem to find side lengths of right triangles

Practice:

2) Find the missing side length of the triangle below. Round to the nearest thousandth.



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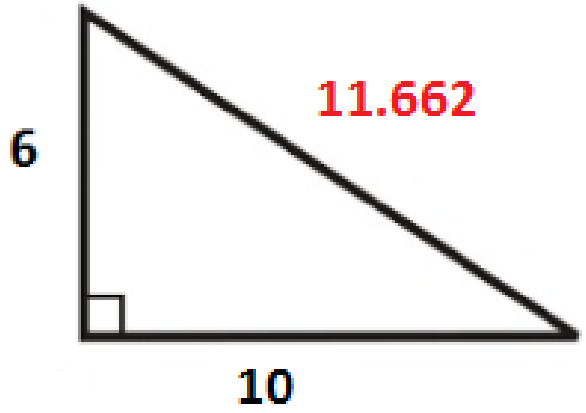


Answer: The missing side length is 11.662.

$a^2 + b^2 = c^2$

$6^2 + 10^2 = c^2$

$36 + 100 = c^2$

$136 = c^2$

$\sqrt{136} = x$

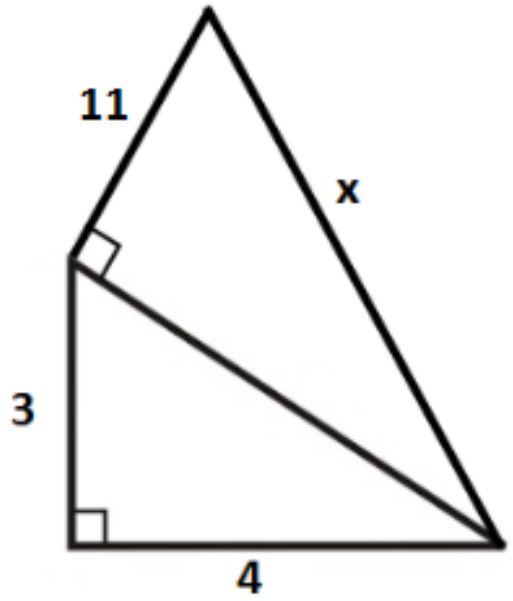
c = 11.662

8th Grade “Intervention” (Approach 2)

Using the Pythagorean Theorem to find side lengths of right triangles

Practice:

3) Solve for x. Round to the nearest hundredth.



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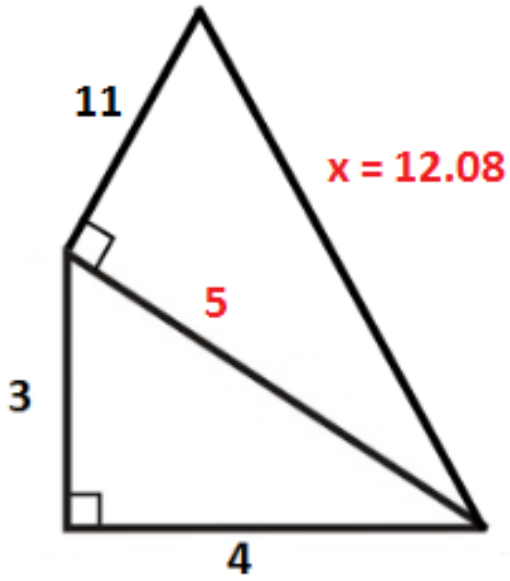

Answer: x = 12.08

This problem uses the Pythagorean Theorem two times.

Smaller Triangle

$a^2 + b^2 = c^2$

$4^2 + 3^2 = c^2$

$16 + 9 = c^2$

$25 = c^2$

$\sqrt{25} = c$

$c = 5$

Larger Triangle

$a^2 + b^2 = x^2$

$5^2 + 11^2 = x^2$

$25 + 121 = x^2$

$146 = x^2$

$\sqrt{146} = x$

$x = 12.08$

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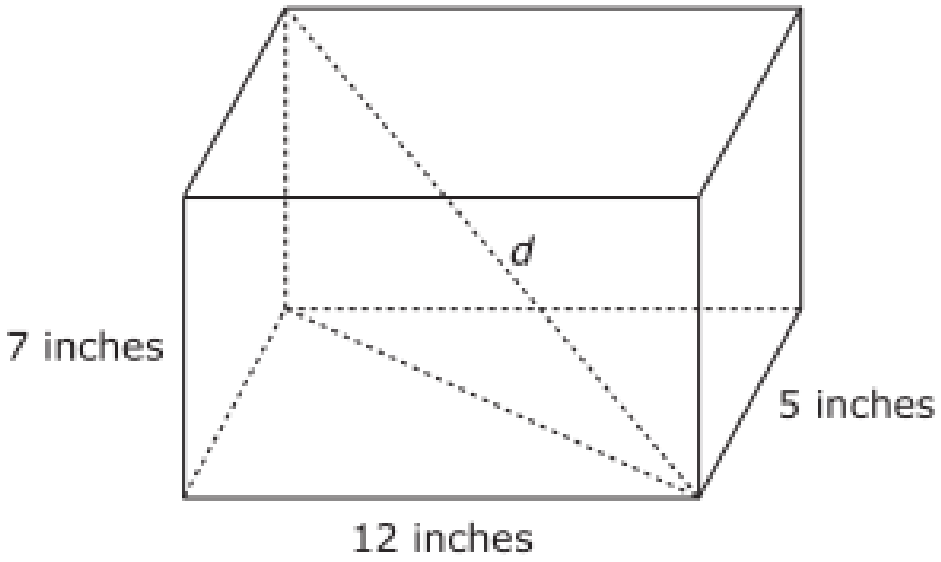

Standard: 8.G.B.7

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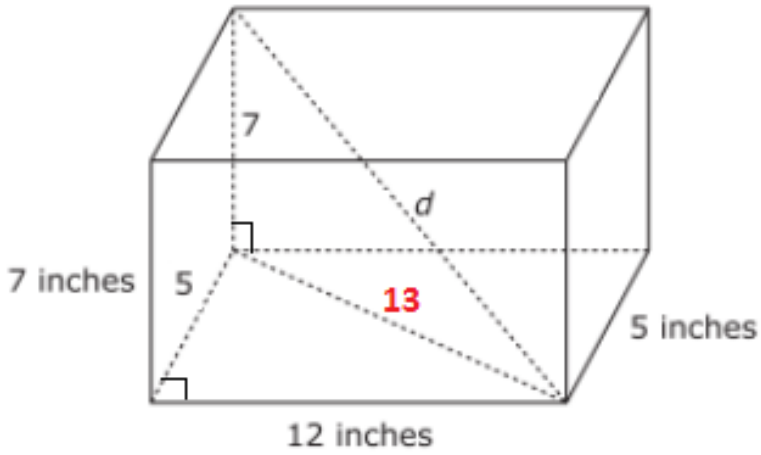

Standard: 8.G.B.7

Answer: **The diagonal of the box is 14.765 inches.**

Step 1: Label the relevant side lengths and right angles of the rectangular prism.

Step 2: Solve the base right triangle using the Pythagorean Theorem.

$$a^2 + b^2 = c^2$$
$$5^2 + 12^2 = c^2$$
$$25 + 144 = c^2$$
$$169 = c^2$$
$$\sqrt{169} = c$$

c = 13 inches

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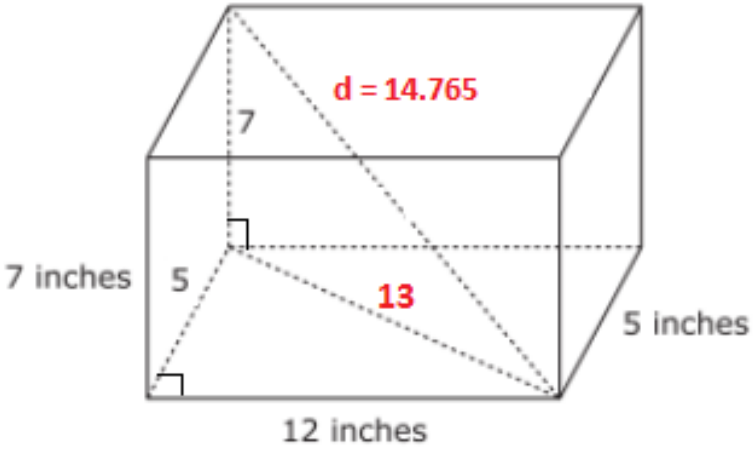

Answer: **The diagonal of the box is 14.765 inches.**

Step 3: Solve the base right triangle using the Pythagorean Theorem.

$a^2 + b^2 = d^2$

$7^2 + 13^2 = d^2$

$49 + 169 = d^2$

$218 = d^2$

$\sqrt{218} = d$

d = 14.765 inches

Supporting Students who Struggle in Math

You just experienced “intervention” time in math with two different approaches.

Standard being taught in class: 8.G.B.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

1. **Gap-focused remediation:** Time focused on the coordinate plane because this is one of the “gaps” that was diagnosed using a diagnostic assessment.

2. **Review of prerequisite skills:**

- Definitions and properties of three dimensional figures
- Using the Pythagorean Theorem to find side lengths of right triangles

Discuss: Which approach happens most often in schools today? Which approach allowed you to engage in the problem posed during “core instruction?” Why?

Next Steps

Next Steps

1. Join the March collaboration: Supporting Students Who Struggle in Math (Part 3 of 3).
2. Register principals and teachers for the TL Summit to learn more about supporting diverse learners.
3. Join the upcoming Intensive Algebra I webinar to plan specifically for Intensive Algebra I implementation at every high school for students who score at the low end of Basic or below Basic.
   - **Webinar Date and Time:** February 13 at 4:00 p.m.
   - **Webinar Link:** https://ldoe.zoom.us/j/923106436
   - **Phone Number:** 1-646-876-9923
   - **Meeting ID#:** 923106436

Email STEM@la.gov with questions.