**Task Model 1**

**Response Type**: **Equation/Numeric**

**DOK Level 2**

**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.

**Evidence Required:**
1. The student solves real–world and mathematical problems of right triangles in two and three dimensions by applying the Pythagorean Theorem and its converse.

**Tools:** Calculator

**Version 3 Update:** Added new TM1b to address the converse of the Pythagorean Theorem, so original TM1 was changed to TM1a.

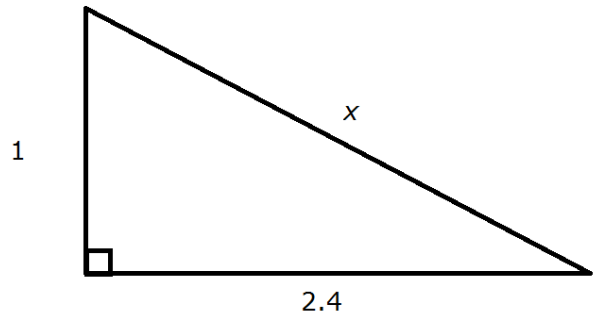
**Prompt Features:** The student is prompted to apply the Pythagorean Theorem to identify an unknown side length of a right triangle.

**Stimulus Guidelines:**

- Context should be familiar to 13–15 year olds.
- Item difficulty can be adjusted via these methods:
  - Finding the hypotenuse or legs
  - Measurements are whole numbers, rational numbers, or irrational numbers
  - Right triangle is in a 2D or 3D figure
  - Pythagorean triplets, such as a 3-4-5 right triangle

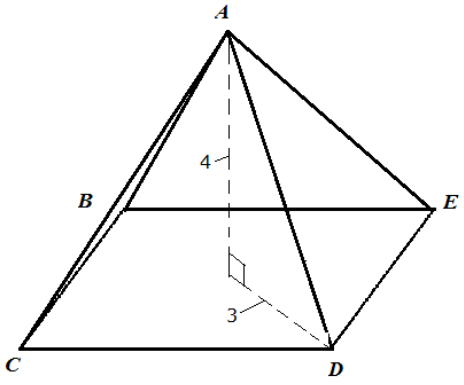
**TM1a**
**Stimulus:** The student is presented with a situation in two or three dimensions where the Pythagorean Theorem must be used to determine the missing sides of the right triangle.

**Example Stem 1:** A right triangle is shown.




Enter the value of *x*.

**Example Stem 2:** A right square pyramid is shown. The height of the pyramid is 4 units. The distance from the center of the base of the pyramid to vertex D is 3 units, as shown.




Enter the length of segment *AD,* in units.

**Task Model 1**

**Response Type**: **Equation/Numeric**

**DOK Level 2**

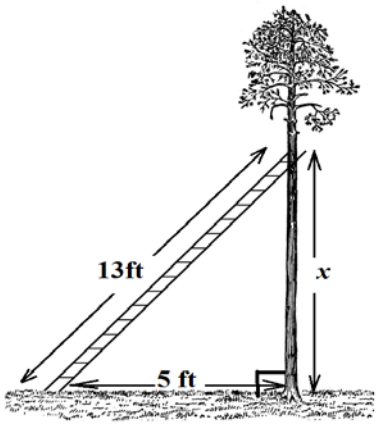
**8.G.B.7**
Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real–world and mathematical problems in two and three dimensions.

**Evidence Required:**
1. The student solves real–world and mathematical problems of right triangles in two and three dimensions by applying the Pythagorean Theorem and its converse.

**Tools:** Calculator

**Version 3 Update:** Added new TM1b to address the converse of the Pythagorean Theorem.

**Example Stem 3:** A 13-foot ladder is leaning on a tree. The bottom of the ladder is on the ground at a distance of 5 feet from the base of the tree. The base of the tree and the ground form a right angle as shown.




Enter the distance between the ground and the top of the ladder, *x*, in feet.

**Rubric:** (1 point) Student enters correct value (e.g., 2.6; 5; 12).

**Response Type:** Equation/Numeric

**TM1b**
**Prompt Features:** The student is prompted to determine whether a triangle meets the definition of a right triangle.

**Stimulus Guidelines:** Same as TM1a

**Example Stem:** The table shows the side lengths for some triangles. Determine whether the side lengths define a right triangle.

Select Yes if it is a right triangle. Select No if it cannot be a right triangle.

| Triangle Side Lengths | Yes | No |
|---|---|---|
| 4 cm, 5 cm, 8 cm | | |
| 8 ft, 10 ft, 16 ft | | |
| 21 in, 28 in, 35 in | | |

**Rubric:** (1 point) Student correctly classifies triangles (e.g., N,N,Y).

**Response Type:** Matching tables

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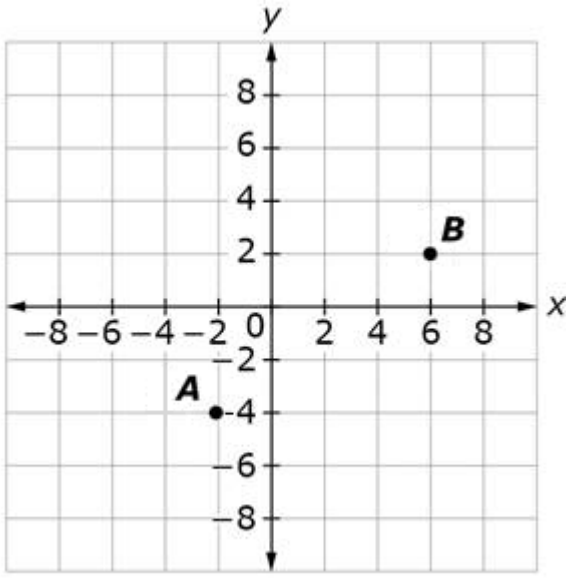
| **Task Model 2**<br><br>**Response Type: Multiple Choice, single correct response; Equation/Numeric**<br><br>**DOK Level 2**<br><br>**8.G.B.8**<br>Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.<br><br>**Evidence Required:**<br>2. The student finds the distance between two points in a coordinate system by applying the Pythagorean Theorem.<br><br>**Tools:** Calculator | **Prompt Features:** The student is prompted to identify the distance between two points in a coordinate system by applying the Pythagorean Theorem.<br><br>**Stimulus Guidelines:**<br>• Context should be familiar to 13–15 year olds.<br>• Item difficulty can be adjusted via these methods:<br>○ Calculations require whole numbers, integers, rational numbers, or irrational numbers.<br>○ The points may be given verbally or with a coordinate grid.<br>○ Pythagorean triplets, such as a 3-4-5 right triangle<br>○ Finding the hypotenuse or legs.<br>○ Measurements are whole numbers, rational numbers, or irrational numbers.<br>○ Right triangle is in a 2D or 3D figure<br>○ Levels of scaffolding.<br><br>**TM2a**<br>**Stimulus:** The student is presented with two or more points in a coordinate system where the Pythagorean Theorem must be used to determine the distance between the points.<br><br>**Example Stem 1:** A coordinate plane is shown with labeled points.<br>  <br><br>What is the distance between point *A* and point *B* on the coordinate plane?<br><br>A. 5<br>B. 6<br>C. 10<br>D. 14 |

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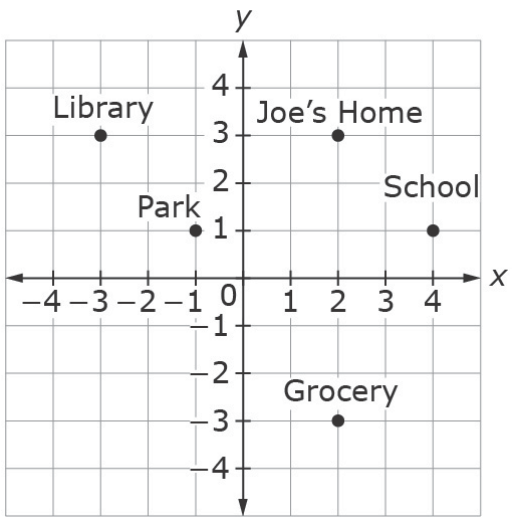
| **Task Model 2**<br><br>**Response Type: Multiple Choice, single correct response; Equation/Numeric**<br><br>**DOK Level 2**<br><br>**8.G.B.8**<br>Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.<br><br>**Evidence Required:**<br>2. The student finds the distance between two points in a coordinate system by applying the Pythagorean Theorem.<br><br>**Tools:** Calculator | **Example Stem 2:** What is the distance between points (5, 2) and (—3, —4) on the coordinate plane?<br><br>A. 5<br>B. 6<br>C. 10<br>D. 14<br><br>**Rubric:** (1 point) Student selects the distance between point *A* and point *B* (e.g., C; C).<br><br>**Response Type:** Multiple Choice, single correct response<br><br>**TM2b**<br>**Stimulus:** The student is presented with two or more points in a coordinate system where the Pythagorean Theorem must be used to determine the distance between the points.<br><br>**Example Stem:** The points show different locations in Joe's town. Each unit represents 1 mile.<br><br>**Places in Joe's Town**<br>  <br><br><br>What is the distance, in miles, between Joe's Home and the Park? Round your answer to the nearest tenth.<br><br>**Rubric:** (1 point) The student finds the distance (e.g., 3.6).<br><br>**Response Type:** Equation/Numeric |