

Name: _____ Date: _____ P: _____

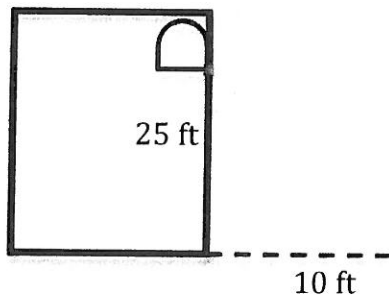
Directions: Read these problems and apply the Pythagorean theorem to find the answers to the questions in each problem.

The measures of three sides of a triangle are given. Determine whether each triangle is a right triangle.

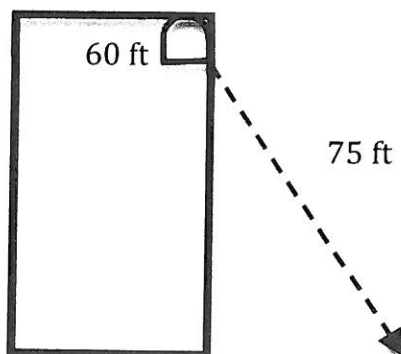
1. $a = \sqrt{21}$, $b = 6$, $c = \sqrt{57}$

2. $a = 11$, $b = \sqrt{55}$, $c = \sqrt{177}$

3. Romeo needs to see the love of his life, Juliet. The only open window is on the second floor, 25 feet above the ground. Romeo will need to borrow a ladder from one of Juliet's neighbors. There is a bush along the edge of her house, so Romeo will have to place the ladder 10 feet from the house. What length of ladder will Romeo need to reach the window? (Round answers to the nearest whole number)

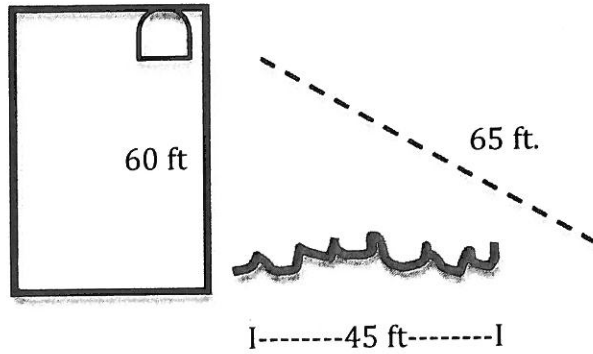


4. The Capulets are not happy with Juliet. Mr. & Mrs. Capulet have moved Juliet to the fourth floor; her open window is now 60 feet above the ground. Once again, Romeo needs to see the love of his life, Julie. Romeo has borrowed a 75-foot ladder from one of Juliet's neighbors. How far from the castle wall will Romeo have to place the base of the ladder if the top of the ladder is at the base of Juliet's open window? (Round answers to the nearest whole number).

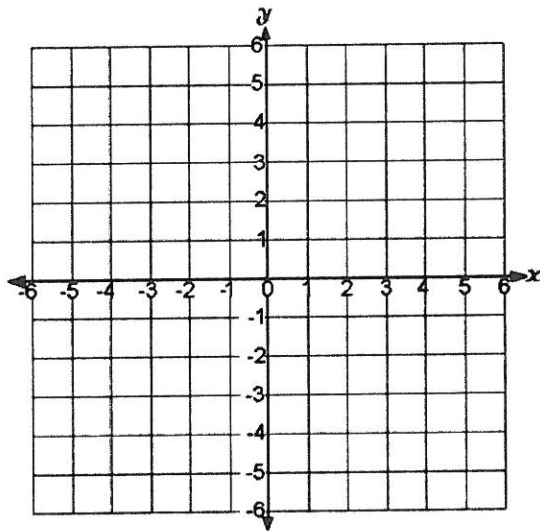


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5. Mr. & Mrs. Capulet are really determined to keep Juliet and Romeo apart. Mr. Capulet has dug a 45-foot wide moat around the wall of the castle, and cut the ladder down to 65 feet. Will Romeo be able to reach Juliet's window, which is 60 feet above the ground, if he places his ladder on the far side of the moat? Prove it.



6. Check the map of Verona and answer the question:



Map Coordinates:

- A. Capulet Palace: (3, -1)
- B. Fr. Lawrence's church: (-2, -3)
- C. Juliet's Tomb: (-2, 4)
- D. Montague Palace: (5, 1)

Do any three of these points form a right triangle if they are connected using straight lines?

How do you know?

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The measures of three sides of a triangle are given. Determine whether each triangle is a right triangle.

1. $a = \sqrt{21}$, $b = 6$, $c = \sqrt{57}$

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

$$(\sqrt{57})^2 = (\sqrt{21})^2 + 6^2$$

$$57 = 21 + 36$$

$$57 = 57$$

yes

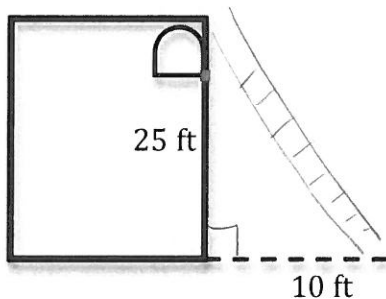
2. $a = 11$, $b = \sqrt{55}$, $c = \sqrt{177}$

$$177 = 121 + 55$$

$$177 \neq 176$$

NO

3. Romeo needs to see the love of his life, Juliet. The only open window is on the second floor, 25 feet above the ground. Romeo will need to borrow a ladder from one of Juliet's neighbors. There is a bush along the edge of her house, so Romeo will have to place the ladder 10 feet from the house. What length of ladder will Romeo need to reach the window? (Round answers to the nearest whole number)



27 feet

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

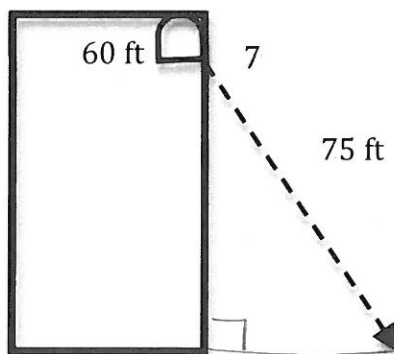
$$c^2 = 25^2 + 10^2$$

$$c^2 = 625 + 100$$

$$\sqrt{c^2} = \sqrt{725}$$

$$c \approx 26.9$$

4. The Capulets are not happy with Juliet. Mr. & Mrs. Capulet have moved Juliet to the fourth floor; her open window is now 60 feet above the ground. Once again, Romeo needs to see the love of his life, Julie. Romeo has borrowed a 75-foot ladder from one of Juliet's neighbors. How far from the castle wall will Romeo have to place the base of the ladder if the top of the ladder is at the base of Juliet's open window? (Round answers to the nearest whole number).



45 ft.

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

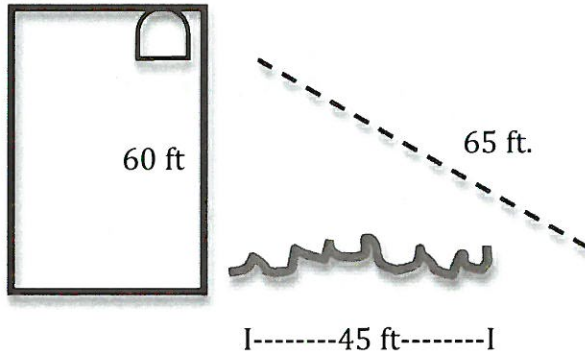
$$75^2 = a^2 + 60^2$$

$$5625 = a^2 + 3600$$

$$\sqrt{2025} = \sqrt{a^2}$$

$$45 = a$$

5. Mr. & Mrs. Capulet are really determined to keep Juliet and Romeo apart. Mr. Capulet has dug a 45-foot wide moat around the wall of the castle, and cut the ladder down to 65 feet. Will Romeo be able to reach Juliet's window, which is 60 feet above the ground, if he places his ladder on the far side of the moat? Prove it.



NO,
Ladder must be
at least 75 ft.

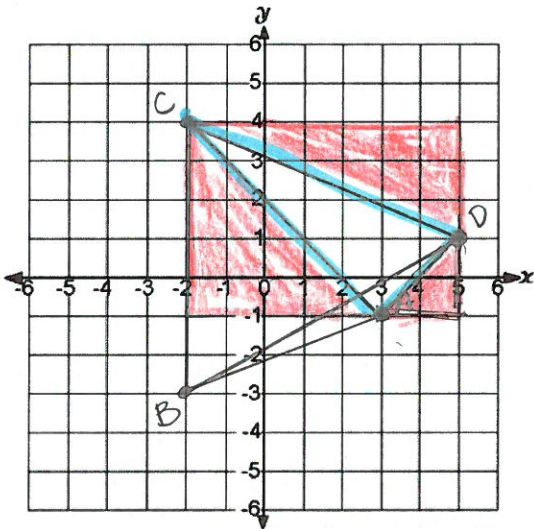
$$60^2 + 45^2 = C^2$$

$$3600 + 2025 = C^2$$

$$\sqrt{5625} = \sqrt{C^2}$$

$$75 = C$$

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- C. Juliet's Tomb: (-2, 4)
- D. Montague Palace: (5, 1)

Do any three of these points form a right triangle if they are connected using straight lines?

$\triangle ACD$
How do you know?

$$AD^2 = 2^2 + 2^2$$

$$AD^2 = 8$$

$$AC^2 = 5^2 + 5^2$$

$$AC^2 = 50$$

$$CD^2 = 7^2 + 3^2$$

$$CD^2 = 58$$

$$AD^2 + AC^2 = CD^2$$

$$8 + 50 = 58$$

$$58 = 58$$

$\triangle ACD$ is a right triangle since the ^{sum of} squares of the legs is equal to the hypotenuse square.