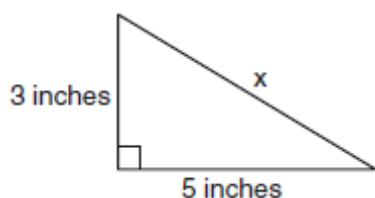


*A.A.45: Determine the measure of a third side of a right triangle using the Pythagorean theorem, given the lengths of any two sides.*

1. 060909ia, P.I. A.A.45

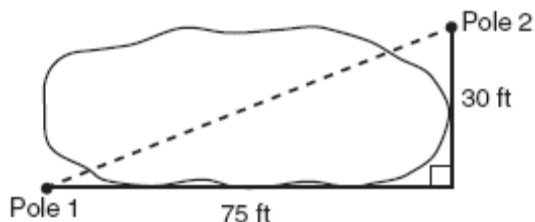
What is the value of  $x$ , in inches, in the right triangle below?



- [A] 4    [B]  $\sqrt{34}$     [C]  $\sqrt{15}$     [D] 8

2. 010508a, P.I. A.A.45

The NuFone Communications Company must run a telephone line between two poles at opposite ends of a lake, as shown in the accompanying diagram. The length and width of the lake are 75 feet and 30 feet, respectively.



What is the distance between the two poles, to the nearest foot?

- [A] 45    [B] 81    [C] 105    [D] 69

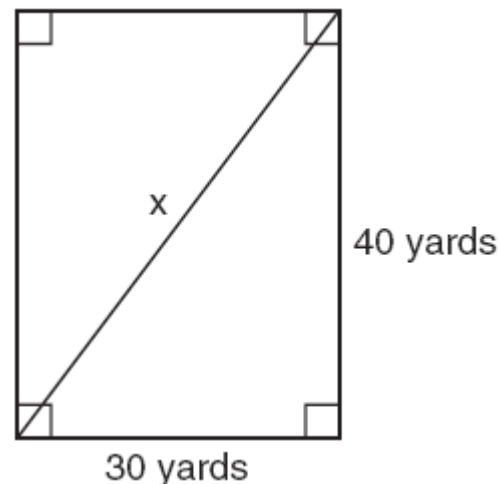
3. 010202a, P.I. A.A.45

If the length of the legs of a right triangle are 5 and 7, what is the length of the hypotenuse?

- [A]  $2\sqrt{3}$     [B]  $\sqrt{74}$   
[C]  $2\sqrt{6}$     [D]  $\sqrt{2}$

4. fall0711ia, P.I. A.A.45

Tanya runs diagonally across a rectangular field that has a length of 40 yards and a width of 30 yards, as shown in the diagram below.

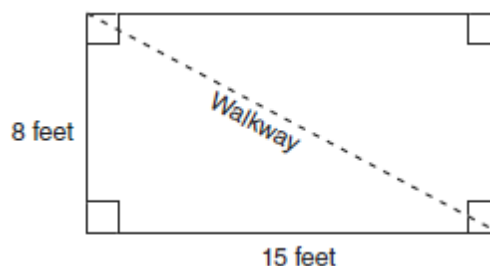


What is the length of the diagonal, in yards, that Tanya runs?

- [A] 80    [B] 50    [C] 70    [D] 60

5. 080906ia, P.I. A.A.45

Nancy's rectangular garden is represented in the diagram below.



If a diagonal walkway crosses her garden, what is its length, in feet?

- [A]  $\sqrt{161}$     [B]  $\sqrt{529}$     [C] 17    [D] 22

6. 060710a, P.I. A.A.45

If the length of a rectangular television screen is 20 inches and its height is 15 inches, what is the length of its diagonal, in inches?

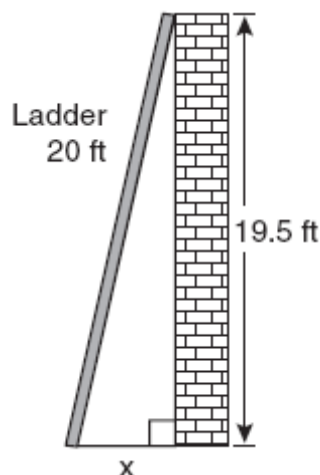
- [A] 35    [B] 5    [C] 13.2    [D] 25

7. 010933a, P.I. A.A.45

The "Little People" day care center has a rectangular, fenced play area behind its building. The play area is 30 meters long and 20 meters wide. Find, to the *nearest meter*, the length of a pathway that runs along the diagonal of the play area.

8. 060825ia, P.I. A.A.45

Don placed a ladder against the side of his house as shown in the diagram below.



Which equation could be used to find the distance,  $x$ , from the foot of the ladder to the base of the house?

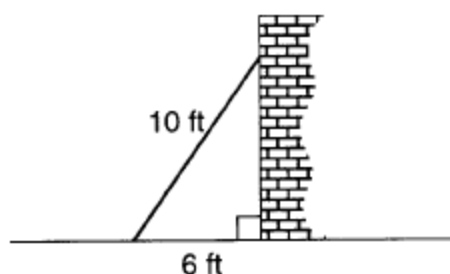
[A]  $x = 20 - 19.5$  [B]  $x = \sqrt{20^2 - 19.5^2}$

[C]  $x = \sqrt{20^2 + 19.5^2}$

[D]  $x = 20^2 - 19.5^2$

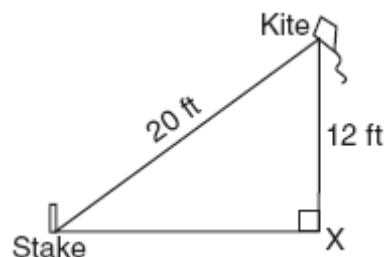
9. 010023a, P.I. A.A.45

A wall is supported by a brace 10 feet long, as shown in the diagram below. If one end of the brace is placed 6 feet from the base of the wall, how many feet up the wall does the brace reach?



10. 080531a, P.I. A.A.45

The accompanying diagram shows a kite that has been secured to a stake in the ground with a 20-foot string. The kite is located 12 feet from the ground, directly over point  $X$ . What is the distance, in feet, between the stake and point  $X$ ?



11. 080809ia, P.I. A.A.45

The length of the hypotenuse of a right triangle is 34 inches and the length of one of its legs is 16 inches. What is the length, in inches, of the other leg of this right triangle?

[A] 16 [B] 18 [C] 30 [D] 25

12. 080122a, P.I. A.A.45

How many feet from the base of a house must a 39-foot ladder be placed so that the top of the ladder will reach a point on the house 36 feet from the ground?

13. 060832a, P.I. A.A.45

An 18-foot ladder leans against the wall of a building. The base of the ladder is 9 feet from the building on level ground. How many feet up the wall, to the *nearest tenth of a foot*, is the top of the ladder?

14. 060115a, P.I. A.A.45

A woman has a ladder that is 13 feet long. If she sets the base of the ladder on level ground 5 feet from the side of a house, how many feet above the ground will the top of the ladder be when it rests against the house?

[A] 9 [B] 11 [C] 8 [D] 12

15. 080707a, P.I. A.A.45

A cable 20 feet long connects the top of a flagpole to a point on the ground that is 16 feet from the base of the pole. How tall is the flagpole?

[A] 8 ft [B] 10 ft [C] 12 ft [D] 26 ft

16. spring9834a, A.A.45

A 10-foot ladder is placed against the side of a building as shown in figure 1 below. The bottom of the ladder is 8 feet from the base of the building. In order to increase the reach of the ladder against the building, it is moved 4 feet closer to the base of the building as shown in figure 2.

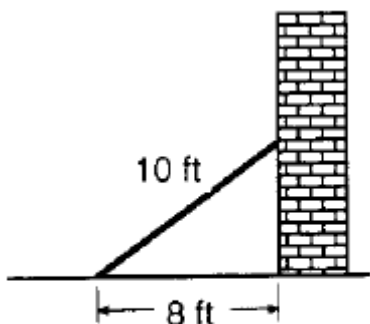


Figure 1

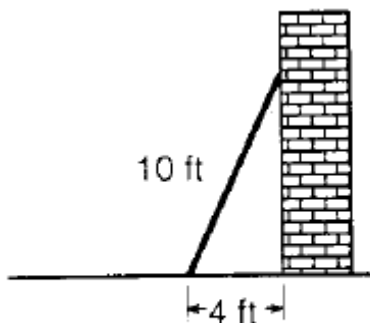
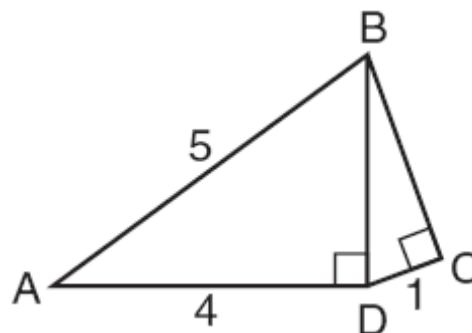


Figure 2

To the *nearest foot*, how much further up the building does the ladder now reach?

17. 080633a, P.I. A.A.45

In the accompanying diagram of right triangles  $ABD$  and  $DBC$ ,  $AB = 5$ ,  $AD = 4$ , and  $CD = 1$ . Find the length of  $\overline{BC}$ , to the nearest tenth.



*A.A.45: Determine the measure of a third side of a right triangle using the Pythagorean theorem, given the lengths of any two sides.*

[1] B \_\_\_\_\_

[2] B \_\_\_\_\_

[3] B \_\_\_\_\_

[4] B \_\_\_\_\_

[5] C \_\_\_\_\_

[6] D \_\_\_\_\_

[2] 36, and appropriate work is shown.

[1] Appropriate work is shown, but one computational or rounding error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] 36, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[7] incorrect procedure. \_\_\_\_\_

[8] B \_\_\_\_\_

[2] 8 and the use of trigonometry, the Pythagorean theorem, or Pythagorean triple is shown.

[1] The Pythagorean theorem or trigonometry is used, but a computational mistake is made or substitution is incorrect, such as

$$6^2 = 10^2 + x^2.$$

[1] 8 and no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[9] incorrect procedure. \_\_\_\_\_

[2] 16, and appropriate work is shown, such as the Pythagorean theorem, the Pythagorean triple, or trigonometry.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made, such as using an incorrect trigonometric function.

or [1] 16, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[10] incorrect procedure. \_\_\_\_\_

[11] C \_\_\_\_\_

[2] 15, and appropriate work is shown, such as using the Pythagorean theorem, Pythagorean triples, or trigonometric functions.

[1] The data are substituted incorrectly, but an appropriate answer is found and is rounded correctly.

or [1] Appropriate work is shown, but one or more computational errors are made.

or [1] 15, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[12] incorrect procedure. \_\_\_\_\_

[2] 15.6, and appropriate work is shown.

[1] Appropriate work is shown, but one computational or rounding error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] 15.6, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[13] incorrect procedure. \_\_\_\_\_

[14] D \_\_\_\_\_

[15] C \_\_\_\_\_

[4] Finds the height of 6 feet in figure 1, the height of 9.16 or 9 feet in figure 2 and subtracts to arrive at a correct answer of 3 feet.

[3] Calculates correctly but does not round to nearest foot.

or [3] Makes one mistake in calculating heights and does calculate a difference.

[2] Finds the 6 foot height and attempts to use the Pythagorean Theorem to find the height of figure 2 but either calculates wrong or substitutes incorrectly.

[1] Finds only the 6 foot height of figure 1.

or [1] Attempts to use the Pythagorean

[16] Theorem but substitutes incorrectly.

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[2] 2.8, and appropriate work is shown, such as  $3^2 = 1^2 + (BC)^2$ .

[1] Appropriate work is shown, but one computational or rounding error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] The length of  $\overline{BD}$  is found to be 3, but no further correct work is shown.

or [1] 2.8, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[17] incorrect procedure.

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