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1. 060307a, P.I. G.G.45

A triangle has sides whose lengths are 5, 12, and 13. A similar triangle could have sides with lengths of

- [A] 3, 4, and 15      [B] 6, 8, and 10  
 [C] 7, 24, and 25      [D] 10, 24, and 26

2. 010410a, P.I. G.G.45

The accompanying diagram shows two similar triangles.

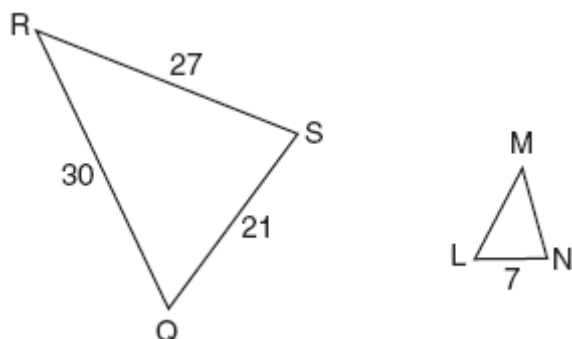


Which proportion could be used to solve for  $x$ ?

- [A]  $\frac{32}{x} = \frac{12}{15}$       [B]  $\frac{x}{24} = \frac{9}{15}$   
 [C]  $\frac{32}{12} = \frac{15}{x}$       [D]  $\frac{24}{9} = \frac{15}{x}$

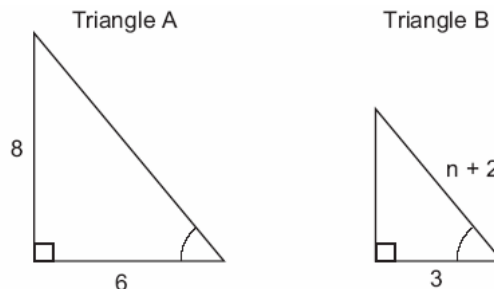
3. 010931a, P.I. G.G.45

In the accompanying diagram,  $\triangle QRS$  is similar to  $\triangle LMN$ ,  $RQ = 30$ ,  $QS = 21$ ,  $SR = 27$ , and  $LN = 7$ . What is the length of  $\overline{ML}$ ?



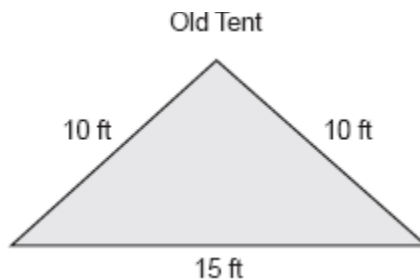
4. 060230a, P.I. G.G.45

In the accompanying diagram, triangle  $A$  is similar to triangle  $B$ . Find the value of  $n$ .



5. 060024a, P.I. G.G.45

The Rivera family bought a new tent for camping. Their old tent had equal sides of 10 feet and a floor width of 15 feet, as shown in the accompanying diagram.

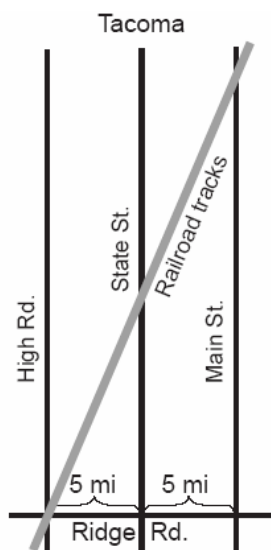


If the new tent is similar in shape to the old tent and has equal sides of 16 feet, how wide is the floor of the new tent?

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6. 080021a, P.I. G.G.45

The accompanying diagram shows a section of the city of Tacoma. High Road, State Street, and Main Street are parallel and 5 miles apart. Ridge Road is perpendicular to the three parallel streets. The distance between the intersection of Ridge Road and State Street and where the railroad tracks cross State Street is 12 miles. What is the distance between the intersection of Ridge Road and Main Street and where the railroad tracks cross Main Street?



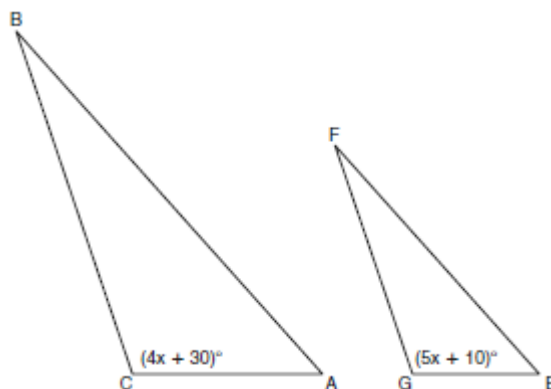
7. 060927ge, P.I. G.G.45

In  $\triangle ABC$ , point  $D$  is on  $\overline{AB}$ , and point  $E$  is on  $\overline{BC}$  such that  $\overline{DE} \parallel \overline{AC}$ . If  $DB = 2$ ,  $DA = 7$ , and  $DE = 3$ , what is the length of  $\overline{AC}$ ?

[A] 8      [B] 10.5      [C] 13.5      [D] 9

8. 060934ge, P.I. G.G.45

In the diagram below,  $\triangle ABC \sim \triangle EFG$ ,  $m\angle C = 4x + 30$ , and  $m\angle G = 5x + 10$ . Determine the value of  $x$ .

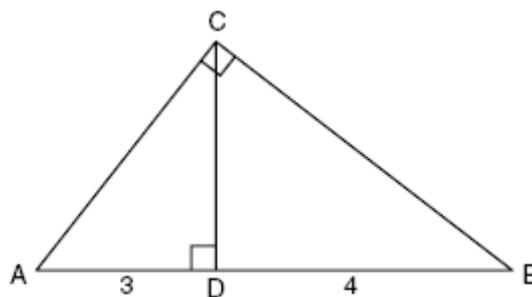


9. 010532a, P.I. G.G.58

Fran's favorite photograph has a length of 6 inches and a width of 4 inches. She wants to have it made into a poster with dimensions that are similar to those of the photograph. She determined that the poster should have a length of 24 inches. How many inches wide will the poster be?

10. fall0829ge, P.I. G.G.47

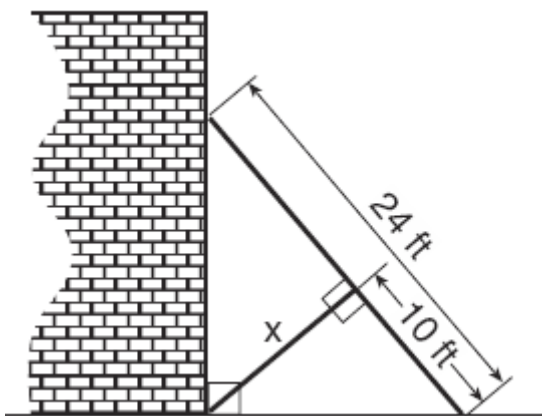
In the diagram below of right triangle  $ACB$ , altitude  $\overline{CD}$  intersects  $\overline{AB}$  at  $D$ . If  $AD = 3$  and  $DB = 4$ , find the length of  $\overline{CD}$  in simplest radical form.



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11. 010619b, P.I. G.G.47

The accompanying diagram shows a 24-foot ladder leaning against a building. A steel brace extends from the ladder to the point where the building meets the ground. The brace forms a right angle with the ladder.



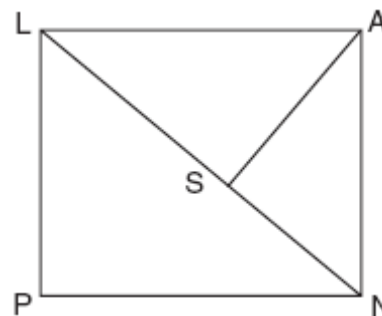
If the steel brace is connected to the ladder at a point that is 10 feet from the foot of the ladder, which equation can be used to find the length,  $x$ , of the steel brace?

[A]  $10^2 + x^2 = 14^2$       [B]  $10^2 + x^2 = 24^2$

[C]  $\frac{10}{x} = \frac{x}{14}$       [D]  $\frac{10}{x} = \frac{x}{24}$

12. 010920b, P.I. G.G.47

The accompanying diagram shows part of the architectural plans for a structural support of a building.  $PLAN$  is a rectangle and  $\overline{AS} \perp \overline{LN}$ .



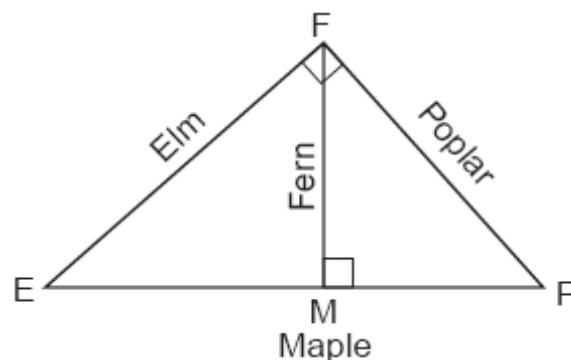
Which equation can be used to find the length of  $\overline{AS}$ ?

[A]  $\frac{AN}{LN} = \frac{AS}{LS}$       [B]  $\frac{LS}{AS} = \frac{AS}{SN}$

[C]  $\frac{AS}{LS} = \frac{LS}{SN}$       [D]  $\frac{AS}{SN} = \frac{AS}{LS}$

13. 060828b, P.I. G.G.47

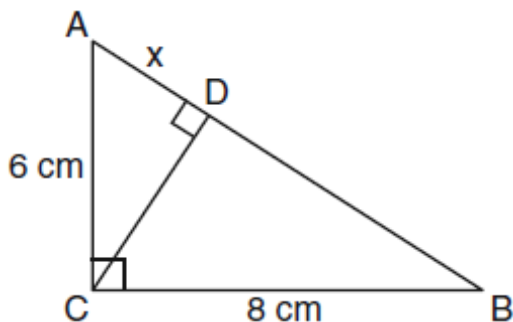
Four streets in a town are illustrated in the accompanying diagram. If the distance on Poplar Street from  $F$  to  $P$  is 12 miles and the distance on Maple Street from  $E$  to  $M$  is 10 miles, find the distance on Maple Street, in miles, from  $M$  to  $P$ .



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14. 060915ge, P.I. G.G.47

In the diagram below, the length of the legs  $\overline{AC}$  and  $\overline{BC}$  of right triangle  $ABC$  are 6 cm and 8 cm, respectively. Altitude  $\overline{CD}$  is drawn to the hypotenuse of  $\triangle ABC$ .

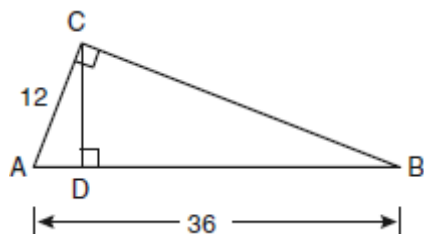


What is the length of  $\overline{AD}$  to the *nearest tenth* of a centimeter?

- [A] 6.4    [B] 6.0    [C] 3.6    [D] 4.0

15. 080922ge, P.I. G.G.47

In the diagram below of right triangle  $ACB$ , altitude  $\overline{CD}$  is drawn to hypotenuse  $\overline{AB}$ .

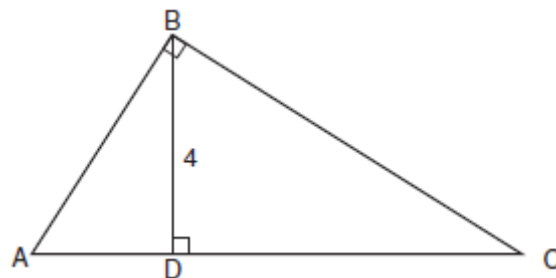


If  $AB = 36$  and  $AC = 12$ , what is the length of  $\overline{AD}$ ?

- [A] 3    [B] 32    [C] 6    [D] 4

16. 080932b, P.I. G.G.47

The drawing for a right triangular roof truss, represented by  $\triangle ABC$ , is shown in the accompanying diagram. If  $\angle ABC$  is a right angle, altitude  $BD = 4$  meters, and  $\overline{DC}$  is 6 meters longer than  $\overline{AD}$ , find the length of base  $\overline{AC}$ , in meters.



[1] D \_\_\_\_\_

[2] A \_\_\_\_\_

[2] 10, and appropriate work is shown.

[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 writing an incorrect proportion.

or [1] A correct proportion is written, but no further correct work is shown.

or [1] 10, 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

[3] incorrect procedure.

[3] 3, and appropriate work is shown, such as using a 3:4:5 right triangle, correct proportions, or the Pythagorean theorem with a proportion.

[2] Appropriate work is shown, and the value of the side is determined to be 5, but  $n = 3$  is not found.

[1] A correct proportion is set up, but no answer or an incorrect answer is found.

or [1] 3, 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

[4] incorrect procedure.

[2] 24 feet and appropriate work is shown,

such as  $\frac{10}{15} = \frac{16}{x}$  or  $\frac{10}{16} = \frac{15}{x}$ .

[1] An appropriate proportion is shown, but an incorrect solution or no solution is found.

or [1] An incorrect proportion of equal difficulty is shown, but an appropriate solution for the proportion written is found.

or [1] 24 feet 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

[5] incorrect procedure.

[2] 24 miles and appropriate work is shown, such as using a proportion, showing doubling of the sides, or using any other appropriate method.

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

or [1] An incorrect proportion is appropriately solved.

or [1] 24 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

[6] incorrect procedure.

[7] C \_\_\_\_\_

[2] 20, and appropriate work is shown.

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

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

or [1] 20, 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

[8] incorrect procedure.

[2] 16, and appropriate work is shown, such

as  $\frac{6}{4} = \frac{24}{x}$  or a labeled diagram.

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

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

or [1] An incorrect proportion is written, but it is solved appropriately.

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

[9] incorrect procedure.

- [2]  $2\sqrt{3}$ , and appropriate work is shown.  
 [1] Appropriate work is shown, but the answer is not written in simplest radical form.  
 or [1] Appropriate work is shown, but one computational error is made.  
 or [1] Appropriate work is shown, but one conceptual error is made.  
 or [1]  $2\sqrt{3}$ , 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 incorrect procedure.
- [10] \_\_\_\_\_
- [11] C
- [12] B
- [4] 8, and appropriate work is shown, such as solving the proportion  $\frac{10+x}{12} = \frac{12}{x}$ .  
 [3] Appropriate work is shown, but one computational error is made.  
 [2] Appropriate work is shown, but two or more computational errors are made.  
 or [2] Appropriate work is shown, but one conceptual error is made.  
 or [2] The proportion  $\frac{10+x}{12} = \frac{12}{x}$  is written, but no further correct work is shown.  
 [1] Appropriate work is shown, but one conceptual error and one computational error are made.  
 or [1] 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 incorrect procedure.
- [13] \_\_\_\_\_
- [14] C
- [15] D

- [4] 10, and appropriate work is shown, such as solving  $\frac{x}{4} = \frac{4}{x+6}$ .  
 [3] Appropriate work is shown, but one computational or factoring error is made.  
 or [3] Appropriate work is shown to find  $x = 2$ , but no further correct work is shown.  
 [2] Appropriate work is shown, but two or more computational or factoring errors are made.  
 or [2] Appropriate work is shown, but one conceptual error is made.  
 or [2] Appropriate work is shown to find 2 and  $-8$ , but the negative value is not rejected, and no further correct work is shown.  
 or [2] A correct right triangle proportion is written, but no further correct work is shown.  
 [1] Appropriate work is shown, but one conceptual error and one computational or factoring error are made.  
 or [1] 10, 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 incorrect procedure.
- [16] \_\_\_\_\_