

6. 11 Solving Right Triangles Using Trigonometric Relationships



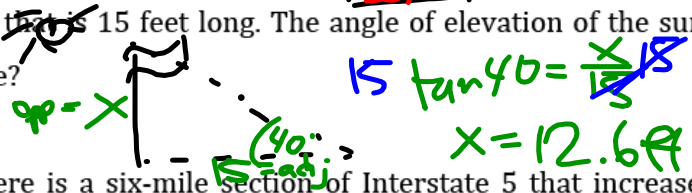
A Practice Understanding Task

- I. For each problem:
- ✓ make a drawing
  - ✓ write an equation
  - ✓ solve (do not forget to include units of measure)

1. Carrie places a 10-foot ladder against a wall. If the ladder makes an angle of  $65^\circ$  with the level ground, how far up the wall is the top of the ladder?

$10 \sin 65 = \frac{x}{10}$       hyp       $x = 9.06 \text{ ft}$

2. A flagpole casts a shadow that is 15 feet long. The angle of elevation of the sun at this time is  $40^\circ$ . How tall is the flagpole?



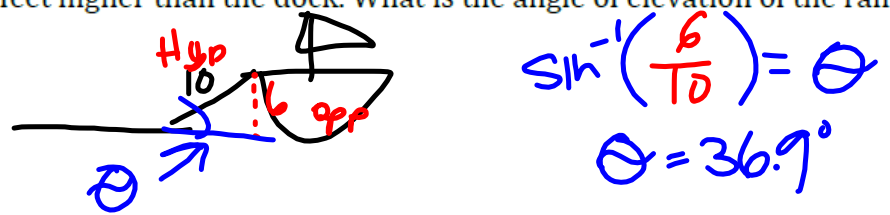
3. In southern California, there is a six-mile section of Interstate 5 that increases 2,500 feet in elevation. What is the angle of elevation?

4. A hot air balloon is 100 feet straight above where it is planning to land. Sarah is driving to meet the balloon when it lands. If the angle of elevation to the balloon is  $35^\circ$ , how far away is Sarah from place on the ground where the balloon will land?

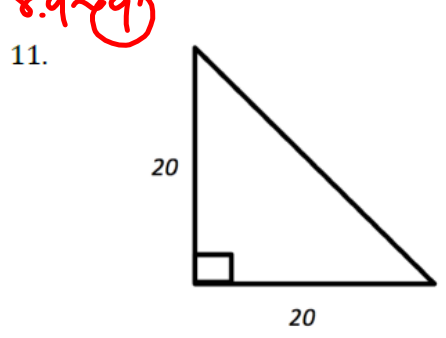
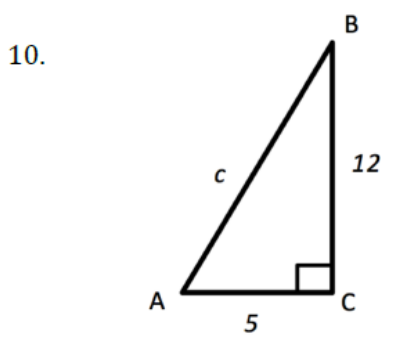
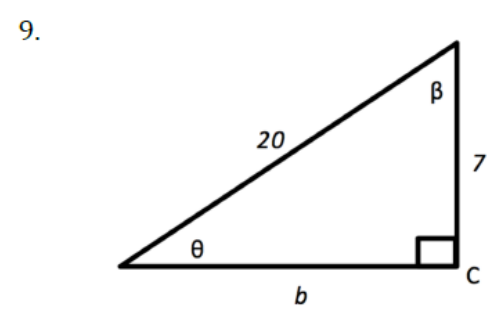
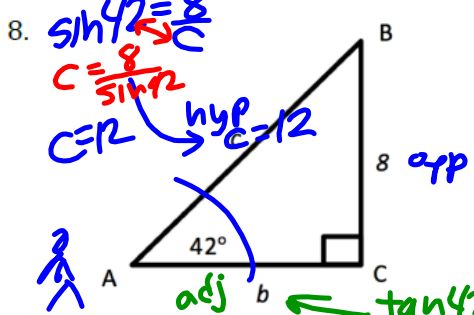
5. An airplane is descending as it approaches the airport. If the angle of depression from the plane to the ground is  $7^\circ$ , and the plane is 2,000 feet above the ground, what is the distance from the plane to the airport?

6. Michelle is 60 feet away from a building. The angle of elevation to the top of the building is  $41^\circ$ . How tall is the building?

7. A ramp is used for loading equipment from a dock to a ship. The ramp is 10 feet long and the ship is 6 feet higher than the dock. What is the angle of elevation of the ramp?



II. For each right triangle below, find all unknown side lengths and angle measures:



12. Draw and find the missing angle measures of the right triangle whose sides measure 4, 6, and 8.

*III. Determine the values of the two remaining trigonometric ratios when given one of the trigonometric ratios.*

13.  $\cos(\alpha) = \frac{3}{5}$

14.  $\tan(\theta) = \frac{8}{3}$

15.  $\sin(\beta) = \frac{4}{7}$

6.11

SIMILARITY & RIGHT TRIANGLE TRIGONOMETRY - 6.11

READY, SET, GO!

Name

Period

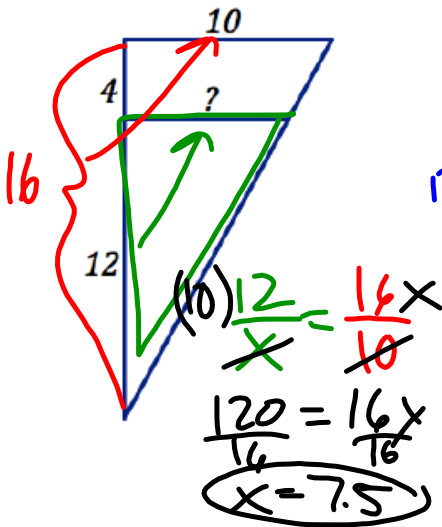
Date

READY

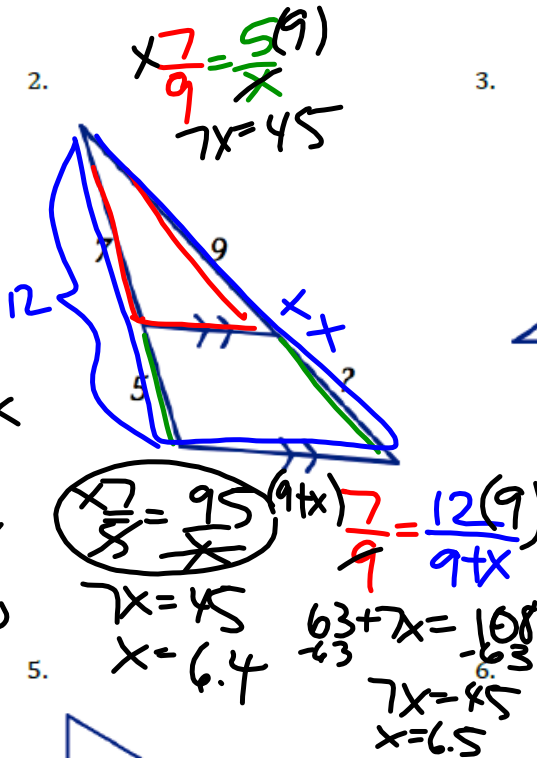
Topic: Similar triangles and proportional relationships with parallel lines

Based on each set of triangles or parallel lines create a proportion and solve it to find the missing values.

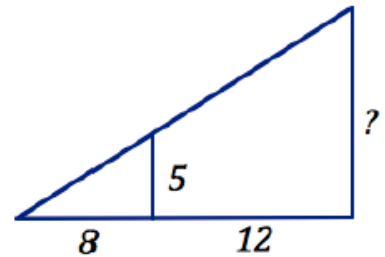
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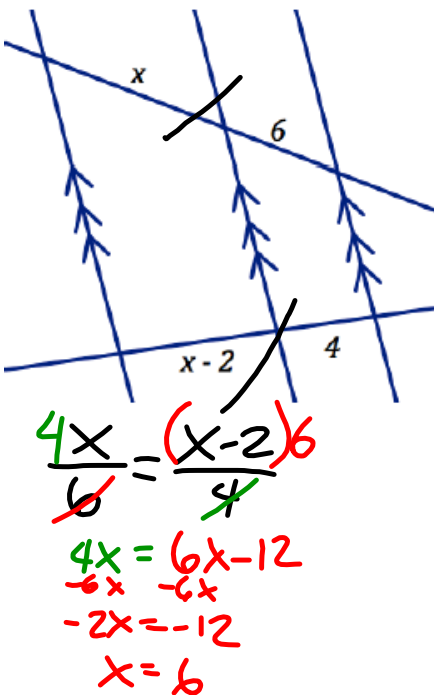
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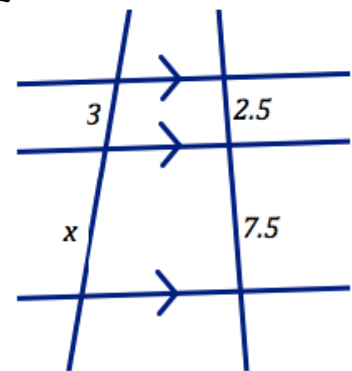
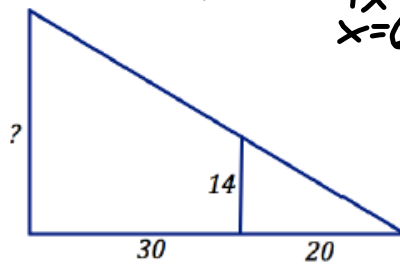
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4.



5.

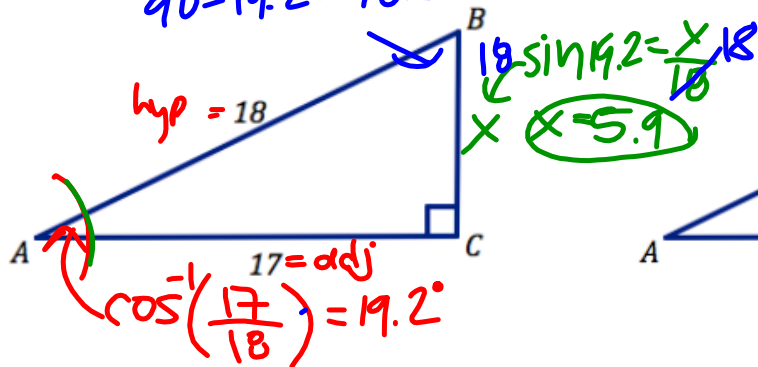


**SET**

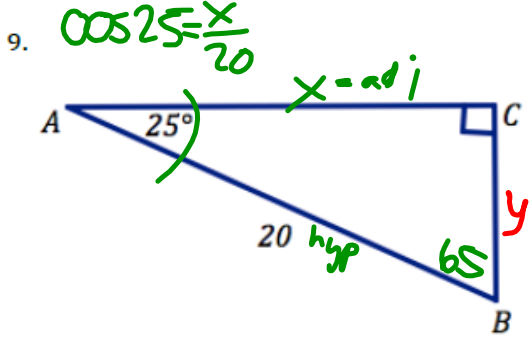
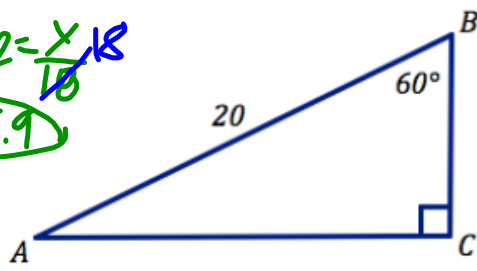
Topic: Solving triangles with trigonometric ratios and Pythagorean theorem

Solve each right triangle. Give any missing sides and missing angles.

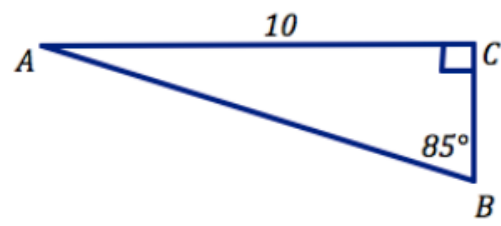
7. SOH CAH TOA  
 $90 - 19.2 = 70.8^\circ$



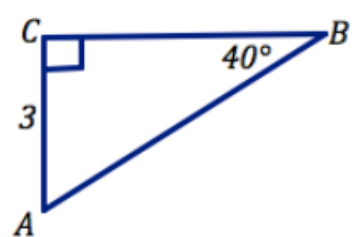
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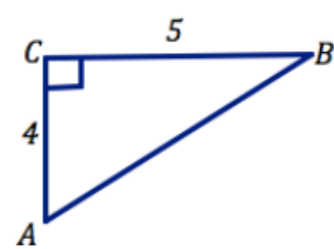
10.



11.



12.



Use the given trigonometric ratio to sketch a right triangle and solve the triangle.

find all missing sides and angles

13.  $\sin(A) = \frac{1}{2}$

14.  $\cos(B) = \frac{3}{5}$

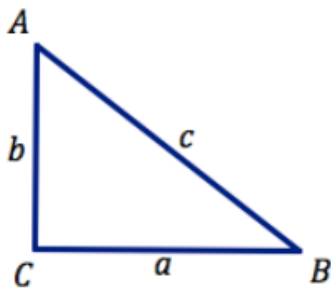
15.  $\tan(B) = \frac{6}{7}$

16.  $\sin(B) = \frac{7}{10}$

17.  $\cos(A) = \frac{5}{8}$

18.  $\tan(A) = \frac{4}{15}$

Use the right triangle below to determine which of the following are equivalent.



19.  $\sin(A)$

20.  $\cos(A)$

21.  $\tan(A)$

22.  $\sin(B)$

23.  $\cos(B)$

24.  $\tan(B)$

25.  $\frac{\sin(A)}{\cos(A)}$

26.  $\frac{1}{\tan(A)}$

27. 1

28.  $a^2 + b^2$

29.  $c^2$

30.  $\sin^2(B) + \cos^2(B)$

**GO**

Topic: Applying trigonometric ratios and identities to solve problems.

**Solve each problem. Sketch a drawing of the situation.**

31. Mark is building his son a pitcher's mound so he can practice for his upcoming baseball season in the back yard. Mark knows that the league requires an incline of  $12^\circ$  and an elevation of 8 inches in height. How long will the front of the pitcher's mound need to be?

32. Susan is designing a wheelchair ramp. Wheelchair ramps require a slope that is no more than 1-inch of rise for every 12-inches of ramp length. Susan wants to determine how much horizontal distance a ramp of 6-feet in length will span? She also wants to know the degree of incline from the base of the ramp to the ground.

33. Michael is designing a house with a roof pitch of 5. Roof pitch is the number of inches that a roof will rise for every 12 inches of run. What is the angle that will need to be used in building the trusses and supports for the roof? What is the angle of a roof with  $5/12$  pitch increase? At the peak of the roof what angle will there be when the front and the back of the roof come together?

