

Geometry

Right Triangle Study Guide

Name _____

For 1 & 2, determine if the 3 side lengths form a triangle. If so, classify the triangle as obtuse, right, or acute.

1) with sides 5, 7, and 8

$5 + 7 > 8$
 $12 > 8$
 yes, \triangle

$8^2 - 5^2 + 7^2$
 $64 < 74$
acute

2) with sides 4, 5, and $\sqrt{41} \approx 6.40$

$4 + 5 > 6.40$
 $9 > 4.0$
 yes, \triangle

$(\sqrt{41})^2 - 4^2 + 5^2$
 $41 = 41$
right

3) A 25 foot ladder just reaches a point on a wall 24 feet above the ground. How far is the foot of the ladder from the wall?

$x = 7 \text{ ft}$

4) What is the sum of the lengths of the diagonals of a 3-by-4 rectangle?

$5 + 5 =$
10

5) Find the altitude of the triangle below.

6√3

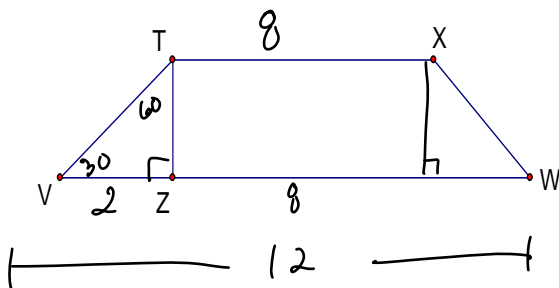
6) Find the perimeter of a square with diagonal of length 4.

$\frac{x\sqrt{2} = 4}{\sqrt{2} \sqrt{2}} \rightarrow 2\sqrt{2}$

$p = (2\sqrt{2})4$
8√2

7) Given: TVWX is an Isosceles Trapezoid
 $TX = 8$, $VW = 12$, $\angle V = 30^\circ$

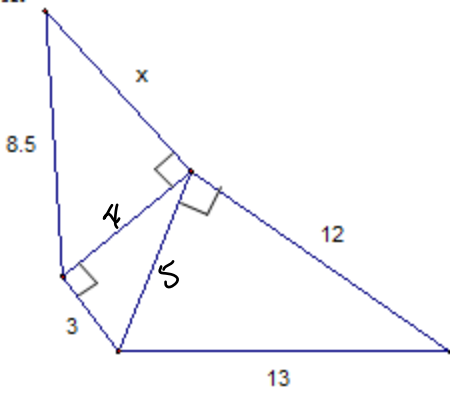
Find: TV and TZ



$x\sqrt{3} = 2$
 $x = \frac{2\sqrt{3}}{3}$
 $2\left(\frac{2\sqrt{3}}{3}\right)$

$TZ = \frac{2\sqrt{3}}{3}$
 $TV = \frac{4\sqrt{3}}{3}$

8) Find x.



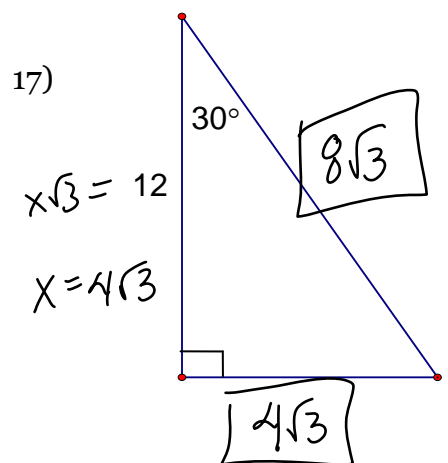
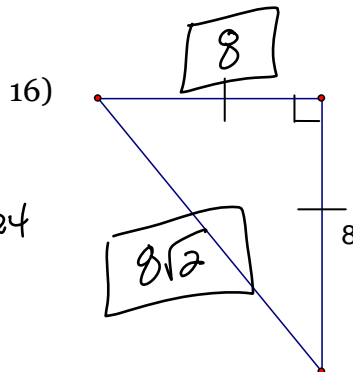
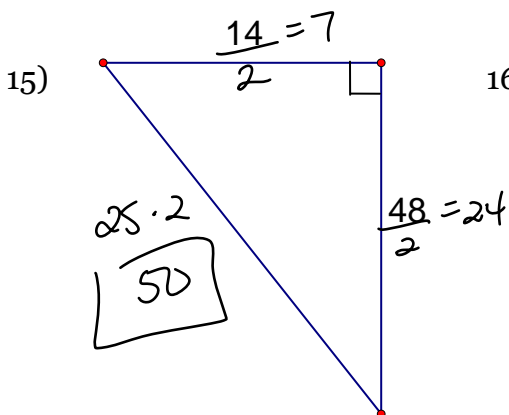
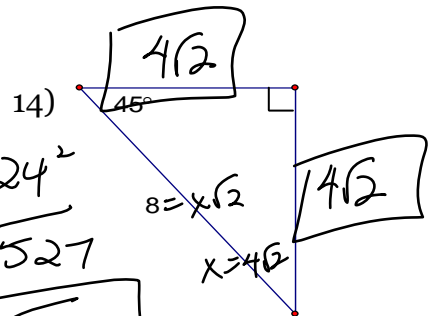
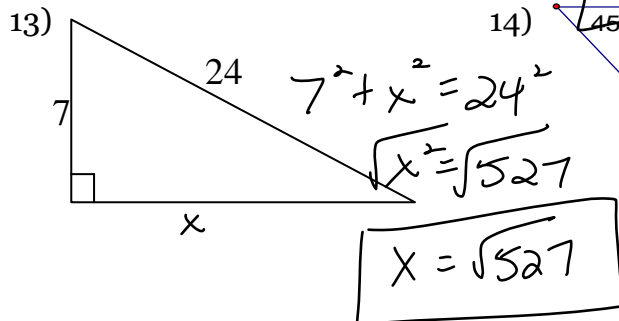
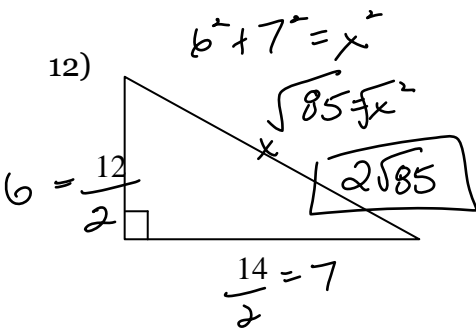
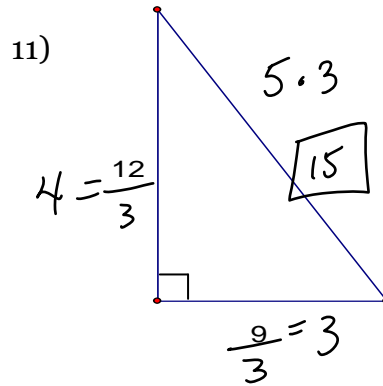
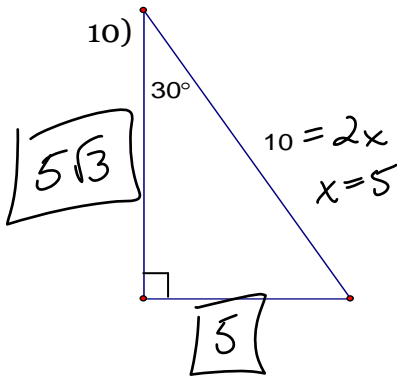
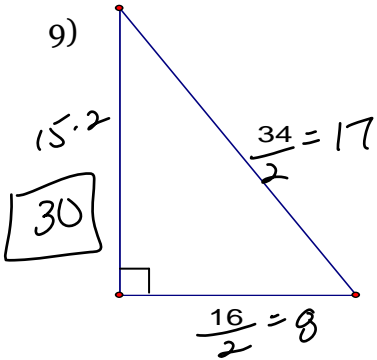
$$x^2 + 4^2 = 0.5^2$$

$$x^2 + 16 = 72.25$$

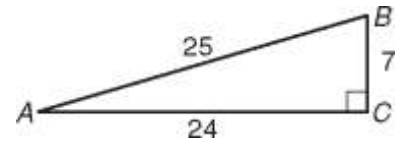
$$\sqrt{x^2} = \sqrt{56.25}$$

$$x = 7.5$$

Find the missing lengths of the following triangles for problems 9-17. You will need to use a combination of the Pythagorean Triples, 45-45-90, 30-60-90, and the Pythagorean Theorem if none of those work. A calculator is not needed for most problems. You will be required to show all work.



Use the figure for Exercises 18–23. Write each trigonometric ratio as a simplified fraction and as a decimal rounded to the nearest hundredth.



18) $\sin A = \frac{7}{25}$

19) $\cos B = \frac{7}{25}$

20) $\tan B = \frac{24}{7}$

21) $\sin B = \frac{24}{25}$

22) $\cos A = \frac{24}{25}$

23) $\tan A = \frac{7}{24}$

Use a calculator to find each trigonometric ratio. Round to the nearest hundredth.

24) $\sin 64^\circ = 0.90$

25) $\cos 58^\circ = 0.53$

26) $\tan 15^\circ = 0.27$

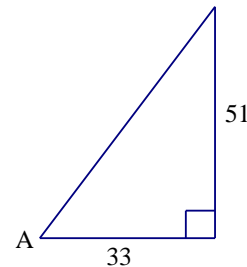
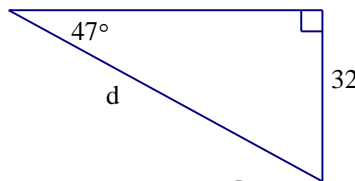
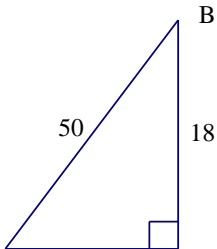
Round to nearest hundredth

For #27-32, solve each problem for the specified missing angle or side. Show all work.

27) Find $\angle B = 60.90^\circ$

28) Find $d = 43.75$

29) Find $\angle A = 57.09^\circ$



$\cos B = \frac{18}{50}$

$$\sin 47 = \frac{32}{d}$$

$$\frac{d \cdot \sin 47}{\sin 47} = \frac{32}{\sin 47}$$

$\tan A = \frac{51}{33}$

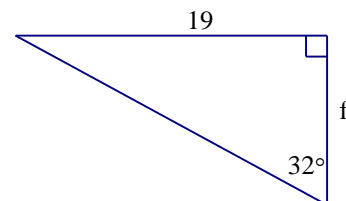
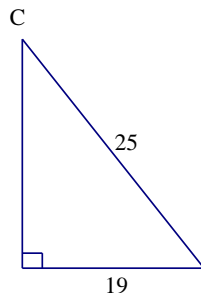
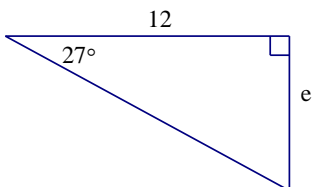
$\cos^{-1}\left(\frac{18}{50}\right)$

$\tan^{-1}\left(\frac{51}{33}\right)$

30) Find $e = 6.11$

31) Find $\angle C = 49.46^\circ$

32) Find $f = 30.41$



$\tan 27 = \frac{e}{12}$

$\sin C = \frac{19}{25}$

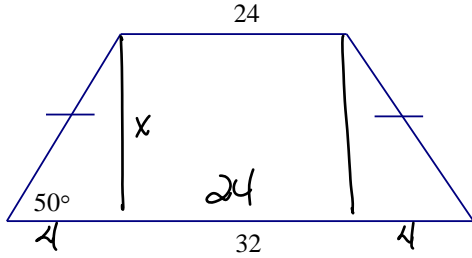
$\tan 32 = \frac{19}{f}$

$12 \cdot \tan 27 = e$

$\sin^{-1}\left(\frac{19}{25}\right)$

$\frac{f \cdot \tan 32}{\tan 32} = \frac{19}{\tan 32}$

33) Find the height of the isosceles trapezoid with the given measures.

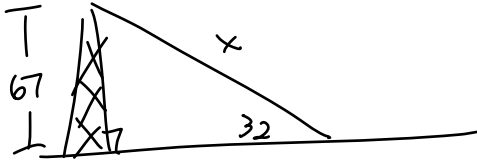


$$\tan 50 = \frac{x}{4}$$

$$x \approx 4.77$$

$$4 \cdot \tan 50 = x$$

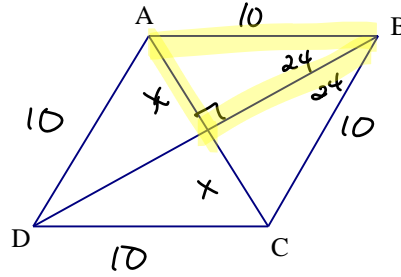
35) A radio tower is 67 feet tall. If a wire from the top of the tower meets the ground at a 32° angle. How long is the wire?



$$\sin 32 = \frac{67}{x}$$

$$x \approx 126.43 \text{ ft}$$

34) ABCD is a rhombus with a perimeter of 40 and $m\angle ABC = 48^\circ$. Find the length of AC.



$$\sin 24 = \frac{x}{10}$$

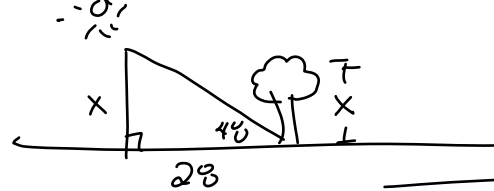
$$10 \cdot \sin 24 = x$$

$$x \approx 4.07$$

$$AC = 2(4.07)$$

$$= \boxed{8.14}$$

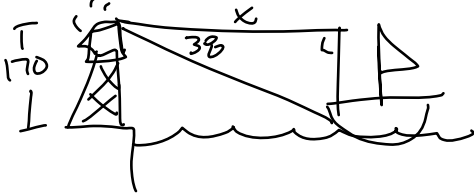
36) If the angle of elevation to the sun at a certain time of the day is 48°. Find the height of a tree whose shadow at that time of day is 28 meters.



$$\tan 48 = \frac{x}{28}$$

$$x \approx 31.10 \text{ m}$$

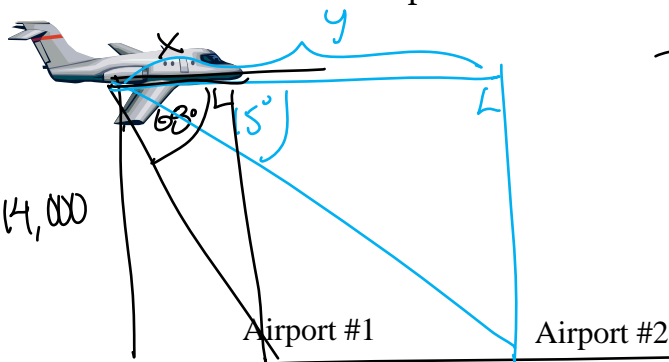
37) From the top of a lighthouse, 170 feet above sea level, the angle of depression to a boat at sea level is 38°. Find the distance from the boat to the base of the lighthouse.



$$\tan 38 = \frac{170}{x}$$

$$x \approx 217.59 \text{ ft}$$

38) A pilot flying at an altitude of 14,000 feet sights two airports directly in front of him. The angle of depression to one airport is 68°, and the angle of depression to the second airport is 15°. What is the distance between the two airports? Round to the nearest foot.



$$\tan 68 = \frac{14,000}{x}$$

$$x \approx 5,656.37$$

$$\tan 15 = \frac{14,000}{y}$$

$$y \approx 52,248.71$$

$$52,248.71 - 5,656.37 = \boxed{46,592 \text{ ft}}$$