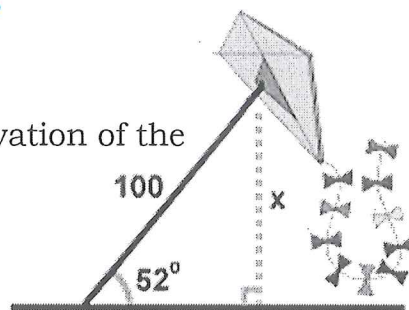


8.1-8.7 (After Break Intervention)

Draw a picture if one is not provided. Find all values to the nearest tenth. Show all work to receive full credit!

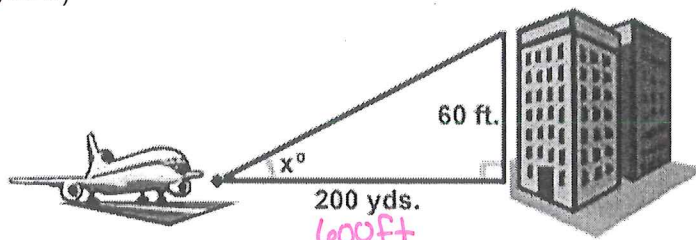
1. A man flies a kite with a 100 foot string. The angle of elevation of the string is 52° . How high off the ground is the kite?



$$\sin(52^\circ) = \frac{x}{100}$$

$$x \approx 78.8 \text{ ft}$$

2. An airplane takes off 200 yards in front of a 60 foot building. At what angle of elevation must the plane take off in order to avoid crashing into the building? Assume that the airplane flies in a straight line and the angle of elevation remains constant until the airplane flies over the building. (3 feet = 1 yard)

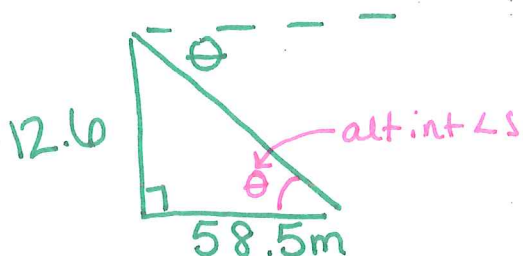


$$\tan x = \frac{60}{600}$$

$$x = \tan^{-1}\left(\frac{60}{600}\right)$$

Larger than 5.7° angle

3. A person stands at the window of a building so that his eyes are 12.6 m above the level ground. An object is on the ground 58.5 m away from the building on a line directly beneath the person. Compute the angle of depression of the person's line of sight to the object on the ground.

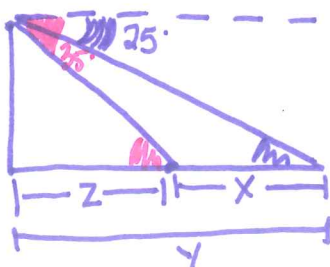
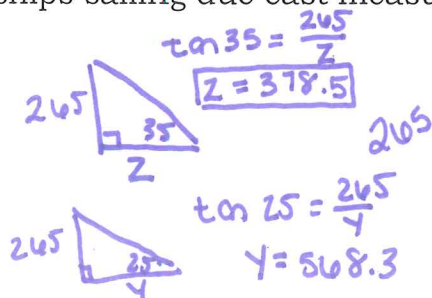


$$\tan \theta = \frac{12.6}{58.5}$$

$$\theta = \tan^{-1}\left(\frac{12.6}{58.5}\right)$$

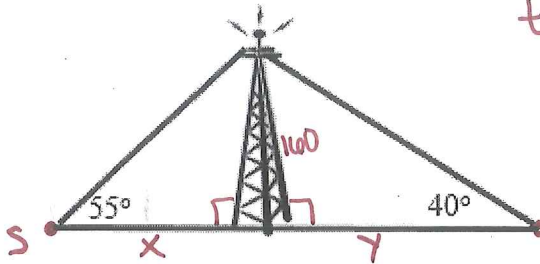
$\theta \approx 12.2^\circ$

4. From a plane flying due east at 265 m above sea level, the angles of depression of two ships sailing due east measure 35° and 25° . How far apart are the ships?



The ships are approx. 189.8 m apart

5. Tom and Sam are on the opposite sides of a tower of 160 meters height. They measure the angle of elevation of the top of the tower as 40° and 55° respectively. Find the distance between Tom and Sam.



$$\tan(55) = \frac{160}{x}$$

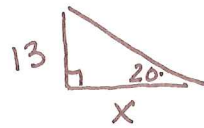
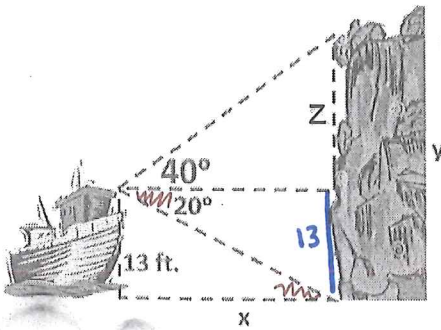
$$x \approx 112.0\text{m}$$

$$\tan(40) = \frac{160}{y}$$

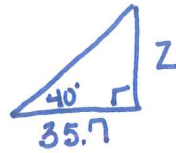
$$y \approx 190.7\text{m}$$

The distance between Tom + Sam is: 302.7m

6. A man on the deck of a ship is 13 ft above water level. He observes that the angle of elevation of the top of a cliff is 40° and the angle of depression of the base is 20° . Find the distance of the cliff from the ship and the height of the cliff if the base of the cliff is at sea level. (Find, x, y, and z)



$$\tan 20 = \frac{13}{x} \quad \boxed{x \approx 35.7\text{ft}}$$

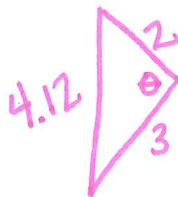
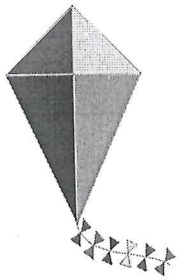


$$\tan(40) = \frac{z}{35.7} \quad \boxed{z \approx 30.0\text{ft}}$$

$$y = 30.0 + 13$$

$$\boxed{y \approx 43.0\text{ft}}$$

7. Bert is building a kite using side lengths of 2 feet and 3 feet. The long vertical dowel to construct the kite is 4.12 ft. find the measure of the angle that the 2 foot edge makes with the 3 foot edge.



$$4.12^2 = 2^2 + 3^2 - 2 \cdot 2 \cdot 3 \cos \theta$$

$$16.9744 = 13 - 12 \cos \theta$$

$$3.9744 = -12 \cos \theta$$

$$\frac{3.9744}{-12} = \cos \theta$$

$$\theta = \cos^{-1} \left(\frac{3.9744}{-12} \right)$$

$\theta \approx 109.3^\circ$
or
 109.5°

8. ARCHITECTURE An architect is designing a playground in the shape of a quadrilateral. Find the perimeter of the playground to the nearest tenth.

Find JL

$$18^2 + 13^2 = JL^2$$

$$\sqrt{493} = JL$$

$$\boxed{22.2\text{m} = JL}$$

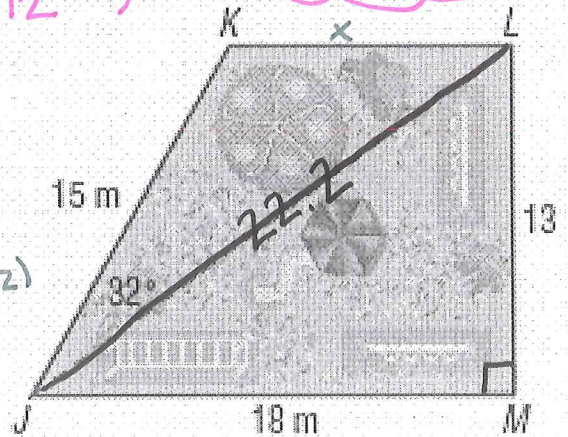
Find KL

$$KL^2 = 15^2 + 22.2^2 - 2 \cdot 15 \cdot 22.2 \cos(32)$$

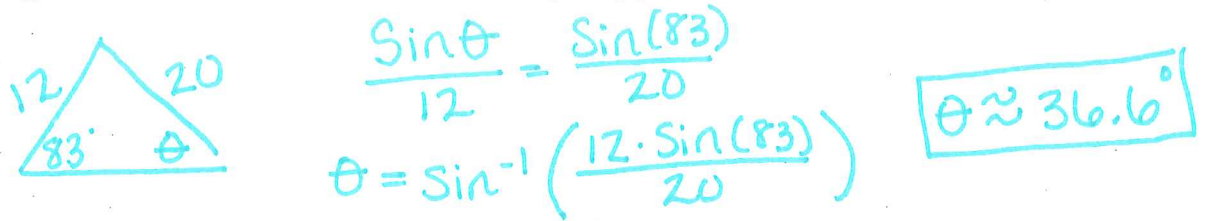
$$\boxed{KL \approx 12.4\text{m}}$$

$$P \approx 12.4 + 13 + 18 + 15$$

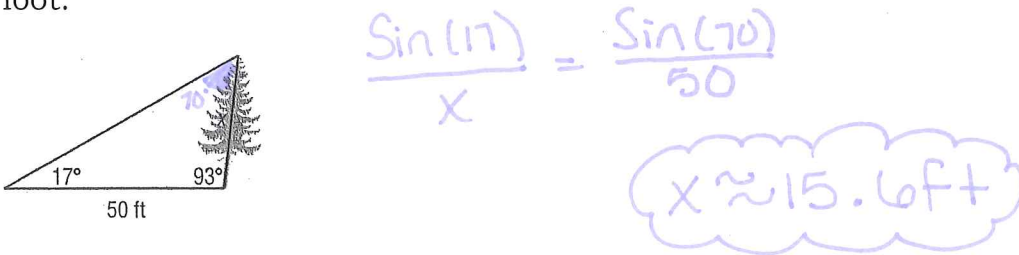
$$\boxed{P \approx 58.4\text{m}}$$



9. In a scalene triangle, one side is 12 feet and another side is 20 feet. The angle opposite 20 feet is 83 degrees. Find the measure of the angle opposite the side that is 12 feet.



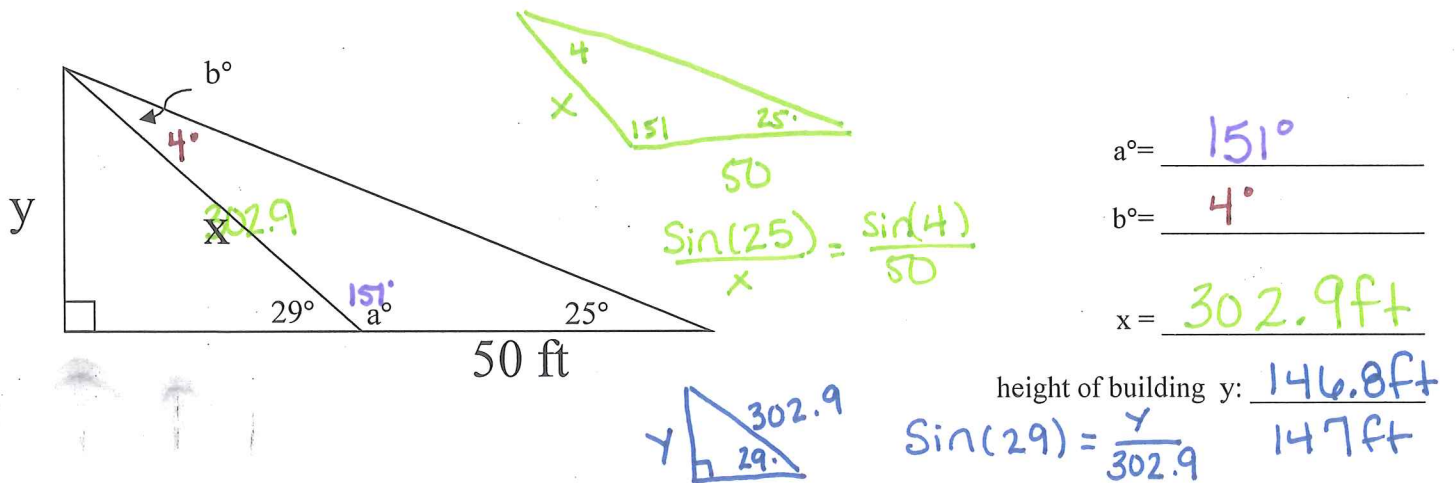
10. A tree grew at a 3° slant from the vertical. At a point 50 feet from the tree, the angle of elevation to the top of the tree is 17°. Find the length of the tree to the nearest tenth of a foot.



11. The angle of elevation from a point on the street to the top of a building is 29°. The angle of elevation from another point on the street, 50 feet farther away from the building, to the top of the building is 25°. To the nearest foot, how tall is the building?

$29 + a = 180$ linear pairs are suppl.

$151 + 25 + b = 180$ Δ sum



12. Which set of measures could represent the sides of a right triangle?

a. 9, 40, 41

1681 1681
 Right

b. 8, 30, 31

964 961
 $964 > 961$
 acute

c. 7, 8, 15

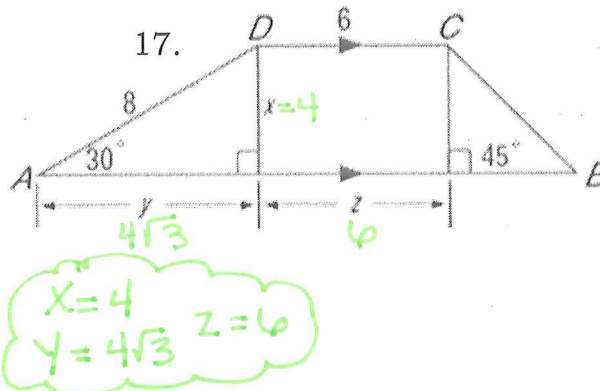
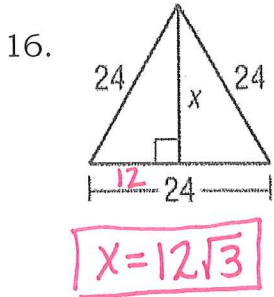
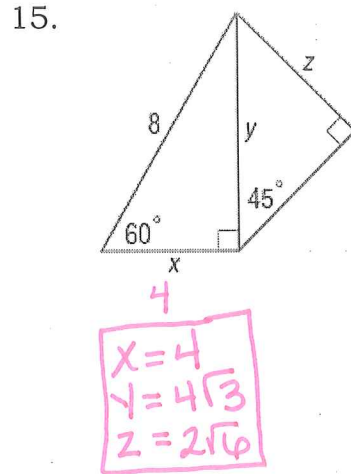
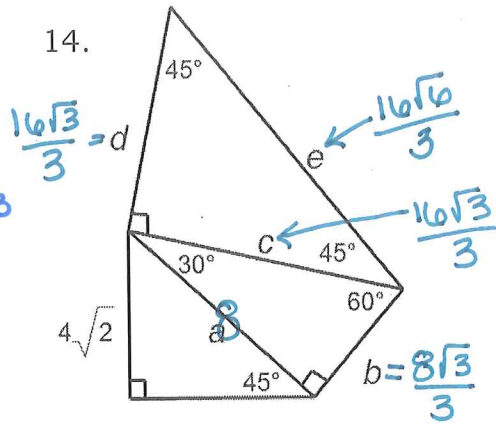
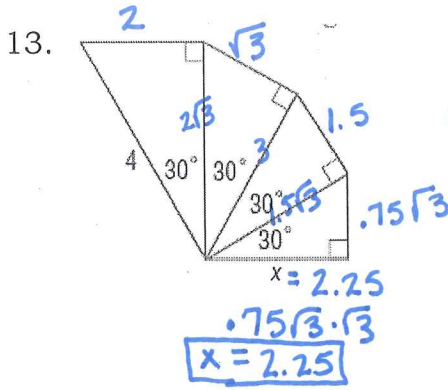
$113 < 225$
 obtuse

d. $\sqrt{2}, \sqrt{3}, \sqrt{6}$

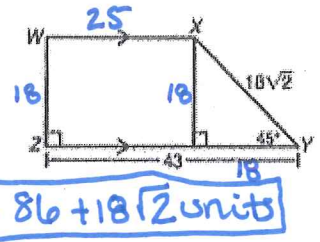
$5 < 6$
 obtuse

Directions: For the following questions, find the variables as exact values.

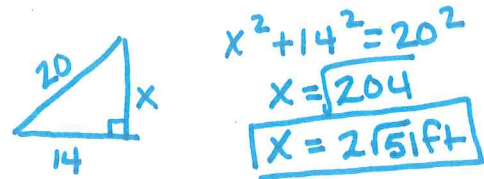
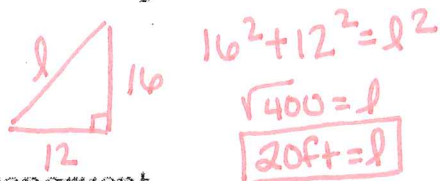
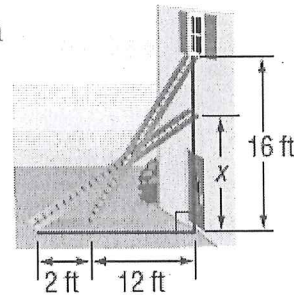
NO Rounding!



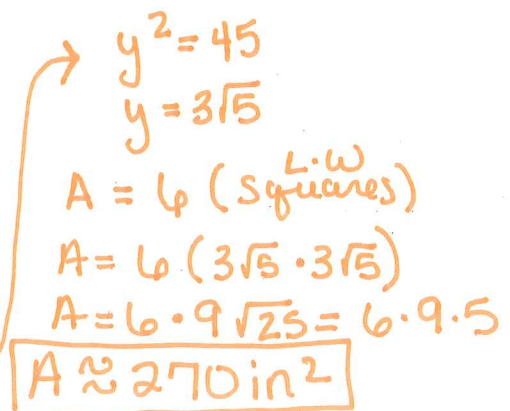
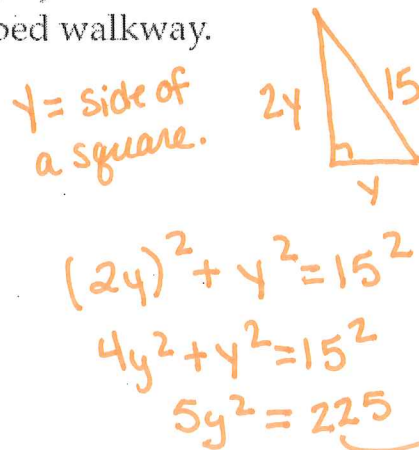
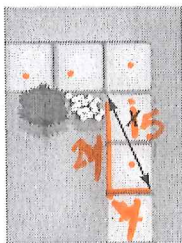
18. Find the perimeter of the trapezoid.



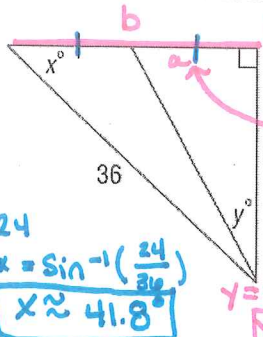
18. **PAINTING** A painter sets a ladder up to reach the bottom of a second-story window 16 feet above the ground. The base of the ladder is 12 feet from the house. While the painter mixes the paint, a neighbor's dog bumps the ladder, which moves the base 2 feet farther away from the house. How far up the side of the house does the ladder reach?

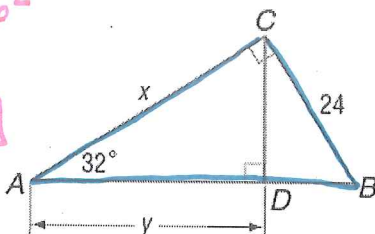


19. **LANDSCAPING** Six congruent square stones are arranged in an L-shaped walkway through a garden. If $x = 15$ inches, then find the area of the L-shaped walkway.

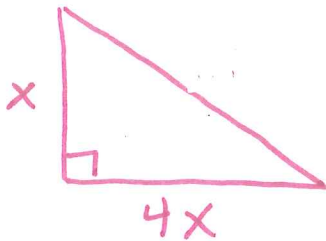


Directions: For the following questions round to the nearest tenth.

20.  $b^2 + 24^2 = 36^2$
 $b = 12\sqrt{5}$
 $A = 6\sqrt{5}$
 $x = \sin^{-1}\left(\frac{24}{36}\right)$
 $x \approx 41.8^\circ$

21.  $\tan 32^\circ = \frac{24}{x}$
 $x \approx 38.4$
 $\cos 32^\circ = \frac{y}{38.4}$
 $y \approx 32.6$

22. If the length of one leg of a right triangle is 4 times the length of the other and the hypotenuse is 153 in, find the exact length of the shorter leg. This is not a special right triangle.



$$(4x)^2 + x^2 = 153^2$$

$$16x^2 + x^2 = 23409$$

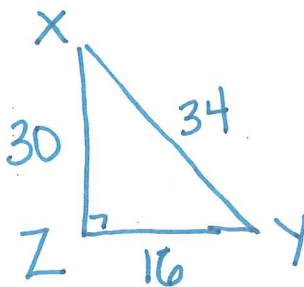
$$17x^2 = 23409$$

$$x^2 = 1377$$

$$x = \sqrt{1377}$$

$$x = 9\sqrt{17} \text{ in}$$

23. If $x = 16$, $y = 30$, and $z = 34$ in the right triangles, find the 6 trigonometric ratios.



$$\sin X = \frac{16}{34} = \frac{8}{17}$$

$$\sin X = \frac{8}{17}$$

$$\sin Y = \frac{15}{17}$$

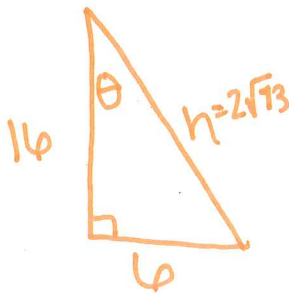
$$\cos X = \frac{15}{17}$$

$$\cos Y = \frac{8}{17}$$

$$\tan X = \frac{8}{15}$$

$$\tan Y = \frac{15}{8}$$

24. If $\tan \theta = \frac{6}{16}$, find $\sin \theta$ and $\cos \theta$.



Find h

$$6^2 + 16^2 = h^2$$

$$\sqrt{292} = h$$

$$2\sqrt{73} = h$$

$$\sin \theta = \frac{6}{2\sqrt{73}} = \frac{3}{\sqrt{73}} = \frac{3\sqrt{73}}{73}$$

$$\sin \theta = \frac{3\sqrt{73}}{73}$$

$$\cos \theta = \frac{16}{2\sqrt{73}} = \frac{8}{\sqrt{73}}$$

$$\cos \theta = \frac{8\sqrt{73}}{73}$$