

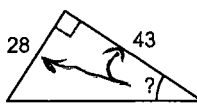
# Tougher Trig

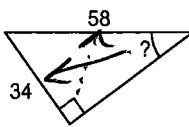
Name \_\_\_\_\_

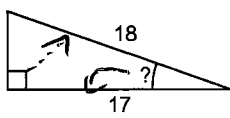
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## Warm Up:

Find the measure of the indicated angle to the nearest degree.

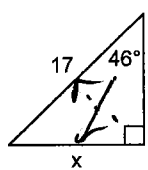
1)   $\tan \theta = \frac{O}{A}$   
 $\tan \theta = \frac{28}{43}$   
 $\theta = \tan^{-1}\left(\frac{28}{43}\right)$   
 $\theta = 33.1^\circ$

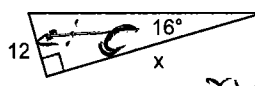
2)   $\sin \theta = \frac{O}{H}$   
 $\sin \theta = \frac{34}{58}$   
 $\theta = \sin^{-1}\left(\frac{34}{58}\right)$   
 $\theta = 35.9^\circ$

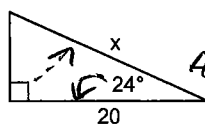
3)   $\cos \theta = \frac{A}{H}$   
 $\cos \theta = \frac{17}{18}$   
 $\theta = \cos^{-1}\left(\frac{17}{18}\right)$   
 $\theta = 19.2^\circ$

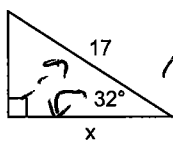
4)   $\cos \theta = \frac{A}{H}$   
 $\cos \theta = \frac{10}{18}$   
 $\theta = \cos^{-1}\left(\frac{10}{18}\right)$   
 $\theta = 56.25^\circ$

Find the missing side. Round to the nearest tenth.

5)   $\sin \theta = \frac{O}{H}$   
 $\sin(46) = \frac{x}{17}$   
 $17 \cdot \sin(46) = x$   
 $12.23 = x$

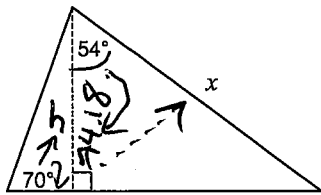
6)   $\tan \theta = \frac{O}{A}$   
 $x \cdot \tan(16) = \frac{12}{x}$   
 $x \cdot \tan(16) = 12$   
 $x = \frac{12}{\tan(16)}$   
 $x = 41.85$

7)   $\cos \theta = \frac{A}{H}$   
 $\cos(24) = \frac{20}{H}$   
 $H \cdot \cos(24) = 20$   
 $H = \frac{20}{\cos(24)}$   
 $H = 21.89$

8)   $\cos \theta = \frac{A}{H}$   
 $\cos(32) = \frac{x}{17}$   
 $17 \cdot \cos(32) = x$   
 $13.9 = x$

Find the length of the side labeled  $x$ . Round intermediate values to the nearest tenth. Use the rounded values to calculate the next value. Round your final answer to the nearest tenth.

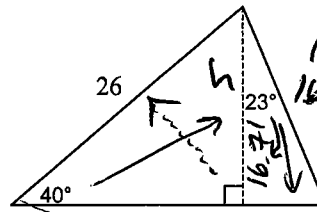
9)



①  $TAN \theta = \frac{O}{A}$   
 $TAN(70) = \frac{h}{27}$   
 $(27)TAN(70) = h$   
 $(74.18) = h$

②  $COS \theta = \frac{A}{H}$   
 $x \cdot COS(54) = \frac{74.18}{x}$   
 $x \cdot COS(54) = \frac{74.18}{COS(54)}$   
 $x = \frac{74.18}{COS(54)}$

10)



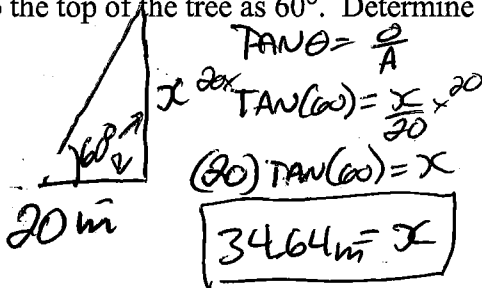
①  $SIN \theta = \frac{O}{H}$   
 $26 \cdot SIN(40) = \frac{h}{26}$   
 $(26)SIN(40) = h$   
 $(16.71) = h$

②  $TAN \theta = \frac{O}{A}$   
 $16.71 \cdot TAN(23) = \frac{x}{16.71}$   
 $(16.71)TAN(23) = x$   
 $7.09 = x$

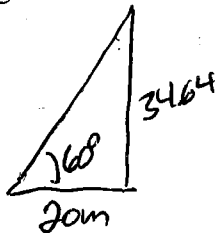
Word Problems

$x = 126.21$

11) Jimmy is standing 20m away from a tree. He uses a clinometer to measure the angle of elevation to the top of the tree as  $60^\circ$ . Determine the height of the tree.

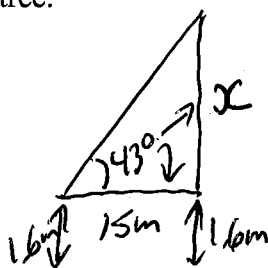


b. Jimmy wants to attach a wire from the top of the tree to the ground where he is standing. How long is the wire?



COULD USE  
SIN OR COS  
 OR  
 $a^2 + b^2 = c^2$   
 $34.64^2 + 20^2 = c^2$   
 $1200 + 400 = c^2$   
 $\sqrt{1600} = \sqrt{c^2}$   
 $40 = c$

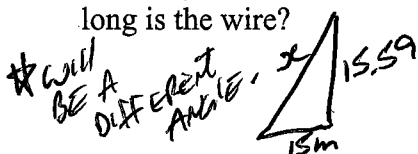
12) Jimmy is standing 15m away from a tree. He uses a clinometer to measure the angle of elevation to the top of the tree as  $43^\circ$ . His eyes are 1.6m above the ground. Determine the height of the tree.



$TAN \theta = \frac{O}{A}$   
 $TAN(43) = \frac{x}{15}$   
 $(15)TAN(43) = x$   
 $13.99m = x$   
 $+ 1.6$   
 $15.59m = 1$

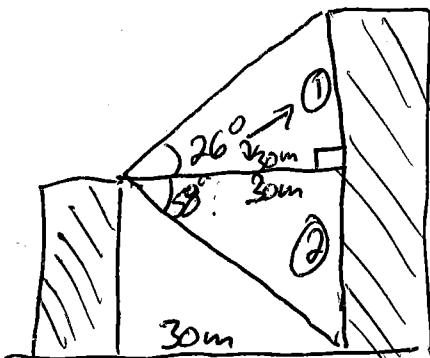
Gotta  
 ADD  
 EYE  
 HEIGHT

b. Jimmy wants to attach a wire from the top of the tree to the ground where he is standing. How long is the wire?



$a^2 + b^2 = c^2$   
 $15^2 + 15.59^2 = c^2$   
 $225 + 24298 = c^2$   
 $146798 = c^2$   
 $21.63m = c$

- 13) Jimmy is standing at the edge of the roof of a building. 30m away there is a taller building. The angle of elevation to the top of the taller building is  $26^\circ$ . The angle of depression to the bottom of the taller building is  $58^\circ$ . Determine the height of the 2 buildings.

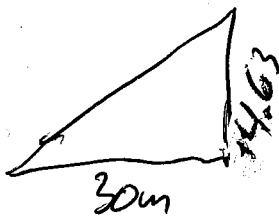


$$\begin{aligned} \textcircled{1} \tan \theta &= \frac{OP}{AD} \\ 30 \times \tan(26) &= \frac{OP}{30} \\ (30) \tan(26) &= OP \\ \boxed{14.63m} &= OP \end{aligned}$$

$$\begin{aligned} \textcircled{2} \tan \theta &= \frac{O}{A} \\ 30 \times \tan(58) &= \frac{O}{30} \\ (30) \tan(58) &= O \\ \boxed{48m} &= O \end{aligned}$$

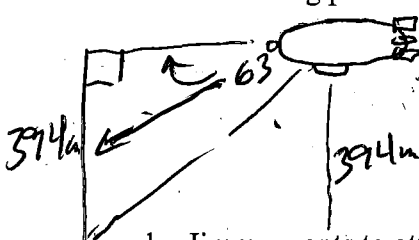
$14.63 + 48m = \boxed{96.01m}$  TALLER

- b. Jimmy wants to attach a wire from the top of the taller building to the top of the shorter building. Determine the length of wire he needs.



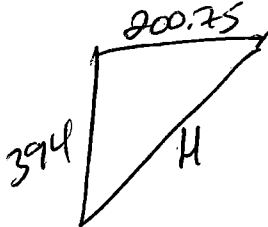
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 14.63^2 + 30^2 &= c^2 \\ 214.04 + 900 &= c^2 \\ \sqrt{1114.04} &= \sqrt{c^2} \\ \boxed{33.38m} &= c \end{aligned}$$

- 14) A blimp is flying towards its landing pad. It is 394m above the ground. The angle of depression to the landing pad is  $63^\circ$ . Determine the horizontal distance to the landing pad.



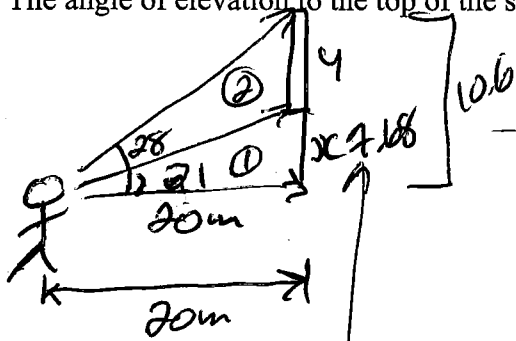
$$\begin{aligned} \tan \theta &= \frac{O}{A} \\ A \times \tan(63) &= \frac{394}{\tan(63)} \times A \\ 394 \times \tan(63) &= \frac{394}{\tan(63)} \\ \boxed{200.75m} &= A \end{aligned}$$

- b. Jimmy wants to attach a cable between the blimp and the landing pad. How long does the cable need to be?

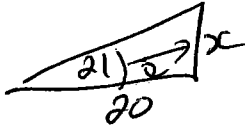


$$\begin{aligned} a^2 + b^2 &= c^2 \\ 200.75^2 + 394^2 &= c^2 \\ 40301.78 + 155236 &= c^2 \\ \sqrt{195537.78} &= \sqrt{c^2} \\ \boxed{442.2m} &= c \end{aligned}$$

- 15) Jimmy is standing 20m away from a building. The angle of elevation to the bottom of a sign is  $21^\circ$ . The angle of elevation to the top of the sign is  $28^\circ$ . Determine the height of the sign.



①

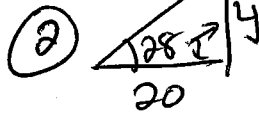


$$\tan \theta = \frac{O}{A}$$

$$20 \times \tan(21) = \frac{x}{20} \times 20$$

$$20 \times \tan(21) = x$$

$$7.68 = x$$



$$\tan \theta = \frac{O}{A}$$

$$20 \times \tan(28) = \frac{y}{20} \times 20$$

$$20 \times \tan(28) = y$$

$$10.6 = y$$

$$10.6 - 7.68$$

$$2.95m$$