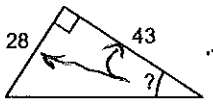
Tougher Trig

Name _____

Warm Up:

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

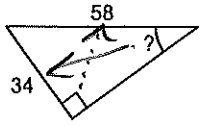
1) 

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

$\tan\theta = \frac{28}{43}$

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

$\theta = 33.1°$

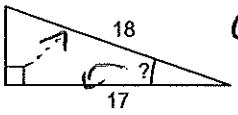
2) 

$\sin\theta = \frac{O}{H}$

$\sin\theta = \frac{34}{58}$

$\theta = \sin^{-1}\left(\frac{34}{58}\right)$

$\theta = 35.9°$

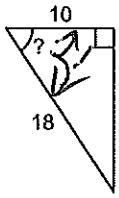
3) 

$\cos\theta = \frac{A}{H}$

$\cos\theta = \frac{17}{18}$

$\theta = \cos^{-1}\left(\frac{17}{18}\right)$

$\theta = 19.2°$

4) 

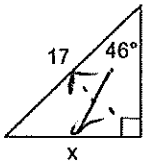
$\cos\theta = \frac{A}{H}$

$\cos\theta = \frac{10}{18}$

$\theta = \cos^{-1}\left(\frac{10}{18}\right)$

$\theta = 56.25°$

Find the missing side. Round to the nearest tenth.

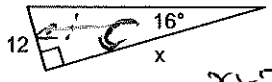
5) 

$\sin\theta = \frac{O}{H}$

$17 \times \sin(46) = \frac{x}{17} \times 17$

$17 \cdot \sin(46) = x$

$12.23 = x$

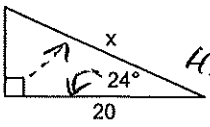
6) 

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

$x \cdot \tan(16) = \frac{12}{x} \cdot x$

$\frac{x\tan(16)}{\tan(16)} = \frac{12}{\tan(16)}$

$x = 41.85$

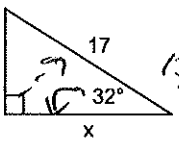
7) 

$\cos\theta = \frac{A}{H}$

$H \times \cos(24) = \frac{20}{H} \times H$

$\frac{H \cdot \cos(24)}{\cos(24)} = \frac{20}{\cos(24)}$

$H = 21.89$

8) 

$\cos\theta = \frac{A}{H}$

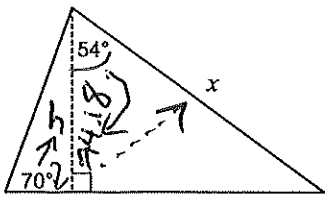
$17 \times \cos(32) = \frac{x}{17} \times 17$

$17 \cdot \cos(32) = x$

$13.9 = x$

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) $\cos\theta = \frac{A}{H}$

$x \times \cos(54) = \frac{74.18}{x} \times x$

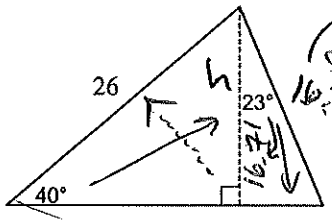
$x\cos(54) = 74.18$

$\frac{x\cos(54)}{\cos(54)} = \frac{74.18}{\cos(54)}$

$x = \frac{74.18}{\cos(54)}$

$x = 126.21$

10)



(1) $\sin\theta = \frac{O}{H}$

$26 \times \sin(40) = \frac{h}{26} \times 26$

$(26)\sin(40) = h$

$16.71 = h$

(2) $\tan\theta = \frac{O}{A}$

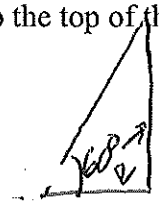
$16.71 \times \tan(23) = \frac{x}{16.71} \times 16.71$

$(16.71)\tan(23) = x$

$7.09 = x$

Word Problems

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°. Determine the height of the tree.



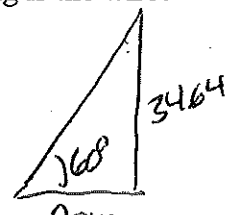
$\tan\theta = \frac{O}{A}$

$20 \times \tan(60) = \frac{x}{20} \times 20$

$(20)\tan(60) = x$

$34.64\text{m} = x$

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 $a^2+b^2=c^2$

$a^2+b^2=c^2$

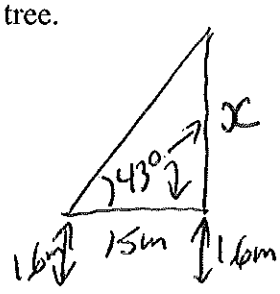
$34.64^2+20^2=c^2$

$1200+400=c^2$

$\sqrt{1600}=\sqrt{c^2}$

$40\text{m} = c$

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°. His eyes are 1.6m above the ground. Determine the height of the tree.



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

$15 \times \tan(43) = \frac{x}{15} \times 15$

$(15)\tan(43) = x$

$13.99\text{m} = x$

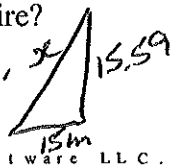
$+1.6$

$15.59\text{m} = 1$

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?

*WILL BE A DIFFERENT ANGLE.



$a^2+b^2=c^2$

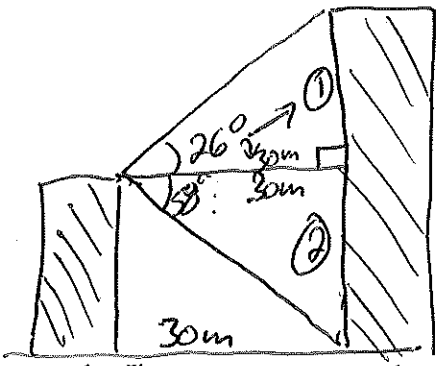
$15^2+15.59^2=c^2$

$225+24298=c^2$

$\sqrt{467.98}=\sqrt{c^2}$

$21.63\text{m} = c$

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°. The angle of depression to the bottom of the taller building is 58°. Determine the height of the 2 buildings.



① $\tan\theta = \frac{OP}{AD}$

$30 \times \tan(26) = \frac{OP}{30} \times 30$

$(30)\tan(26) = OP$

$14.63_m = OP$ ①

② $\tan\theta = \frac{O}{A}$

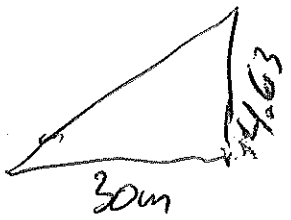
$30 \times \tan(58) = \frac{O}{30} \times 30$

$(30)\tan(58) = O$

$48m = OP2$ = SHORTER

$14.63 + 48m =$ 62.6 m 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.



$a^2 + b^2 = c^2$

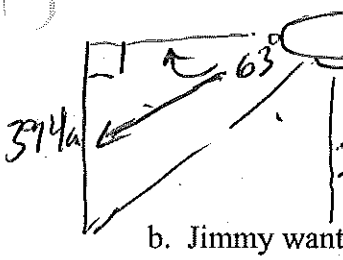
$14.63^2 + 30^2 = c^2$

$214.04 + 900 = c^2$

$\sqrt{1114.04} = \sqrt{c^2}$

$33.38_m = c$

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°. Determine the horizontal distance to the landing pad.



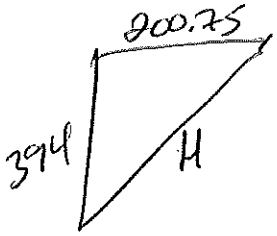
$\tan\theta = \frac{O}{A}$

$A \times \tan(63) = \frac{394}{A} \times A$

$\frac{A \cdot \tan(63)}{\tan(63)} = \frac{394}{\tan(63)}$

200.75m

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



$a^2 + b^2 = c^2$

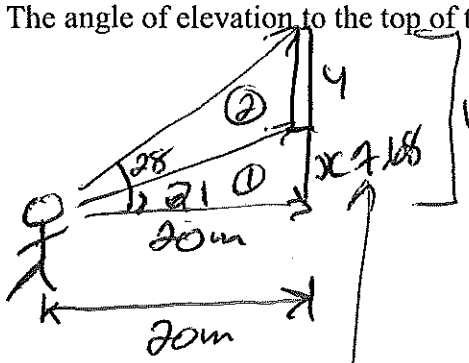
$200.75^2 + 394^2 = c^2$

$40301.78 + 155236 = c^2$

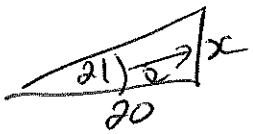
$\sqrt{195537.78} = \sqrt{c^2}$

$442.2m = c$

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



①



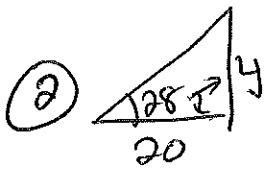
$\tan\theta = \frac{O}{A}$

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

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

$7.68 = x$ →

②



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

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

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

$10.6 = y$

$+ \ 7.68$

29.5m