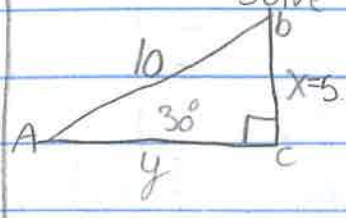
Topic: Trigonometric ratios 46 ✓ 3-8-18

EQ: How can you use the three trigonometric ratios to solve for an unknown angle in any triangle? ✓

Why can I not solve this? ✓

-I cant solve this because it has 2 Variables.

Solve for x + y $\theta = 30^\circ$ Hyp=10 opp=x adj=y



$\sin(30) = \frac{x}{10}$

$10 \cdot .5 = \frac{x}{10} \cdot 10$

$5 = x$

$\cos(30) = \frac{y}{10}$

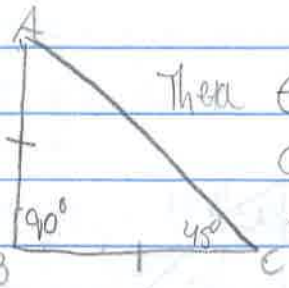
$10 \cdot .866 = \frac{y}{10} \cdot 10$

$8.66 = y$

Acronym: SohCahToa Soh/Cah/Toa

3 equation

1. $\sin(\theta) = \frac{opp}{hyp}$
2. $\cos(\theta) = \frac{adj}{hyp}$
3. $\tan(\theta) = \frac{opp}{adj}$



Then $\theta = 45^\circ$

Opposite: 3M

adjacent: 3M

$\sin(\theta) = \frac{opp}{hyp}$

$\sin(45^\circ) = \frac{3}{c}$

$c \cdot .7071 = \frac{3}{c} \cdot c$

$\frac{c \cdot .7071}{.7071} = \frac{3}{.7071}$

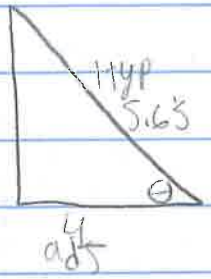
$c = 4.24\,M$

α = Alpha

✓ You can use the three trigonometric ratios to solve for an unknown angle by finding out where Hyp, adj, & opp are on a triangle. Also you needa Know where Theta is.

Can you use pytagream theram to solve for Hyp?

No but you can use trig.



$16+16=C^2$

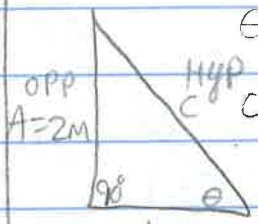
$\sqrt{32}=\sqrt{C^2}$

$C=5.65$

$\sin(\theta)=\frac{4}{5.65}=.7071$ $\quad \tan(\theta)=\frac{4}{4}=1$

$\cos=\frac{4}{5.65}$

$\theta=30^\circ$ opp $=2M$ Hyp $=4$ adj $=?$



$C\cdot\sin(30^\circ)=\frac{2M}{C}$

$C\cdot\sin(30^\circ)=2M$

$\frac{C\cdot.5}{.5}=\frac{2M}{.5}$

$C=\frac{2M}{.5}=4$

$2^2+b^2=4^2$

$-4 \quad -4$

$b^2=\sqrt{12}$

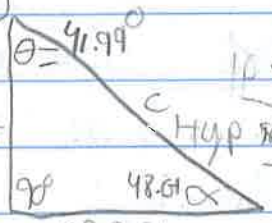
$b=3.46$

$b\cdot\tan(30^\circ)=\frac{2}{b}$

$b\cdot.577=2$

$\frac{b\cdot.577}{.577}=\frac{2}{.577}$ $\quad b=3.46$

How can we solve for unknow angles



$10\cdot\tan(\theta)=\frac{9}{10}$

$\tan(\theta)=.9$ $\tan^{-1}$

$\theta=\tan^{-1}(.9)$

$\theta=41.99$

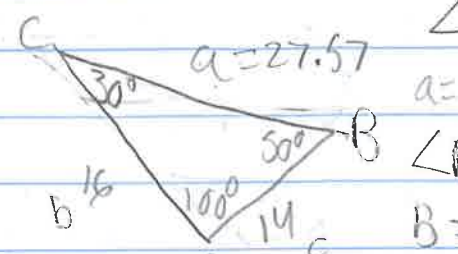
Inverse Function

$\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$

$100+81=C^2$

$\sqrt{181}=\sqrt{C^2}$ $\quad C=13.45$

Law of Sines



$\angle A = 100°$

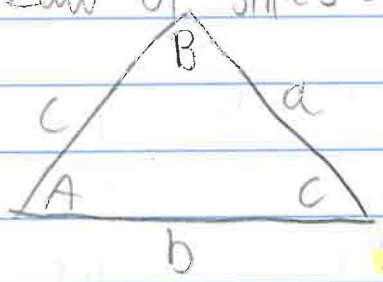
$a = ?$

$\angle B = ?$

$B = 16$

$\angle C = ?$

Law of Sines $c = 14$



big letter - Angles

small letter - Side legs

Always across from each other

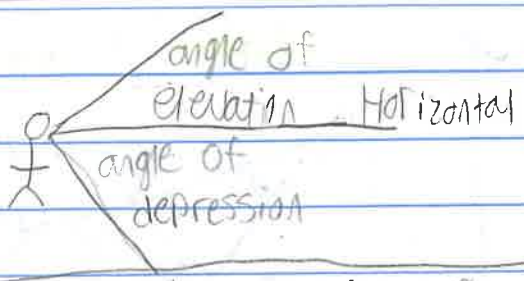
$$\frac{\sin A}{a} = \frac{\sin b}{b} = \frac{\sin c}{c}$$

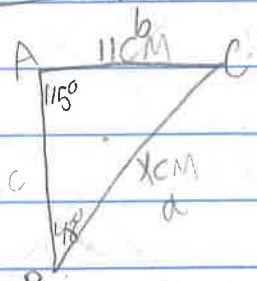
$$\frac{\sin(100°)}{a} = \frac{\sin(30°)}{14}$$

$$\frac{.98480753}{a} = .03571428\,6 \cdot a$$

$$\frac{.98480753}{.03571428\,6} = \frac{.03571428\,6 \cdot a}{.03571428\,6}$$

$$a = 27.57$$





$\angle A = 115^\circ$

$a = x$

$\angle B = 48^\circ$

$b = 11\text{cm}$

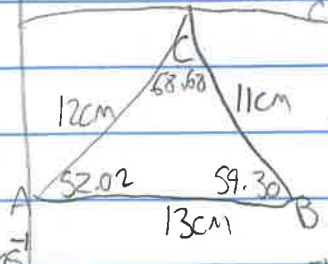
$$\frac{\sin(115)}{x} = \frac{\sin(48)}{11}$$

$$\frac{x}{\sin(115^\circ)} = \frac{11}{\sin(48)} \cdot \sin(115)$$

$$x = \frac{11 \cdot \sin(115^\circ)}{\sin(48)} \quad .906307787$$

Law of Cosines

$$c^2 = a^2 + b^2 - 2ab\cos c$$



$13^2 = 11^2 + 12^2 - 2(11)(12)\cos(C)$

$169 = 121 + 144 - 2(11)(12)\cos(C)$

$169 = 121 + 144 - 264\cos(C)$

$169 = 265 - 264\cos(C)$

$\cos^{-1}$ $265 \quad 265$

$-96 = -264 \cdot \cos(C)$

$\frac{-96}{-264} = \frac{-264 \cdot \cos(C)}{-264}$

$\cos^{-1}$ $.363636 = \cos(C)$

$68.68^\circ = C$