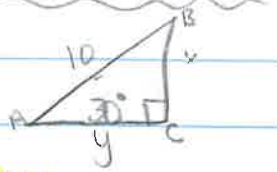
Theta = θ

Trigonometric Ratios

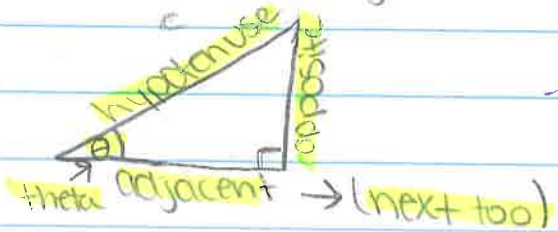
How can you use the three trigonometric ratios to save for an unknown angle in any triangle?

Why can't I solve this?
↳ There are two varibles.

Solve for x and y



Can you use Pythagorean Theorem to solve for c?
↳ no but you can use trig.

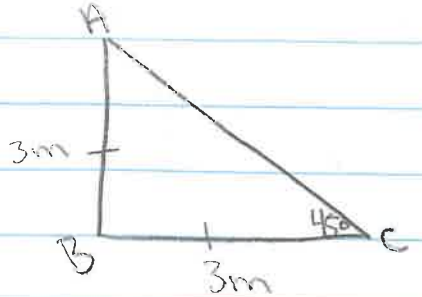


SohCahToa

1. $\sin\theta = \frac{opp}{hyp}$

2. $\cos\theta = \frac{adj}{hyp}$

3. $\tan\theta = \frac{opp}{adj}$



Theta θ = 45°
opp: 3m
adj: 3m

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

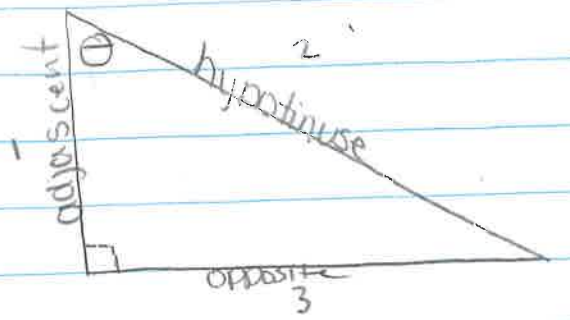
$\sin(45°) = \frac{3}{c}$

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

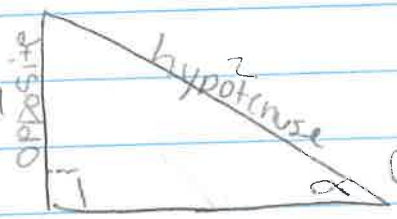
$\frac{c \cdot .7071}{.7071} = \frac{3}{.7071}$

c = 4.24m

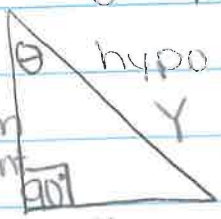
Theta
θ
α alpha



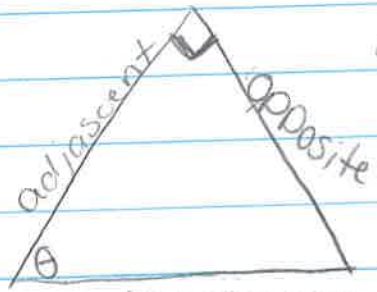
Theta = 40°
adjacent = 55
opposite = X



$\theta = 40°$



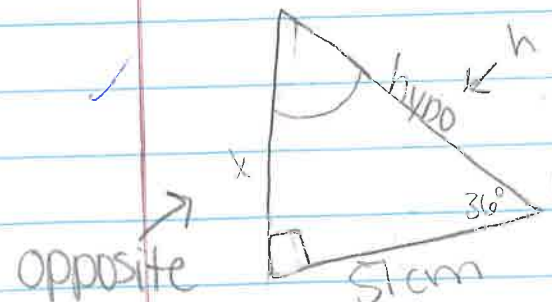
Tan(θ) 40°



$55 \cdot \tan(\theta)40° = \frac{X}{55} \cdot 55$
$55 \cdot \tan(40°) = X$
$46.15 = X$

Soh caa Toa

Theta = 36°
adjacent = 51cm
Opposite = X = 37.026 cm



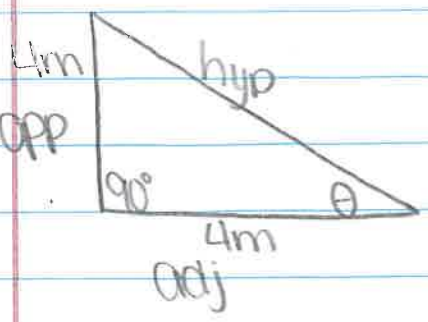
$51 \cdot \tan(\theta)(36°) = \frac{X}{51} \cdot 51$
$51 \cdot \tan(36°) = X$
$37.026 = X$

$h \cdot \sin(\theta)36° = \frac{37.026\text{cm}}{h} \cdot h$

$\frac{h \cdot \sin 36°}{.5877} = \frac{37.026}{.5877}$

$h = 63.00$

3-12-18



$4^2 + 4^2 = C^2$

$16 + 16 = C^2$

$32 = C^2$

$5.65 = C$

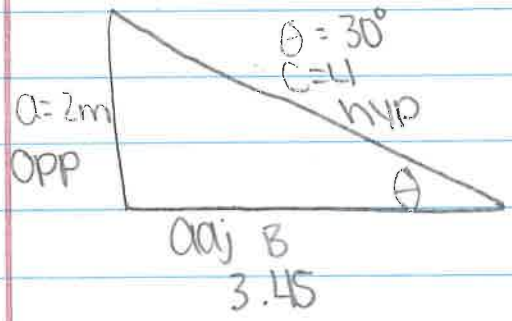
$\sin(\theta) = \frac{Opp}{hyp}$

$\sin(\theta) = \frac{4m}{5.65}$

$\approx .7071$

$\cos(\theta) = \frac{4m}{5.65} \approx .7071$

$\tan(\theta) = \frac{4m}{4m} \approx 1$



Opp = 2m

hypotinose?

$C \cdot \sin(30°) = \frac{2m}{C} \cdot C$

$C \cdot \sin(30°) = 2m$

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

$C = 2m = 4$

$2^2 + B^2 = 4^2$

$\frac{4}{4} + \frac{b^2}{4} = \frac{16}{4}$

$B^2 = 12$

$B = 3.46$

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

$B \cdot .577 = \frac{2 \cdot b}{b}$

$\frac{B \cdot .577}{.577} = \frac{2}{.577}$

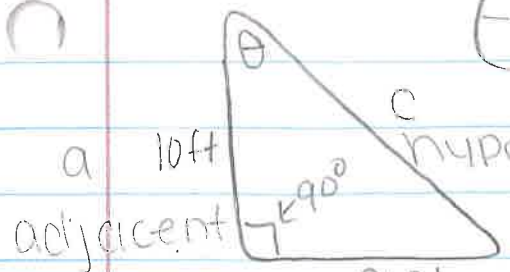
(Sohcahtoa)

Sine = opposite side / hypotenuse

Cosine = adjacent side / hypotenuse

tangent = opposite side / adjacent side

(Trig Notes)



a

b

Theta = ?

opposit = 9ft

adjective = 10ft

How can we solve for an unknown angle?

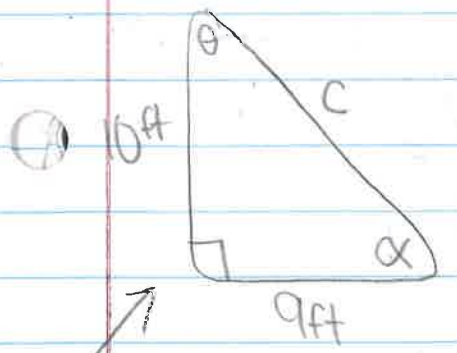
$\tan(\theta) = \frac{9}{10}$

$\tan(\theta) = .9$

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

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

$(\theta) = 41.99$



pethagrum and thuram.

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

$10^2 + 9^2 = c^2$

$100 + 81 = c^2$

$181 = c^2$

$\sqrt{181} = 13.45ft$

inverse function

$\sin^{-1}$

$\cos^{-1}$

$\tan^{-1}$

Solve for (θ)

What do we know?

Theta?

oposite 6m : Tan

adjacent 7m

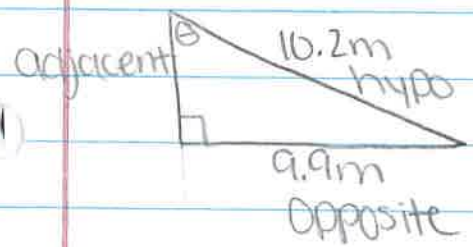
$\text{Tan}(\theta) = \frac{6}{7}$

$\text{Tan}(\theta) = 0.86$

$\text{Tan}^{-1}\text{Tan}(\theta) = 0.86\,\text{tan}^{-1}$

$(\theta) = \text{Tan}^{-1}\ 0.86$

$(\theta) = 40.7$ m



Theta?

hypo 10.2

Opposite 9.9

$\text{Sin}(\theta) = \frac{9.9}{10.2}$ → $\sin^{-1}$ → .970588235

$\text{Sin}^{-1}\text{Sin}(\theta) =$ → $\sin^{-1}$

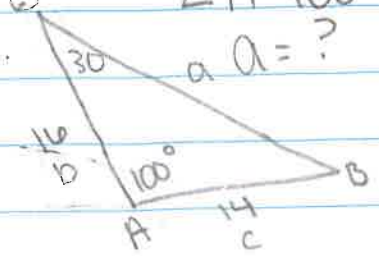
$(\theta) =$ → $\theta = 76.07$

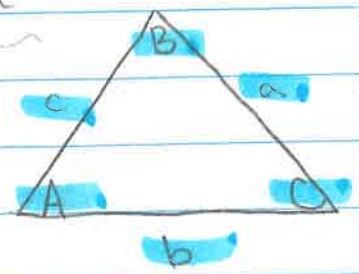
Law of Sines

Find the missing measurement

$\angle A = 100°$ $\angle B = ?$ $\angle C = 30°$ Formula

$a = ?$ $b = 6$ $c = 14$





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

BigLetter = Angles

LittleLetter = Side length

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

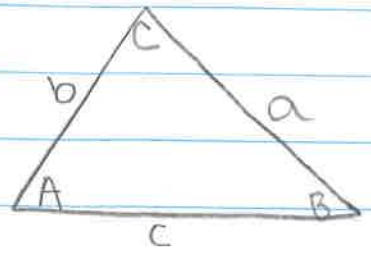
$$a \cdot \frac{.98480775}{a} = 0.03571428 6 \cdot a$$

$$\frac{.98480775}{.03571428 6} = \frac{.03571428 6 \cdot a}{.03571428 6}$$

$$27.57 = a$$

Law of cosine

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



✓

$\angle A = 41.0°$
$a = ?$
$\angle B = ?$
$b = 200$
$\angle C =$
$c =$

Use formula

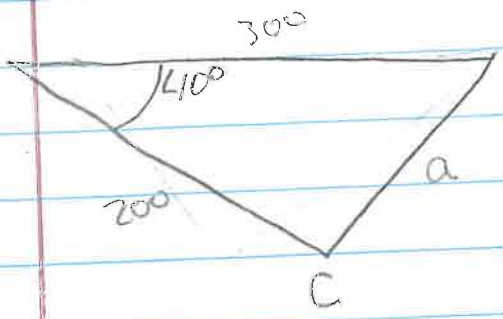
$c^2 = a^2 + b^2 - 2ab\cos C$

$300^2 + 200^2 \quad \cos(41.0°)$

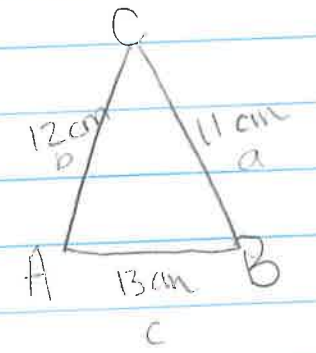
$C^2 = 90{,}000 + 40{,}000 - 120{,}000(.7660414414413)$

$C^2 = 90{,}000 + 40{,}000 - 91{,}925.33317$

$C^2 = 38074.666683$



*can't use Pethagum theorum-



$\angle A = A$
$a = 11cm$
$\angle B = B$
$b = 12cm$
$\angle C = C$
$C = 13cm$

Sin

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

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

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

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

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

$-265 \quad -265$

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

$\overline{-264 \quad -264}$

$.3636363636 = \cos(C)$ $\cos^{-1}$

$\cos^{-1}$

$108.68° = C$