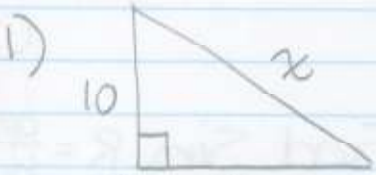
december 6th, 2007

Right Angled Trig

Pythagoras and SohCahToa

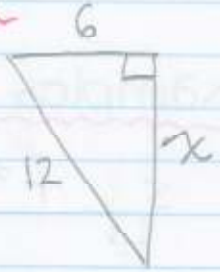
1)



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

$10^2 + 15^2 = x^2$
$100 + 225 = x^2$
$325 = x$
$x = \sqrt{325}$
$x = 5\sqrt{13}$

2)



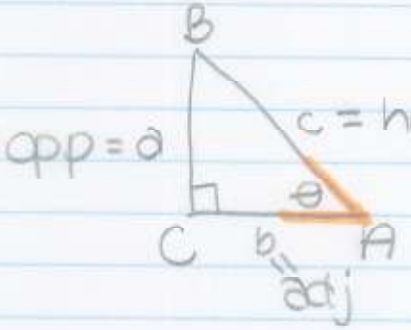
$6^2 + x^2 = 12^2$
$36 + x^2 = 144$
$x^2 = 108$
$x = \sqrt{108}$
$x = \sqrt{36}\sqrt{3}$
$x = 6\sqrt{3}$

SohCahToa

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

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

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

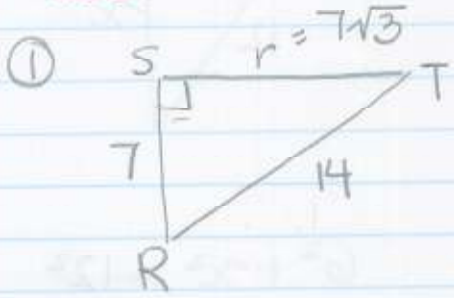


*adj and hyp touch angle

3 Types of Questions

Find Sin θ → get ratio & reduce
Find θ → SHIFT
Find x → × or ÷

Examples

① 

$7^2 + r^2 = 14^2$
$49 + r^2 = 196$
$r^2 = 147$
$r = \sqrt{147}$
$r = 7\sqrt{3}$

a) Find Sin R = $\frac{opp}{hyp}$

$= \frac{7\sqrt{3}}{14}$

$= \frac{\sqrt{3}}{2}$

b) Find Cos t = $\frac{adj}{hyp}$

$= \frac{7\sqrt{3}}{14}$

$= \frac{\sqrt{3}}{2}$

c) Find $\angle R$

$\cos R = 7/14$
$= 1/2$

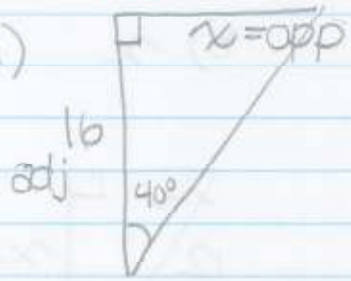
$\cos^{-1}(1/2) = R$

$\therefore R = 60$

x when x is on top
÷ when x is on bottom

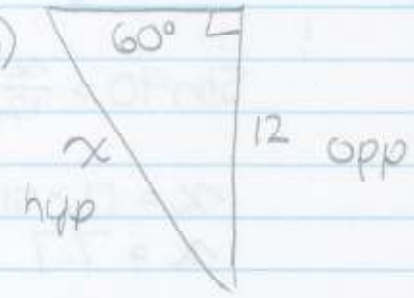
② Find unknown

a)



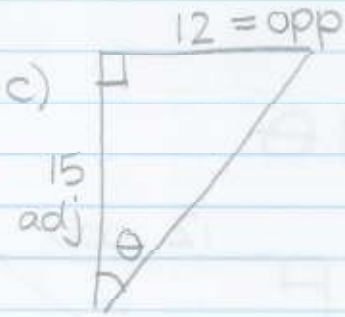
$\tan 40 = x/16$
$x = 16 \cdot \tan 40$
$x = 13.4$

b)



$x = \sin 60 = 12$
$= \frac{12}{\sin 60}$ $\sin 60 = \frac{12}{x}$
$= 13.9$

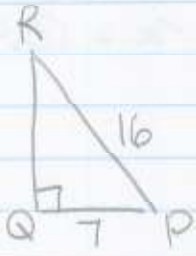
c)



$\tan \theta = 12/15$
$\tan^{-1}(12/15) = \theta$
$\theta = 38.7°$

③ Find each

a) Tan P + ∠P



$p^2+7^2=16^2$

$p^2+49=256$

$p^2=207$

$p=\sqrt{207}$

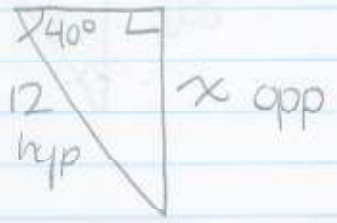
$p=3\sqrt{23}$

$\text{Tan } P = \frac{opp}{adj} = \frac{3\sqrt{23}}{7}$

$\text{Tan}^{-1}\left(\frac{3\sqrt{23}}{7}\right) = P$

$P = 64.1°$

b) x

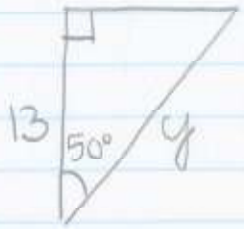


$\text{Sin}40 = \frac{x}{12}$

$x = 12 \cdot \sin 40$

$x = 7.7$

c) y

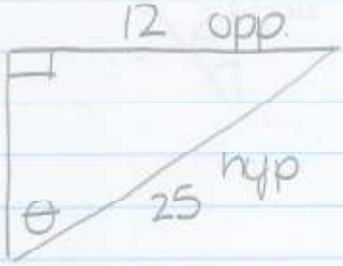


$\cos 50 = 13/y$

$y = \frac{13}{\cos 50}$

$y = 20.2$

d) θ

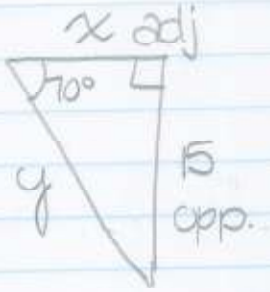


$\text{Sin}\theta = \frac{12}{25}$

$\theta = \text{Sin}^{-1}\left(\frac{12}{25}\right)$

$\theta = 28.7°$

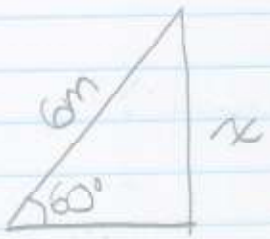
e) $x+y$



$\tan 70 = \frac{15}{x}$ $\quad x = 5.5$

$\sin 70 = \frac{15}{y}$ $\quad y = 16$

(4) A 6m ladder leans on a wall to reach a window. If ladder's makes an angle of 60° to the ground, how high is the window?



$\sin 60 = \frac{x}{6}$

$x = 5.2m$

⑤ In $\triangle ABC$, $\angle B = 90°$ $AB = 10cm$
Find $\overline{AC}$ if $\angle A = 25°$

$\cos 25 = \frac{10}{x}$

$x = 11$