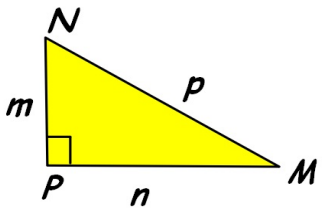
13-1 Right Triangle Trigonometry and Special Triangles

Six trigonometric functions defined:

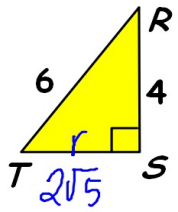


$\sin M = \frac{m}{p}$ $\cos M = \frac{n}{p}$ $\tan M = \frac{m}{n}$

reciprocal functions:

cosecant $\csc M = \frac{p}{m}$ $\frac{hyp}{opp}$ secant $\sec M = \frac{p}{n}$ $\frac{hyp}{adj}$ cotangent $\cot M = \frac{n}{m}$ $\frac{adj}{opp}$

1 Evaluate the 6 trig functions of angle R.



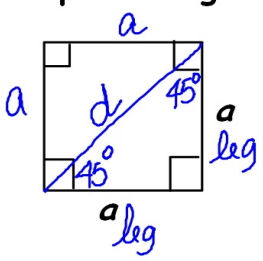
$r^2 = 36 - 16$ $\sin R = \frac{\sqrt{5}}{3}$ $\cos R = \frac{2}{3}$ $\tan R = \frac{\sqrt{5}}{2}$

$\csc R = \frac{3}{\sqrt{5}} = \frac{3\sqrt{5}}{5}$ $\sec R = \frac{3}{2}$ $\cot R = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$

2 Use a calculator. Round to 4 decimal places.

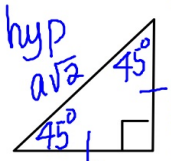
csc 52° cot 85°

Special Right Triangles



$d^2 = 2a^2$

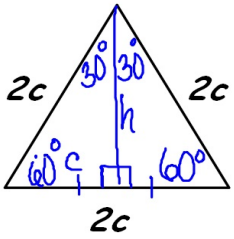
$d = a\sqrt{2}$



45°-45°-90°

a : a : a√2

1 : 1 : √2



$c^2 + h^2 = 4c^2$

$h^2 = 3c^2$

$h = c\sqrt{3}$

30°-60°-90°

c : c√3 : 2c

1 : √3 : 2

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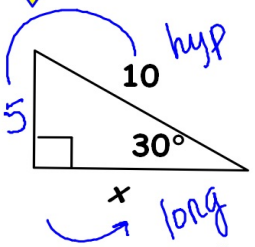
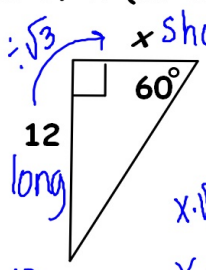
3 Find exact value of x (no calculator).



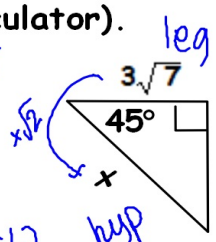
$\frac{\text{hyp}}{\text{LL}} \quad \frac{2}{\sqrt{3}} = \frac{10}{x}$



$x \cdot \sqrt{3} = 12$

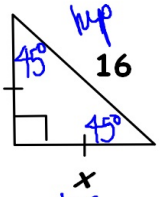
$x = \frac{12}{\sqrt{3}}$

$x = 4\sqrt{3}$



$x = 3\sqrt{7} \cdot \sqrt{2}$

$x = 3\sqrt{14}$



$x\sqrt{2} = 16$

or $x = \frac{16}{\sqrt{2}}$

$= 8\sqrt{2}$

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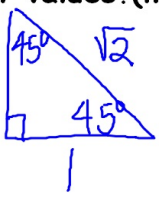
4 Find exact values. (no calculator)

cos 45°

$= \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$



$\frac{1}{\sin 60°} = \csc 60°$

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