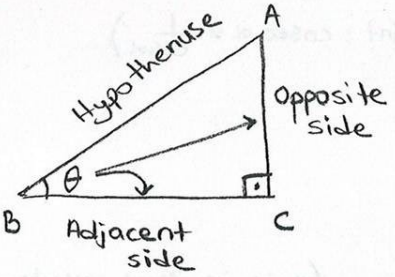
Right Triangle Trigonometri (INTRODUCTION)

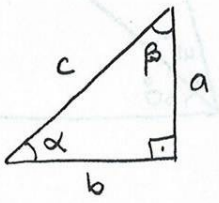


$$\sin\theta = \frac{\text{opposite side}}{\text{hypothenuse}} = \frac{opp}{hyp}$$

$$\cos\theta = \frac{\text{Adjacent side}}{\text{hypothenuse}} = \frac{Adj}{hyp}$$

$$\tan\theta = \frac{\text{Opposite side}}{\text{Adjacent side}} = \frac{Opp}{Adj}$$

$$\cot\theta = \frac{\text{Adjacent side}}{\text{Opposite side}} = \frac{Adj}{opp}$$



$$\sin\alpha = \frac{opp}{hyp} = \frac{a}{c}$$

$$\cos\alpha = \frac{adj}{hyp} = \frac{b}{c}$$

$$\tan\alpha = \frac{opp}{adj} = \frac{a}{b}$$

$$\cot\alpha = \frac{adj}{opp} = \frac{b}{a}$$

$\sin\beta = ?$ $\quad \tan\beta = ?$

$\cos\beta = ?$ $\quad \cot\beta = ?$

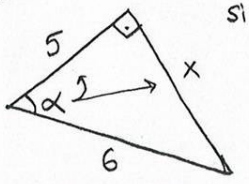
* Easy way to memorize the ratios (identities) is;

SOH : Sine = $\frac{\text{Opposite}}{\text{Hypothenuse}}$

CAH : Cosine = $\frac{\text{Adjacent}}{\text{Hypothenuse}}$

TOA : Tangent = $\frac{\text{Opposite}}{\text{Adjacent}}$

ex



$\sin\alpha, \cos\alpha, \tan\alpha, \cot\alpha = ?$

$x^2 + 5^2 = 6^2$

$x^2 = 36 - 25$

$x^2 = 11$

$x = \sqrt{11}$

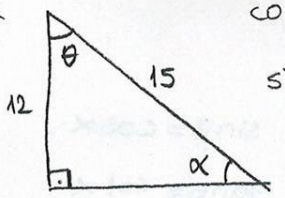
$\sin\alpha = \frac{opp}{Hyp} = \frac{x}{6} = \frac{\sqrt{11}}{6}$

$\cos\alpha = \frac{Adj}{Hyp} = \frac{5}{6}$

$\tan\alpha = \frac{Opp}{Adj} = \frac{x}{5} = \frac{\sqrt{11}}{5}$

$\cot\alpha = \frac{Adj}{} = \frac{5}{\sqrt{11}}$

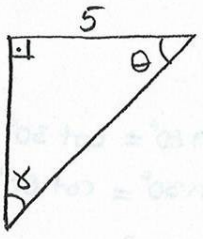
ex



$\cos\alpha, \sin\alpha, \tan\alpha, \cot\alpha = ?$

$\sin\theta, \cos\theta, \tan\theta, \cot\theta = ?$

ex

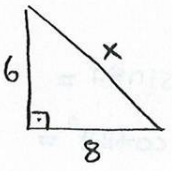


$\sin\theta, \cos\theta, \tan\theta, \cot\theta = ?$

$\sin\gamma, \cos\gamma, \tan\gamma, \cot\gamma = ?$

Exercises for Pythagorean theorem.

1)



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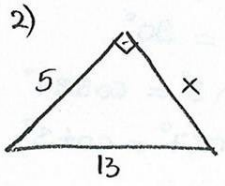

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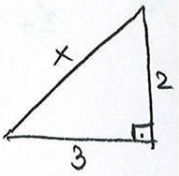

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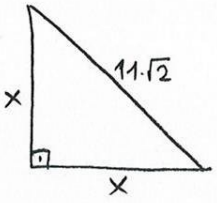

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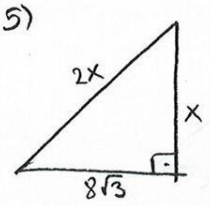

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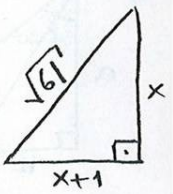
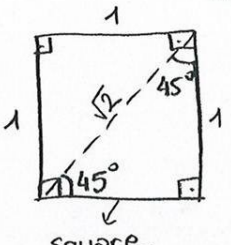
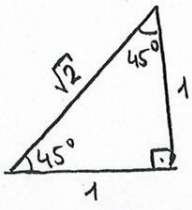


SPECIAL TRIANGLES AND RATIOS





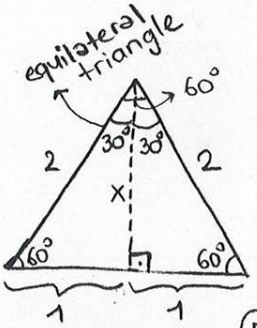
SOH CAH TOA

$\sin 45° = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\cos 45° = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\tan 45° = \frac{1}{1} = 1$

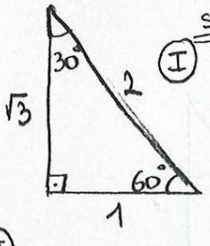
$\cot 45° = \frac{1}{1} = 1$



$x^2 + 1^2 = 2^2$

$x^2 = 3$

$x = \sqrt{3}$



SOH CAH TOA

(I) $\sin 30° = \frac{1}{2}$

$\cos 30° = \frac{\sqrt{3}}{2}$

$\tan 30° = \frac{1}{\sqrt{3}}$

$\cot 30° = \frac{\sqrt{3}}{1}$

(II) $\sin 60° = \frac{\sqrt{3}}{2}$

$\cos 60° = \frac{1}{2}$

$\tan 60° = \frac{\sqrt{3}}{}$

$\cot 60° = \frac{1}{\sqrt{3}}$

CONCLUSION:

if $\alpha+\beta=90^\circ$

$\sin\alpha=\cos\beta$ or $\sin\beta=\cos\alpha$

$\tan\alpha=\cot\beta$ or $\tan\beta=\cot\alpha$

ex $30^\circ+60^\circ=90^\circ$

$\sin30^\circ=\cos60^\circ$ $\quad\tan60^\circ=\cot30^\circ$

$\sin60^\circ=\cos30^\circ$ $\quad\tan30^\circ=\cot60^\circ$

$\sin45^\circ=\cos45^\circ$

$\tan45^\circ=\cot45^\circ$

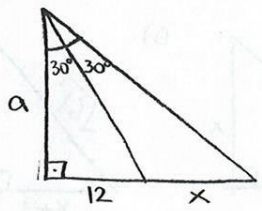
ex $3^\circ+87^\circ=90^\circ$

$\sin3^\circ=\cos87^\circ$ $\quad\sin87=$

$\tan87^\circ=\cot3^\circ$ $\quad\cot87^\circ=$

Exercises:

1)



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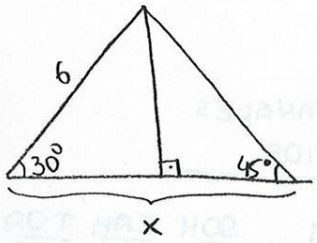

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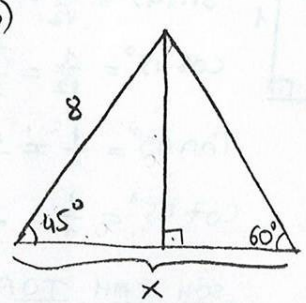

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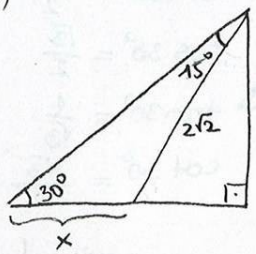


5) $\dfrac{\tan30^\circ\cdot\operatorname{cosec}60^\circ}{\cos45^\circ\cdot\sin60^\circ}=x\cdot\cot30^\circ\cdot\sin45^\circ$ $\left(\frac{1}{\sin60}\right)$

(hint : $\operatorname{cosec}\alpha=\frac{1}{\cos\alpha}$)

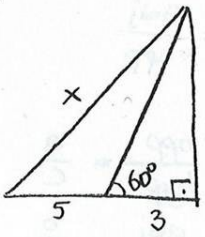
6) $\tan x=\dfrac{1}{\sqrt{17}}$ (x is in first quadrant

$\sin x=$

$\cos x=$

$\cot x=$

7)



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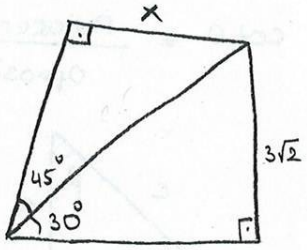

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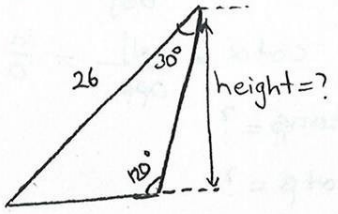

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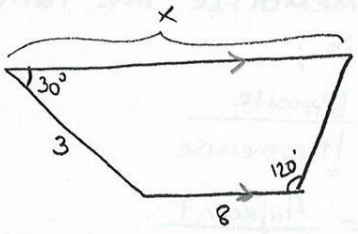

11)