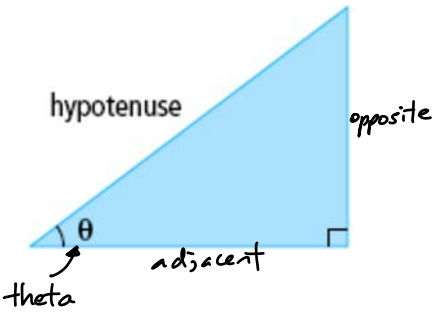
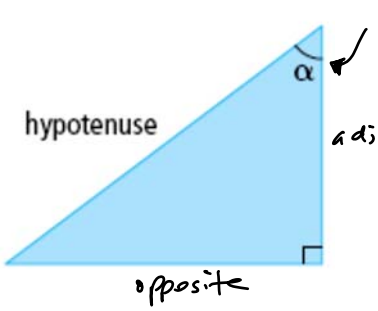
Unit 5: Non-Right Triangle Trigonometry
5.1 Right Angle Trigonometry Review





alpha

Three primary trigonometric ratios:

sine	cosine	tangent
$\sin\theta = \frac{opp}{hyp}$	$\cos\theta = \frac{adj}{hyp}$	$\tan\theta = \frac{opp}{adj}$

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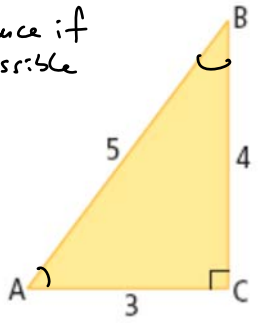
$\sin 30° = \frac{1}{2}$

Ex. Write Trigonometric Ratios

Write each trigonometric ratio.



a) sin A = $\frac{4}{5}$ *reduce if possible

b) cos A = $\frac{3}{5}$

c) tan A = $\frac{4}{3}$

d) sin B = $\frac{3}{5}$

e) cos B = $\frac{4}{5}$

f) tan B = $\frac{3}{4}$

Ex. Evaluating ratios & finding angles

a) Evaluate each ratio, to four decimal places.

sin 42° = 0.6691 cos 68° = 0.3746 tan 25° = 0.4663

b) Determine each angle measure, to the nearest degree.

$\sin^{-1}$ = "arcsine" $\cos^{-1}$ = "arccosine" $\tan^{-1}$ = "arctangent"

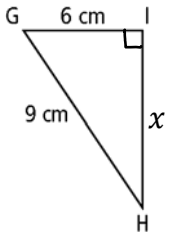
sin θ = 0.4771
θ = $\sin^{-1}(0.4771)$
= 28°

cos β = 0.7225
β = $\cos^{-1}(0.7225)$
= 44°

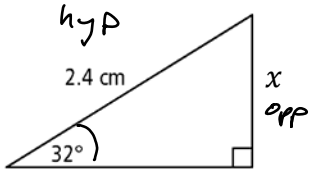
$\tan\theta = \frac{5}{4}$
θ = $\tan^{-1}(5/4)$
= 51°

Ex. Finding missing sides and angles

Determine the indicated missing side or angle.



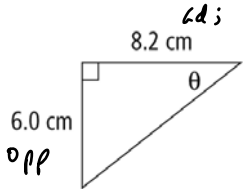
Pythagoras
$a^2 + 3^2 = c^2$
$x^2 + 6^2 = 9^2$
$x^2 + 36 = 81$
$-36 \quad -36$
$x^2 = 45$
$x = \sqrt{45}$
$= \sqrt{9}\sqrt{5}$
$= 3\sqrt{5}$ cm (exact radical form) ≈ 6.7 cm



$\sin 32° = \frac{x}{2.4}$

$x = 2.4 \sin 32°$

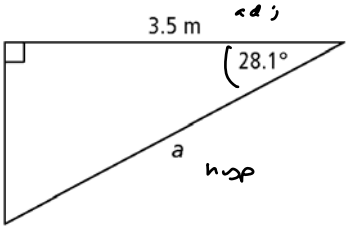
$x = 1.3$ cm



$\tan\theta = \frac{6}{8.2}$

$\theta = \tan^{-1}(6/8.2)$

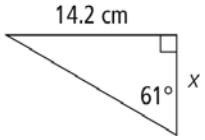
$\theta = 36°$



$\cos 28.1° = \frac{3.5}{a}$

$a = \frac{3.5}{\cos 28.1°}$

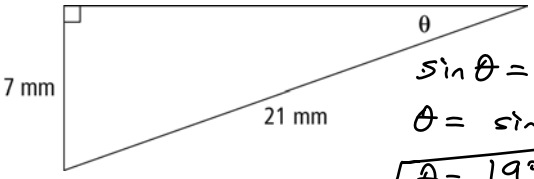
$a = 4.0\ m$



$\tan 61° = \frac{14.2}{x}$

$x = \frac{14.2}{\tan 61°}$

$x = 7.9\ cm$



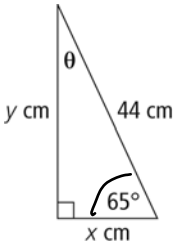
$\sin\theta = 7/21$

$\theta = \sin^{-1}(7/21)$

$\theta = 19°$

Ex. Solving a triangle

Determine the missing measurements in the right triangle. Express side lengths to the nearest tenth of a centimetre and angles to the nearest degree.



$\theta = 180° - 90° - 65°$

$\theta = 25°$

$\cos 65° = \frac{x}{44}$

$x = 44\cos 65°$

$x = 18.6\ cm$

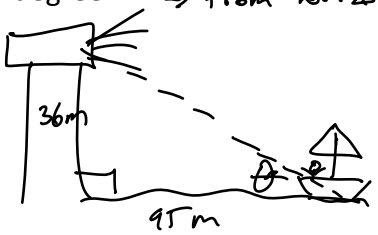
$\sin 65° = \frac{y}{44}$

$y = 44\sin 65°$

$y = 39.9\ cm$

Ex. Solving Problems

A small boat is 95 m from the base of a lighthouse that has a height of 36 m above sea level. Calculate the angle of elevation from the boat to the top of the lighthouse. Express your answer to the nearest degree. ↳ from horizontal up

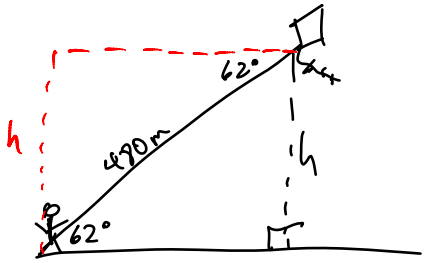


$\tan\theta = \frac{36}{95}$

$\theta = \tan^{-1}(36/95)$

$\theta = 21°$

A person flies a kite such that the angle of depression from the kite to the person is 62°. Determine the height of a kite above the ground if the kite string extends 480 m from the ground. Express your answer to the nearest tenth of a metre. ↳ horizontal down



$\sin 62° = \frac{h}{480}$

$h = 480\sin 62°$

$h = 423.8\ m$

Practice: Worksheet 5.1/ #3 – 6ab, 7, 8, 9 – 10ab, 11i&ii, 12 – 14ab, 15 – 20