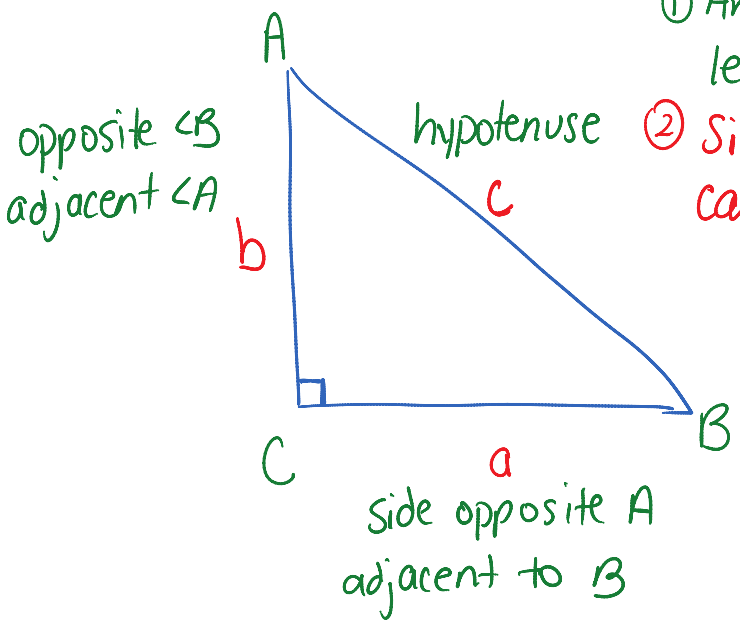


① Angles labelled with capital letters

② Sides are labelled with lower case letters
→ correspond to angles opposite them

③ Pythagorean Theorem

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

a & b are called legs
c is the hypotenuse
(longest side of Δ)

There are trigonometric ratios that work with right Δ's
↳ ratios that relate side lengths to angles

$$\text{Sine } A = \frac{\text{opposite side to } A}{\text{hypotenuse}} = \frac{a}{c}$$

$$\text{sine } B = \frac{\text{opposite side to } B}{\text{hypotenuse}} = \frac{b}{c}$$

$$\text{Sin } A = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\text{Cosine } A = \frac{\text{adjacent side to } A}{\text{hypotenuse}} = \frac{b}{c}$$

$$\text{Cos } A = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\text{Cosine } B = \frac{\text{adjacent side to } B}{\text{hypotenuse}} = \frac{a}{c}$$

$$\text{Tangent } A = \frac{\text{opposite side to } A}{\text{adjacent side to } A} = \frac{a}{b}$$

$$\text{Tangent } B = \frac{\text{opposite side to } B}{\text{adjacent side to } B} = \frac{b}{a}$$

$$\text{Tan } A = \frac{\text{opposite}}{\text{adjacent}}$$

SOH CAH TOA

$$\text{Sine} = \frac{\text{opp}}{\text{hyp}} \quad \text{Cos} = \frac{\text{Adj}}{\text{hyp}} \quad \text{Tan} = \frac{\text{opp}}{\text{adj}}$$

Calculator Practice

① calculator mode MUST be set to degree "DEG" "D"

② know how to key in information

Ex: Find to 4 decimal places

$\frac{.5 \to \text{opp}}{1 \to \text{hyp}}$

Sin 30° = .5 Tan 30° = .5774 Cos 20° = .9397

Cos 75° = .2588 Sin 65° = .9063 Tan 85 = 11.43

Sin 90° = 1 $\frac{\text{opp}}{\text{hyp}} = \frac{\text{hyp}}{\text{hyp}} = 1$

Cos 90° = 0 $\frac{\text{adj}}{\text{hyp}} = \frac{0}{c} = 0$

Tan 90° = N.P.
* opposite of 90° is the hyp.

you can also use the ratios to find angles using the inverse of the ratios ($\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$)

Example: Find A if:

Sin A = .5 Cos A = .75

2nd sin .5 = 30° A = 41.4°

$\frac{1}{2}$

Sin A = $\frac{1}{5}$ Cos A = $\frac{7}{8}$

2nd sin (.2) = 11.5° A = 29°

2nd sin (1 ÷ 5)

$\sin A = \frac{5}{4}$

* NOT POSSIBLE because opposite side cannot be longer than hypotenuse.

Cross Multiplication in Equivalent Fractions

Example: Solve for x

$\frac{3}{8} \times \frac{x}{42}$

$8x = (3)(42)$

$\frac{8x}{8} = \frac{126}{8}$

$x = 15.75$

$\frac{6}{x} = \frac{8}{1}$

$\frac{6}{8} = \frac{8x}{8}$

$\frac{6}{8} = x$

$.75 = x$

$\frac{\sin 50}{1} \times \frac{x}{11}$

$11 \cdot \sin 50 = x$

$8.43 = x$

$\frac{\cos 60}{1} \times \frac{6}{x}$

$x \cos 60 = 6$

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

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

$X = 12$

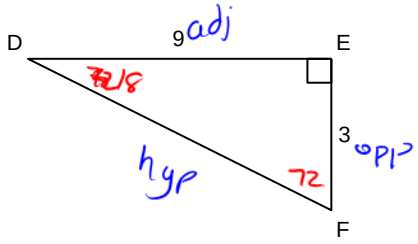
FM 11 Chapter 3 – Prerequisite Skills

Cross Multiplying – Remember to isolate the variable

Examples

$\frac{2}{x}=\frac{7}{4}$ $\frac{5}{3}=\frac{p}{9}$ $\frac{1.5}{6}=\frac{1}{t}$

1. Determine the measure of ∠ D to the nearest tenth of a degree.



$\tan D = \frac{3}{9}$

$D = \tan^{-1}(3 \div 9)$

$= 18°$

$F = 72$

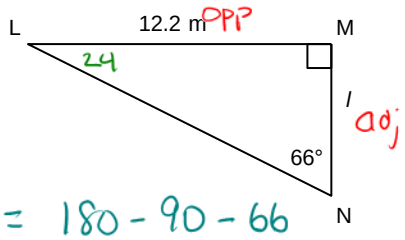
$9^2 + 3^2 = e^2$

$81 + 9 = e^2$

$\sqrt{90} = \sqrt{e^2}$

$9.5 = e$

2. Determine the length of side *l* to the nearest tenth of a metre.



$L = 180 - 90 - 66$

$= 24°$

$\frac{\tan 66}{1} = \frac{12.2}{l}$

$l \cdot \tan 66 = 12.2$

$\frac{l \cdot \tan 66}{\tan 66} = \frac{12.2}{\tan 66}$

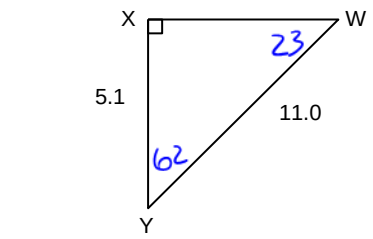
$l = 5.43\,m$

$12.2^2 + 5.43^2 = m^2$

$\sqrt{178.32} = \sqrt{m^2}$

$13.35 = m$

3. Determine the measure of ∠ Y to the nearest tenth of a degree.



$W = 180 - 90 - 62$

$= 23°$

$\cos Y = \frac{5.1}{11}$

$Y = \cos^{-1}(5.1 \div 11)$

$Y = 62°$

$y^2 = 11^2 - 5.1^2$

$\sqrt{y^2} = \sqrt{94.99}$

$y = 9.75$