2.1- 2.5 Using the Sine, Cosine and Tangent Ratios to Calculate Angles

So far, we have used the trigonometric formulas to determine the length of a side of a right triangle.

$\sin\theta = \frac{O}{H}$ $\cos\theta = \frac{A}{H}$ $\tan\theta = \frac{O}{A}$

We can also rewrite the trig formulas in terms of an acute angle (θ) using the following operations:

$\sin^{-1}$ $\cos^{-1}$ $\tan^{-1}$ inv. sin inv. cos inv tan

(depending on your calculator). These operations are known as the inverse of sine, cosine and tangent.

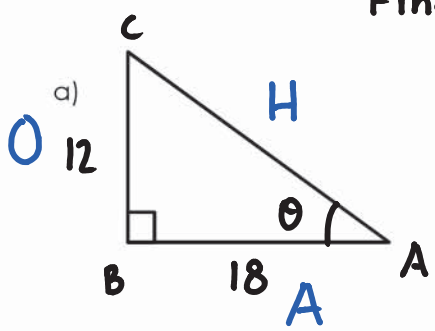
$\theta = \sin^{-1}\left(\frac{O}{H}\right)$ $\theta = \cos^{-1}\left(\frac{A}{H}\right)$

$\theta = \tan^{-1}\left(\frac{O}{A}\right)$

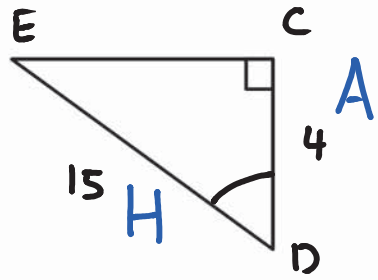
EXAMPLE 1 : Find the measure of the indicated angle, to the nearest degree.

Find $\angle A$ or $\angle BAC$ or $\angle CAB$

a)



b)



$\tan\theta = \frac{O}{A}$

$\tan\theta = \frac{12}{18}$

$\theta = \tan^{-1}\left(\frac{12}{18}\right)$

$\theta = \tan^{-1}(0.\overline{66})$

$\theta = 33.690$

$\theta = 34°$

$\cos\theta = \frac{A}{H}$

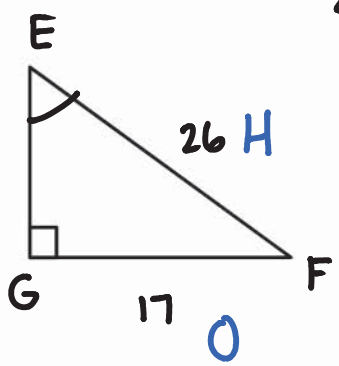
$\cos\theta = \frac{4}{15}$

$\theta = \cos^{-1}\left(\frac{4}{15}\right)$

$\theta = 74.53 = 75°$

$\angle GEF = ?$

c)



$$\sin\theta = \frac{O}{H}$$

$$\sin\theta = \frac{17}{26}$$

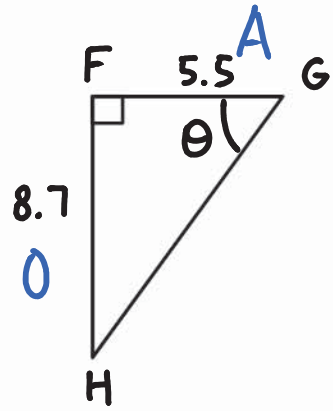
$$\theta = \sin^{-1}\left(\frac{17}{26}\right)$$

$$\theta = \sin^{-1}(0.6538)$$

$$\theta = 40.83^\circ$$

$$\theta = 41^\circ$$

d)



$$\tan\theta = \frac{O}{A}$$

$$\tan\theta = \frac{8.7}{5.5}$$

$$\theta = \tan^{-1}\left(\frac{8.7}{5.5}\right)$$

$$\theta = \tan^{-1}(1.58\overline{1})$$

$$\theta = 57.6996^\circ$$

$$\theta = 58^\circ$$

Practice: p.75 #5ab, 10cd; p.95 #8, 10ab, 12

Mrs. Donnelly

F. & P.-C. 10