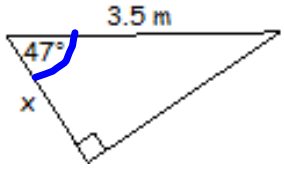
Unit 1 Test Review

Example 1: Determine the value of the missing variables.

a)



$\cos 47^\circ = \frac{x}{3.5}$

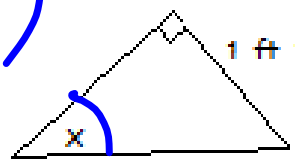
$3.5(\cos 47^\circ) = 3.5\left(\frac{x}{3.5}\right)$

$3.5(\cos 47^\circ) = x$

$x \doteq 2.3869$

$\therefore \boxed{x \doteq 2.39}$ m

b)



$\sin x = \frac{14}{36}$

$x = \sin^{-1}\left(\frac{14}{36}\right)$

$x = \sin^{-1}\left(\frac{7}{18}\right)$

$x \doteq 22.885$

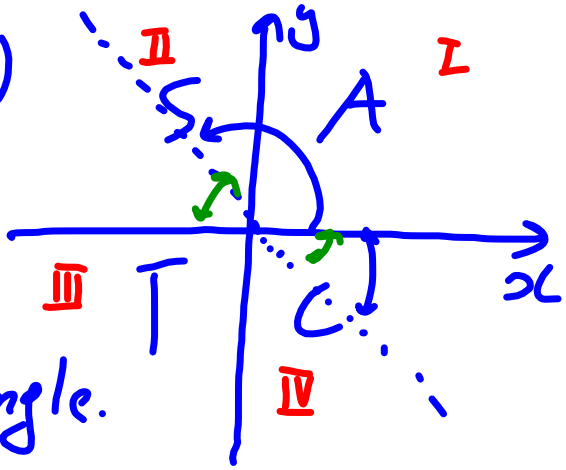
$\boxed{x \doteq 22.9^\circ}$

Example 2: Is each angle acute or obtuse? Explain.

a) tan B = -2.36

b) cos B = 0.21

$\angle B = \tan^{-1}(-2.36)$
$= -67^\circ$



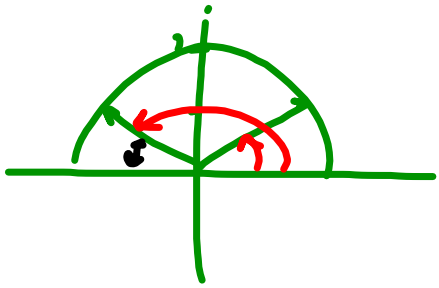
Solution:

a) Since tangent is negative in quadrant 2, then $\angle B$ is an obtuse angle.

$\angle B = 180^\circ - 67^\circ$
$= 113^\circ$ //

b) $\cos B = 0.21$
$\angle B = \cos^{-1}(0.21)$
$\angle B = 77.8^\circ$

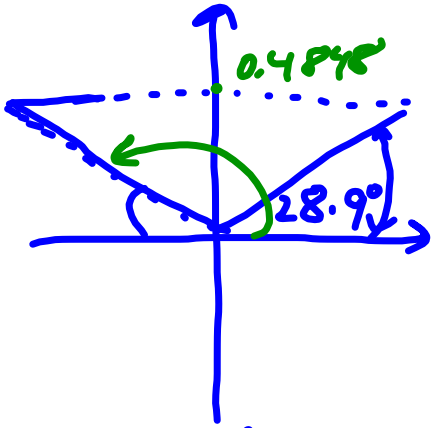
So, $\angle B$ is an acute angle.



Example 3: Determine all possible values for <A, if $0^\circ < A < 180^\circ$ and sin A = 0.4848. Show your steps.

Solution:

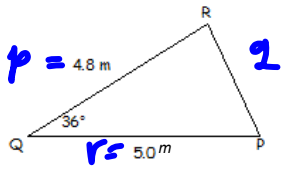
$\sin A = 0.4848$
$\angle A = \sin^{-1}(0.4848)$
$\angle A = 28.9^\circ$



$\sin A = \sin(180^\circ - A)$
$\angle A = 180^\circ - 28.9^\circ$
$\angle A = 151.1^\circ$

$\therefore \angle A$ could be 28.9° or 151.1°.

Example 4: Solve the following triangle.



Find q, ∠P, ∠R.

Solution:

Find q using the cosine law (SAS).

$q^2 = p^2 + r^2 - 2pr\cos Q$

$q^2 = (4.8)^2 + (5.0)^2 - 2(4.8)(5.0)\cos 36°$

$q^2 = 23.04 + 25 - 38.83$

$q^2 = 9.21$

$\sqrt{q^2} = \sqrt{9.21}$

$q = 3$ m

- Next find either ∠P or ∠R using the sine law or the cosine law.

$\frac{4.8}{\sin P} = \frac{3}{\sin 36°}$

$\frac{\sin P}{4.8} = \frac{\sin 36°}{3}$

$4.8\left(\frac{\sin P}{4.8}\right) = 4.8\left(\frac{\sin 36°}{3}\right)$

$\sin P = 0.9405$

$\angle P = \sin^{-1}(0.9405)$

$\angle P = 70°$

- Finally, $\angle R = 180° - 70° - 36°$

$= 180° - 106°$

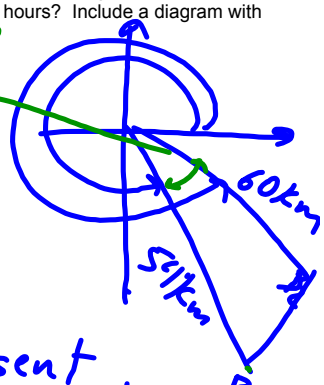
$= 74°$

$\therefore q = 3$ m, $\angle R = 74°$, $\angle P = 70°$

Example 5: Two boats leave port at the same time. One sails at 30 km/h on a bearing of 305°. The other sails at 27 km/h on a bearing of 333°. How far apart are the boats after 2 hours? Include a diagram with your solution.

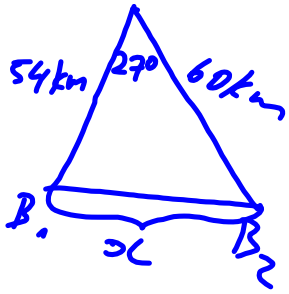
Solution:

$333° - 305° = 27°$



Boat 2: distance $= 27 \times 2$
$= 54$ km

Boat 1: distance $= 30 \times 2$
$= 60$ km



- Let x represent the distance between the two boats after 2 hours.

$x^2 = 54^2 + (60)^2 - 2(54)(60)\cos 27°$
$x^2 = 742.28$
$x = \sqrt{742.28}$
$x \doteq 27.2$
∴ The boats were 27.2 km apart.

Example 6: The point P(-5, 2) lies on the terminal arm of an angle in standard position. Determine the exact values of sin *x*, cos *x*, and tan *x*.

Solution:

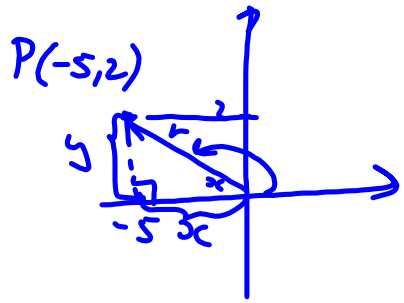
$\sin P = \frac{y}{r}$

$\cos P = \frac{x}{r}$

$\tan P = \frac{y}{x}$
$= -\frac{2}{5}$

$\sin P = \frac{2}{\sqrt{29}}$

$\cos P = -\frac{5}{\sqrt{29}}$



$x^2 + y^2 = r^2$
$(-5)^2 + (2)^2 = r^2$
$25 + 4 = r^2$
$29 = r^2$
$\sqrt{29} = r$
∴ $r = \sqrt{29}$

Hwk: Pg. 54 - 56: #1-11, 13-27