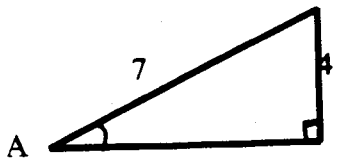
Trig/Vector Practice Test: Name: _____ Block: ___

Part A: For each triangle shown solve for the unknown angle or side. Each angle should be rounded to a whole number and all sides rounded to one decimal place.

1)

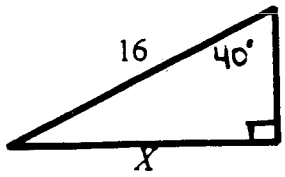


$\sin A = \frac{4}{7}$

$\angle A = \sin^{-1}\left(\frac{4}{7}\right)$

$\angle A = 35°$

2)

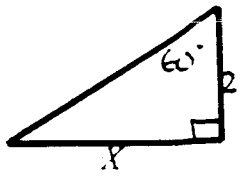


$\sin 40° = \frac{x}{16}$

$16 \sin 40° = x$

$10.3 = x$

3)

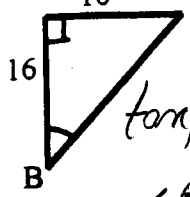


$\tan 60° = \frac{x}{2}$

$2 \tan 60° = x$

$3.5 = x$

4)

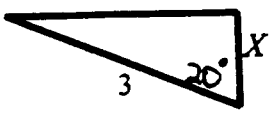


$\tan \beta = \frac{10}{16}$

$\angle \beta = \tan^{-1}\left(\frac{10}{16}\right)$

$\angle \beta = 32°$

5)

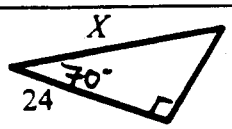


$\cos 20° = \frac{x}{3}$

$3 \cos 20° = x$

$2.8 = x$

6)



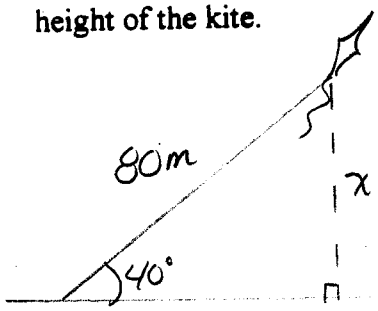
$\cos 70° = \frac{24}{x}$

$x = \frac{24}{\cos 70°}$

$x = 70.2$

Part B: Word Problems: Draw diagrams. Show work. Same round off rules as part A.

1. A kite is flying on 80 metres of string makes an angle of 40° with the ground. Determine the height of the kite.

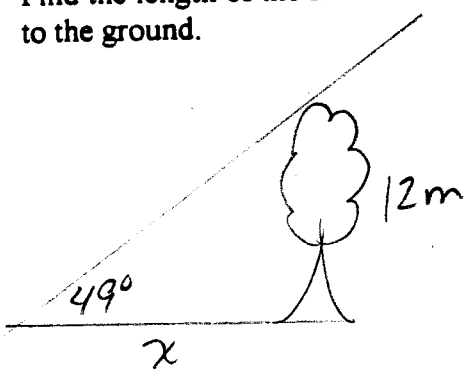


$\sin 40° = \frac{x}{80}$

$80 \sin 40° = x$

$51.4 = x$ ∴ 51.4 m above ground

2. Find the length of the shadow cast by a tree 12 m tall, if the sun's rays are at an angle of 49° to the ground.

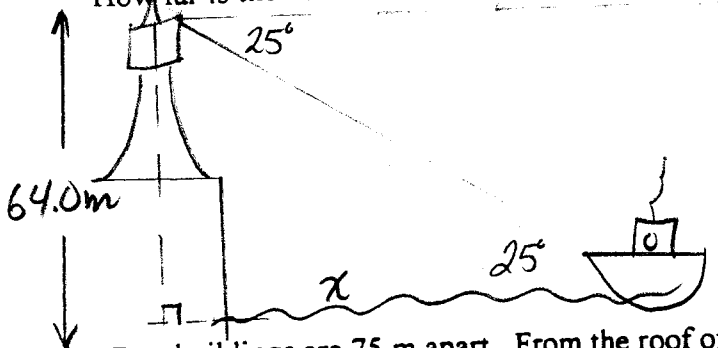


$\tan 49° = \frac{12}{x}$

$x = \frac{12}{\tan 49°}$

$x = 10.4$ m shadow

3. From the top of a lighthouse, 64.0 m above the sea, the angle of depression to a boat is 25°. How far is the boat from the base of the lighthouse?

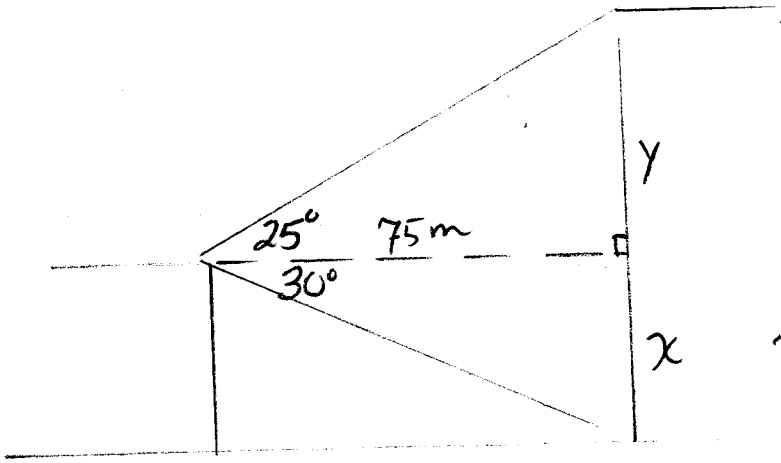


$\tan 25° = \frac{64.0}{x}$

$x = \frac{64.0}{\tan 25°}$

$x = 137.2\text{m}$ from base

4. Two buildings are 75 m apart. From the roof of the shorter building, the angle of elevation of the top of the other building is 25° and the angle of depression of the base is 30°. Find the height of the taller building.



$\tan 30° = \frac{x}{75}$ $\tan 25° = \frac{y}{75}$

$75 \tan 30° = x$ $75 \tan 25° = y$

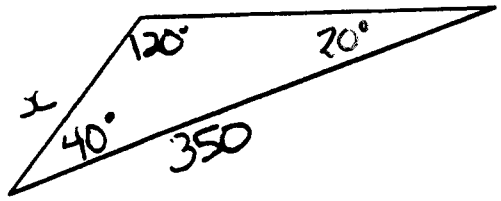
$43.3\text{m} = x$ $35.0 = y$

∴ Building is 78.3m tall

Part C: Sine Law & Cosine Law

Answers to nearest whole numbers. Show work.

1) Solve for x

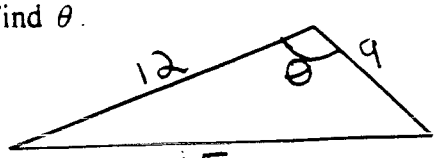


$\frac{\sin 120°}{350} = \frac{\sin 20°}{x}$

$x = \frac{350 \sin 20°}{\sin 120°}$

$x = 138.2$

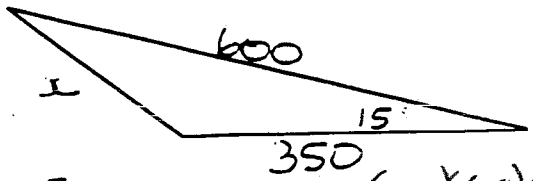
3) Find θ.



$\cos\theta = \frac{15^2 - 17^2 - 9^2}{-2(12)(9)}$

$\angle\theta = 90°$

4) Find x.



$x^2 = 350^2 + 600^2 - 2(350)(600)\cos 15°$

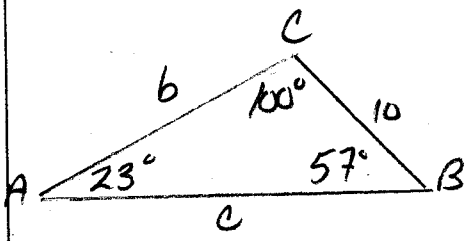
$x = 277.1$

5) Solve for ΔABC.

$\angle A = 23°$ $a = 10$

$\angle B = 57°$ $b = 21.5$

$\angle C = 100°$ $c = 25.2$



$\frac{\sin 23°}{10} = \frac{\sin 57°}{b}$ $\frac{\sin 23°}{10} = \frac{\sin 100°}{c}$

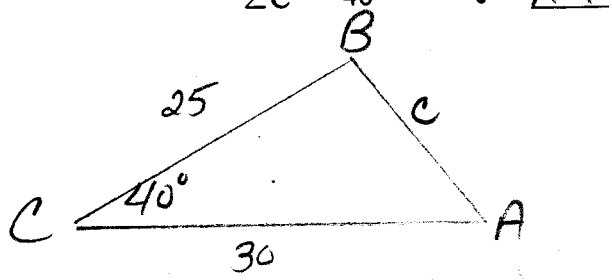
$b = 21.5$ $c = 25.2$

6) Solve for ΔABC.

$\angle A = 56°$ $a = 25$

$\angle B = 84°$ $b = 30$

$\angle C = 40°$ $c = 19.4$



$c^2 = 30^2 + 25^2 - 2(30)(25)\cos 40°$

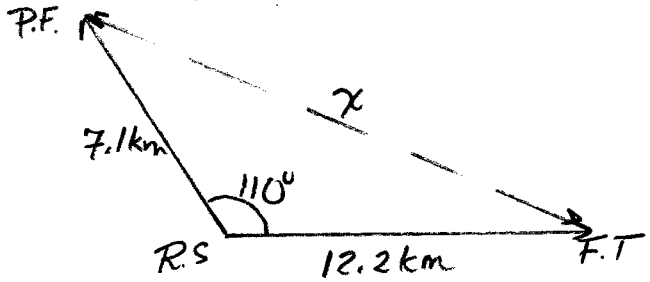
$c = 19.4$

$\frac{\sin 40°}{19.4} = \frac{\sin A}{25}$ $\angle A = 56°$

$\therefore \angle B = 84°$

Part D: Sine & Cosine Law Word Problems:

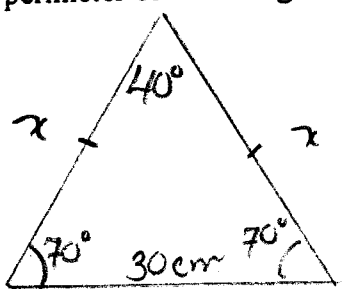
1. A radar tracking station locates a fishing trawler at a distance of 12.2 km and a passenger ferry at a distance of 7.1 km. At the station, the angle between the two boats is 110 degrees. How far apart are they?



$x^2 = (7.1)^2 + (12.2)^2 - 2(7.1)(12.2)\cos 110$

$x = 16.1$ km apart

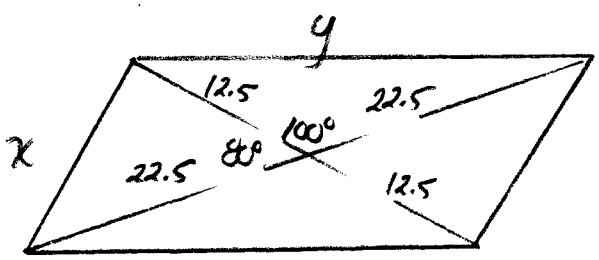
2. An isosceles triangle has a base of 30 cm and a vertex angle of 40 degrees. What is the perimeter of the triangle?



$\frac{\sin 40°}{30} = \frac{\sin 70°}{x}$

$x = 43.9$ $\therefore P = 117.8$ cm

3.



$x^2 = (12.5)^2 + (22.5)^2 - 2(12.5)(22.5)\cos 80°$

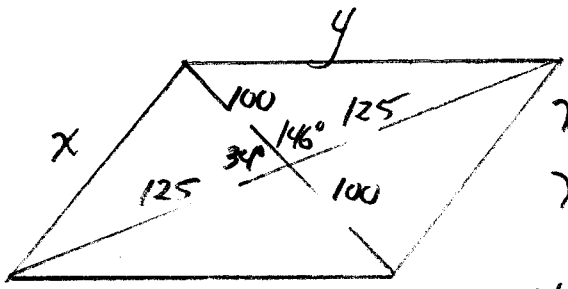
$x = 23.8\text{ cm}$

$y^2 = (12.5)^2 + (22.5)^2 - 2(12.5)(22.5)\cos 100°$

$y = 27.6\text{ cm}$

∴ Perimeter is 102.8 cm

4.



$x^2 = 100^2 + 125^2 - 2(100)(125)\cos 34°$

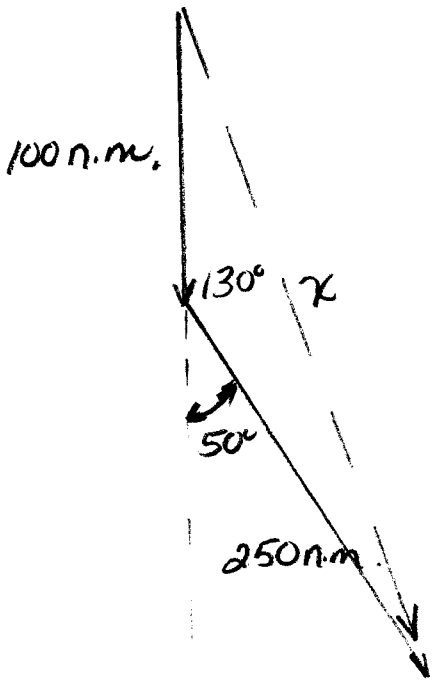
$x = 70.0\text{ m}$

$y^2 = 100^2 + 125^2 - 2(100)(125)\cos 146°$

$y = 215.3\text{ m}$

∴ Perimeter is 570.6 m

5.

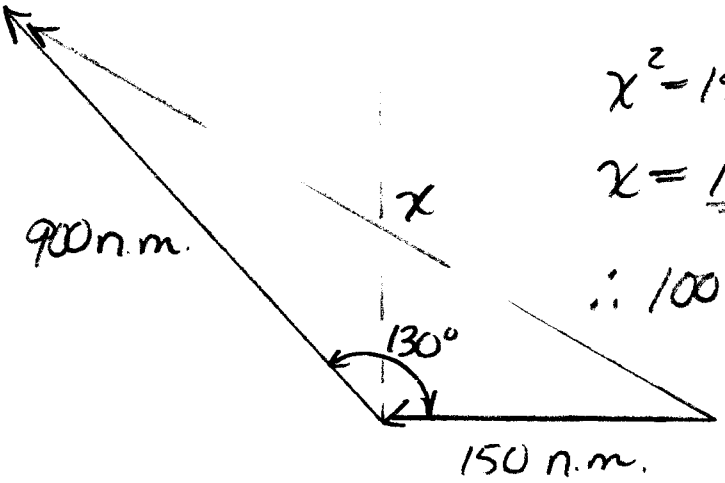


$x^2 = 100^2 + 250^2 - 2(100)(250)\cos 130°$

$x = 323.5\text{ n.m}$

∴ 323.5 n.m from Start Pt.

6.

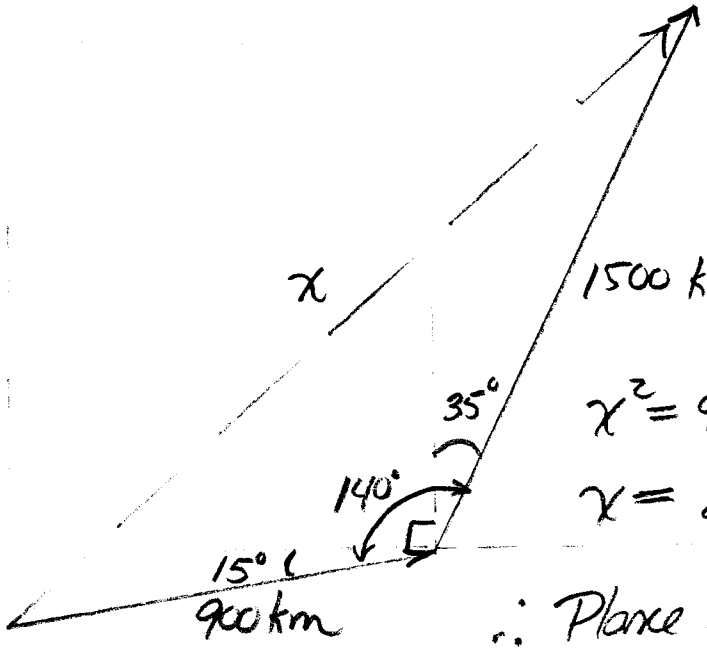


$x^2 = 150^2 + 900^2 - 2(150)(900)\cos 130°$

$x = \underline{1003.0 \text{ n.m.}}$

$\therefore$ 1003.0 n.m. from Start Pt.

7.

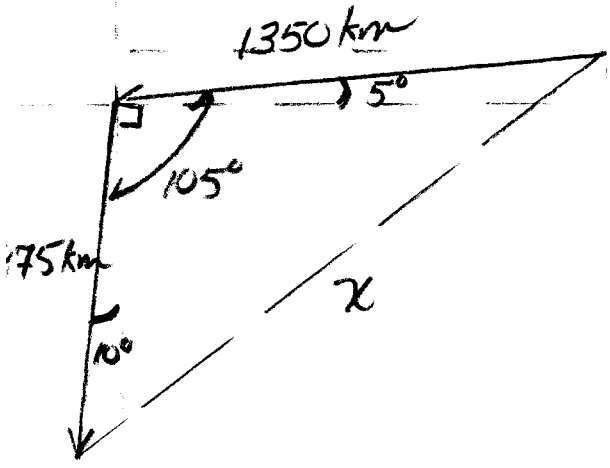


$x^2 = 900^2 + 1500^2 - 2(900)(1500)\cos 140°$

$x = \underline{2264.6 \text{ km}}$

$\therefore$ Plane is 2264.6 km from Start Pt.

8.



$x^2 = 875^2 + 1350^2 - 2(875)(1350)\cos 105°$

$x = \underline{1799.7 \text{ km}}$

$\therefore$ Plane is 1799.7 km from Start Pt.

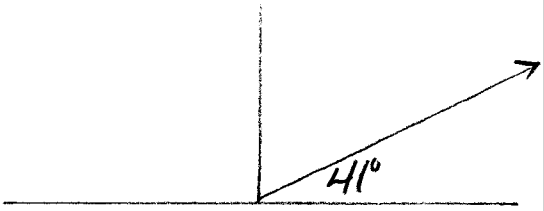
Sine and Cosine Values of Obtuse Angles

1. *For each equation below, determine the value(s) of angle A to the nearest degree. Assume that* $0° \le \angle A \le 180°$. *Draw a diagram for each situation.*

a) cos A = 0.7553

$\angle A = \cos^{-1}(0.7553)$

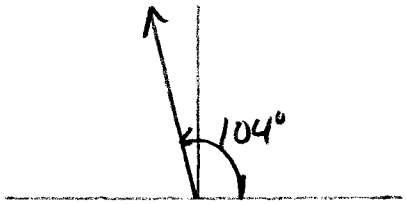
$\angle A = 41°$



b) cos A = − 0.2358

$\angle A = \cos^{-1} -0.2358$

$\angle A = 104°$

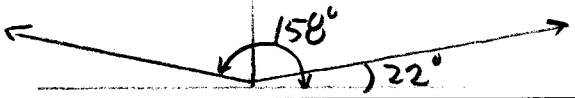


c) sin A = 0.3754

$\angle A = \sin^{-1} 0.3754$

$\angle A = 22°$ or $158°$

$[180° - 22°]$

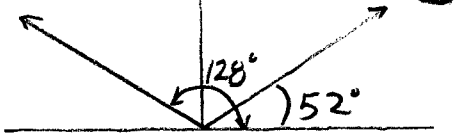


d) sin B = 0.7890

$\angle B = \sin^{-1} 0.7890$

$\angle B = 52°$ or $128°$

$[180° - 52°]$



e) If A + B = 180°, is cos A = − cos B? Explain.

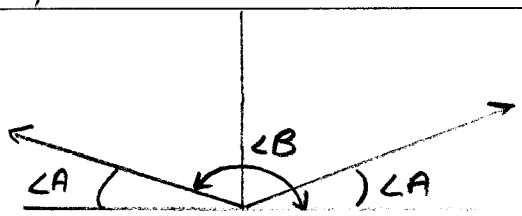
If $\angle A = 20°$, then $\angle B = 160°$

$\cos 20° = -\cos 160°$

$0.9397 = -(-0.9397)$

$\therefore 0.9397 = 0.9397$

$\therefore$ yes $\cos A = -\cos B$



f) sin A = ¼

$\angle A = \sin^{-1}\left(\frac{1}{4}\right)$

$\angle A = 15°$ or $165°$

$[180° - 15°]$