Before we begin, are there any questions from last day's work? 5.2.1

pp.61-62 1,3c,4,6,8   pp.69-70 1c,3,5,7,9
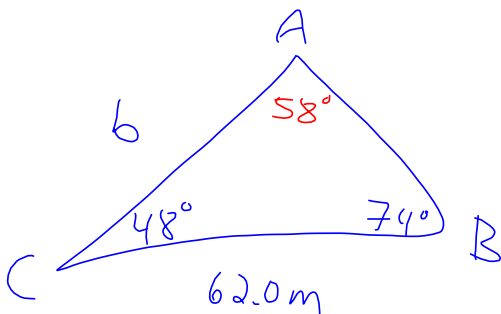
(Tuesday's quiz will be based on the first three lessons; this includes today's)

Today's Learning Goal(s):

By the end of the class, I will be able to:

a) solve trigonometry questions involving more than one triangle.

8. In $\triangle ABC$, C is located 62.0 m from B. $\angle ABC=74.0°$ and $\angle ACB=48.0°$. Determine the measure of side b.
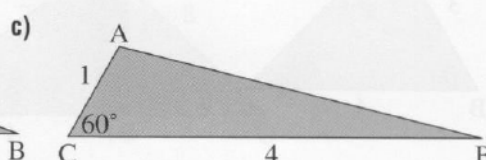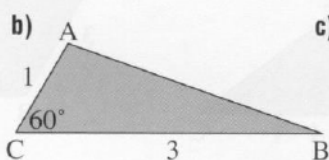

$\angle A = 180° - 74° - 48°$

$= 58°$
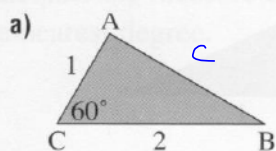
$$\frac{b}{\sin 74°} = \frac{62}{\sin 58°}$$

$$b = \sin 74° \times \frac{62}{\sin 58°}$$

$$= 70.2769$$

$$\doteq 70.277 \text{ m}$$

7. Determine the measure of $\angle B$ in each triangle.

a) A, 1, 60°, C, 2, B, c

b) A, 1, 60°, C, 3, B

c) A, 1, 60°, C, 4, B

a)
$$c^2 = 1^2 + 2^2 - 2(1)(2)\cos 60°$$
$$= 1 + 4 - 4\left(\tfrac{1}{2}\right)$$
$$= 5 - 2$$
$$= 3$$
$$C = \sqrt{3}$$
$$\doteq 1.73$$

$$\frac{\sin B}{1} = \frac{\sin 60°}{\sqrt{3}}$$

$$B = \sin^{-1}\left(1 \times \frac{\sin 60°}{\sqrt{3}}\right)$$

$$= 30°$$

b)
$$c^2 = 1^2 + 3^2 - 2(1)(3)\cos 60°$$
$$= 10 - 6\left(\tfrac{1}{2}\right)$$
$$= 7$$
$$C = \sqrt{7}$$

$$\frac{\sin B}{1} = \frac{\sin 60°}{\sqrt{7}}$$

$$B = \sin^{-1}\left(1 \times \frac{\sin 60°}{\sqrt{7}}\right)$$

$$\doteq 19.1°$$

c)
$$c^2 = 1^2 + 4^2 - 2(1)(4)\cos 60°$$
$$= 17 - 8\left(\tfrac{1}{2}\right)$$
$$= 13$$
$$C = \sqrt{13}$$

$$\frac{\sin B}{1} = \frac{\sin 60°}{\sqrt{13}}$$

$$B = \sin^{-1}\left(1 \times \frac{\sin 60°}{\sqrt{13}}\right)$$

$$\doteq 13.89°$$

5.3.1: Solving Problems Involving More Than One Triangle

Ex. 1 Determine the measure of $\angle Q$.

Date: _NOV. 14/19_

$$TOA$$

$$\tan Q = \frac{TR}{9.3}$$

$$Q = \tan^{-1}\left(\frac{12.956}{9.3}\right)$$

$$\doteq 54.328$$

$$= 54.33°$$

$$TR$$

$$\frac{8.5}{\sin 41°} = \frac{TR}{\sin 90°}$$

$$TR = \frac{8.5}{\sin 41°}$$

$$= 12.956$$

Triangle diagram:
- T (top), angle 49°
- 8.5 m on side TS (adj)
- hyp label
- opp label
- S (bottom left, right angle)
- R (bottom, right angle) 41°
- 9.3 m (adj)
- Q (right)
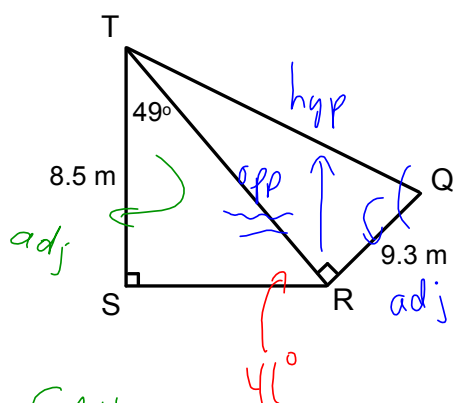
$$CAH$$

$$\cos 49° = \frac{8.5}{TR}$$

$$TR = \frac{8.5}{\cos 49°}$$

$$\doteq 12.956$$

Ex. 2 Determine the height of the cliff, in metres.

height = YZ

TOA

$$\tan 57° = \frac{h}{26.390}$$

$$h = 26.390 \tan 57°$$
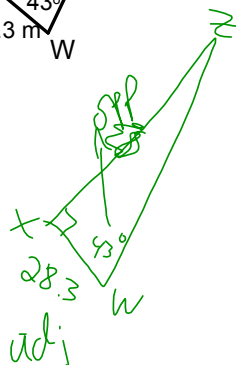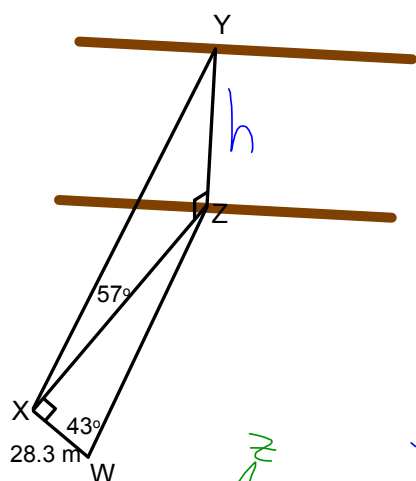
$$= 40.6370$$

$$\doteq 40.637 \text{ m}$$

TOA

$$\tan 43° = \frac{XZ}{28.3}$$

$$XZ = 28.3 \tan 43°$$

$$= 26.3961$$

$$\doteq 26.390$$

Ex. 3 Determine the value of x.
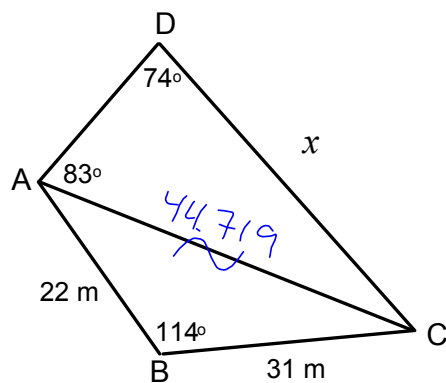
Need AC First

$$AC^2 = 22^2 + 31^2 - 2(22)(31)\cos 114°$$

$$AC = \sqrt{1999.78}$$

$$= 44.7189$$

$$\doteq 44.719$$

$$\frac{x}{\sin 83°} \doteq \frac{44.719}{\sin 74°}$$

$$x \doteq \sin 83° \times \frac{44.719}{\sin 74°}$$

$$\doteq 46.1743$$

$$\doteq 46.174 \text{ m}$$