

Unit 5 lesson 4 Ambiguous Case  
Page 308 #2a  $\angle A 42^\circ$   $a = 30\text{cm}$   $b = 25\text{cm}$

so not the ambiguous case.  $b < a$  so  $\angle B$  cannot be obtuse.

$$\frac{\sin B}{25} = \frac{\sin 42^\circ}{30}$$

$$\sin B = \frac{25 \sin 42^\circ}{30}$$

$$\sin B = 0.5576$$

$$B = 33.9^\circ$$

$\therefore$  one triangle is possible.  
 $\angle C = 180^\circ - 42^\circ - 33.9^\circ$   
 $= 104.1^\circ$

MCR 3W1

# Unit 5 lesson 4 solutions.

Pg 308 # 2de, 3ce, 7a, 15

Pg. 308 # 2

d)  $\triangle KLM$ ,  $\angle M = 37.3^\circ$ ,  $m = 85\text{cm}$ ,  $l = 90\text{cm}$

$$\frac{\sin L}{90} = \frac{\sin 37.3^\circ}{85}$$

$$\sin L = \frac{90 \sin 37.3^\circ}{85}$$

$$\sin L = 0.64163$$

$$L_1 = 39.9^\circ$$

$$K_1 = 180^\circ - 37.3^\circ - 39.9^\circ = 102.8^\circ$$

$$L_2 = 180^\circ - 39.9^\circ = 140.1^\circ$$

$$K_2 = 180^\circ - 37.3^\circ - 140.1^\circ = 2.6^\circ$$

note: since  $l > m$ , it could be ambiguous case

\* this is the ambiguous case (where there are two possible triangles).

$\therefore$  there are two possible triangles.

$$K = 102.8^\circ, L = 39.9^\circ, M = 37.3^\circ \text{ or}$$

$$K = 2.6^\circ, L = 140.1^\circ, M = 37.3^\circ.$$

e)  $\triangle UVW$   $\angle W = 38.7^\circ$ ,  $w = 10\text{cm}$ ,  $v = 25\text{cm}$

$$\frac{\sin V}{25} = \frac{\sin 38.7^\circ}{10}$$

$$\sin V = \frac{25 \sin 38.7^\circ}{10}$$

$$\sin V = 1.563$$

not possible.

note:  $v > w$  so could be ambiguous case

$\therefore$  there are 0 possible triangles.

3c)  $\triangle PQR$   $\angle R = 40.3^\circ$   $r = 35.2\text{cm}$   $q = 40.5\text{cm}$ .

$$\frac{\sin Q}{40.5} = \frac{\sin 40.3^\circ}{35.2}$$

$$\sin Q = \frac{40.5 \sin 40.3^\circ}{35.2}$$

$$Q_1 = 48.1^\circ$$

$$P_1 = 180^\circ - 48.1^\circ - 40.3^\circ = 91.6^\circ$$

$$Q_2 = 180^\circ - 48.1^\circ = 131.9^\circ$$

$$P_2 = 180^\circ - 131.9^\circ - 40.3^\circ = 7.8^\circ$$

$\therefore$  two triangles are possible.

Pg 308 3c cont'd.

-to solve 1st triangle.

$$p^2 = 35.2^2 + 40.5^2 - 2(35.2)(40.5)\cos 91.6^\circ$$

$$p = 54.4 \text{ cm}$$

to finish solving the second triangle,

$$p^2 = 35.2^2 + 40.5^2 - 2(35.2)(40.5)\cos 7.8^\circ$$

$$p = 7.4 \text{ cm}$$

$$\Delta_1 \quad P = 91.6^\circ, Q = 48.1^\circ, R = 40.3^\circ, p = 54.4 \text{ cm}$$

$$\Delta_2 \quad P = 7.8^\circ, Q = 131.9^\circ, R = 40.3^\circ, p = 7.4 \text{ cm}.$$

Pg. 308 3e)  $\Delta RST$   $T = 50.2^\circ$   $s = 10.5 \text{ cm}$   $t = 7.1 \text{ cm}.$

$$\frac{\sin S}{10.5} = \frac{\sin 50.2^\circ}{7.1}$$

$$\sin S = \frac{10.5 \sin 50.2^\circ}{7.1}$$

$$\sin S = 1.136$$

$\therefore$  no triangles possible.

7a)  $p = 35 \text{ cm}$   $r = 18 \text{ cm}$   $\angle R = 15^\circ$

$$\frac{\sin P}{35} = \frac{\sin 15^\circ}{18}$$

$$\sin P = \frac{35 \sin 15^\circ}{18}$$

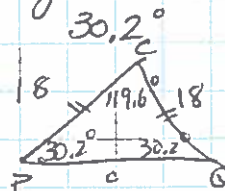
$$P_1 = 30.2^\circ$$

$$P_2 = 149.8^\circ$$

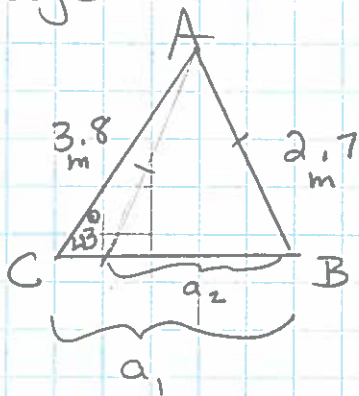
$$c = \sqrt{18^2 + 18^2 - 2(18)(18)\cos 119.6^\circ}$$

$$c = 31.1 \text{ m}$$

$\therefore$  the chord is 31.1 metres long.



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$$\frac{\sin B_1}{3.8} = \frac{\sin 43^\circ}{2.7}$$

$$B_1 = 73.7^\circ$$

$$A_1 = 63.3^\circ$$

$$B_2 = 106.3^\circ$$

$$A_2 = 30.7^\circ$$

$$a_1 = \sqrt{b^2 + c^2 - 2bc \cos A_1}$$

$$a_2 = \dots$$

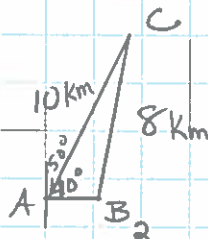
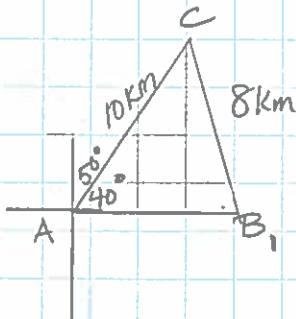
$$a_1 \doteq 3.5369$$

$$a_2 \doteq 2.0213$$

$$\begin{aligned} & a_1 - a_2 \\ &= 3.5369 - 2.0213 \\ &\doteq 1.5 \end{aligned}$$

$\therefore$  the bucket will dig 1.5 m of ditch in one swing.

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$$\frac{\sin B}{10} = \frac{\sin 40^\circ}{8}$$

$$B_1 \doteq 53.464^\circ \quad B_2 \doteq 126.536^\circ$$

$$C_1 = 86.536^\circ \quad C_2 = 13.464^\circ$$

$$c_1 = \sqrt{a^2 + b^2 - 2ab \cos C_1}$$

$$c_2 =$$

$$c_1 = 12.423$$

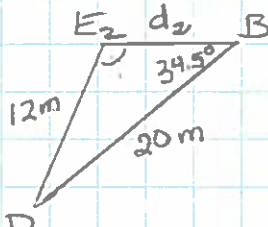
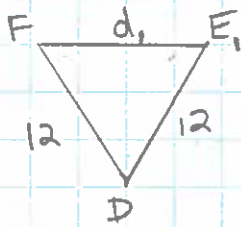
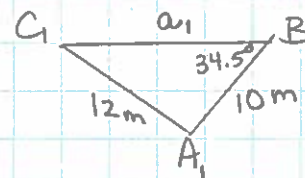
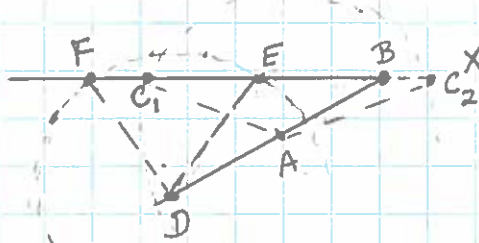
$$c_2 = 2.8978$$

$$c_1 \doteq 12 \text{ km}$$

$$c_2 \doteq 3 \text{ km}$$

$\therefore$  the distance between the two stations is either 12 km or 3 km.

15.



$$E_1 = 70.736^\circ$$

$$F = 70.736^\circ (\text{ITT})$$

$$D = 180 - 141.473$$

$$= 38.527$$

$$d_1 = \sqrt{e^2 + f^2 - 2ef \cos D}$$

$$= \sqrt{62.693}$$

$$\approx 7.92 \text{ m}$$

$$\frac{\sin E}{20} = \frac{\sin 34.5^\circ}{12}$$

$$E_1 = 70.736^\circ$$

$$E_2 = 109.264^\circ$$

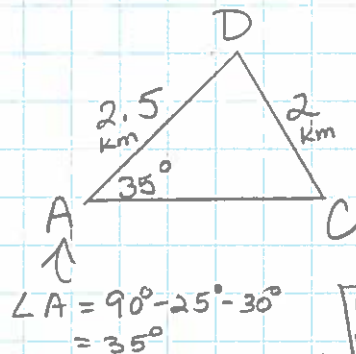
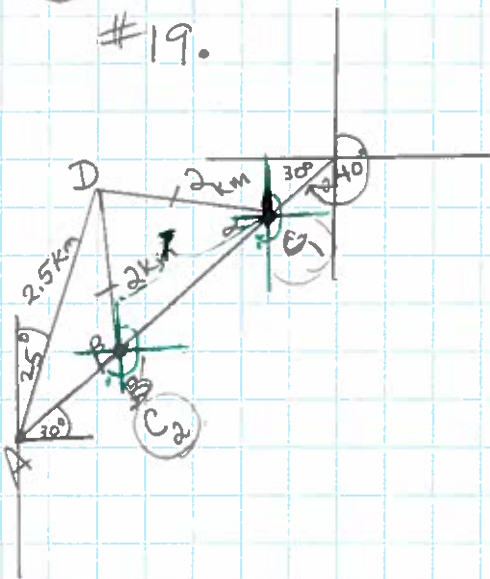
$$D_2 = 36.236^\circ$$

$$d_2 = 12.52$$

$$d_1 + d_2 = 20.4 \text{ m}$$

∴ the sprinklers will reach 20.4m of fencing.

#19.



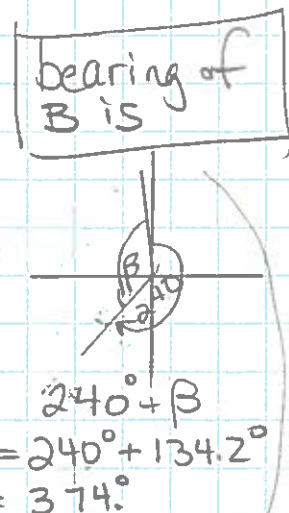
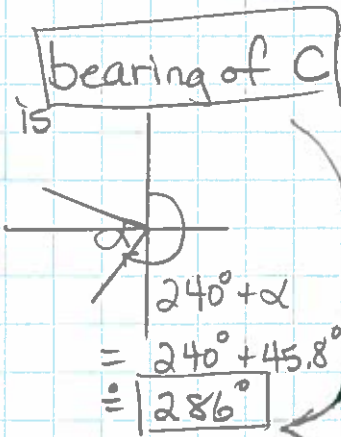
$$\frac{\sin C_1}{2.5} = \frac{\sin 35^\circ}{2}$$

$$C_1 = 45.8^\circ$$

$$C_2 = 134.2^\circ$$

$$\angle A = 90^\circ - 25^\circ - 30^\circ$$

$$= 35^\circ$$



∴ 14° past 360°  
so bearing 14°