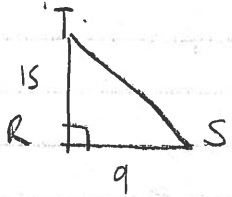


MPM2D - Exam Review - Unit 5

i.



$$r^2 = s^2 + t^2$$

$$= 15^2 + 9^2$$

$$= 306$$

$$r = \sqrt{306}$$

$$r \approx 17.49 \text{ m}$$

$$\tan S = 15/9$$

$$S = \tan^{-1}(15/9)$$

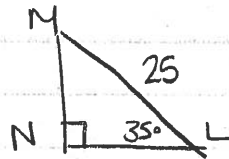
$$S \approx 59^\circ$$

$$\tan T = 9/15$$

$$T = \tan^{-1}(9/15)$$

$$T \approx 31^\circ$$

b.



$$\sin 35 = l/25$$

$$l = 25 \sin 35 = 55^\circ$$

$$l \approx 14.34 \text{ m (ASTT)}$$

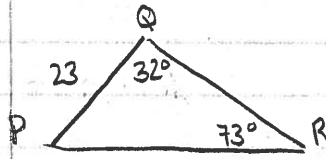
$$M = 180 - 90 - 35$$

$$\cos 35 = m/25$$

$$m = 25 \cos 35$$

$$m \approx 20.48 \text{ cm}$$

c.



$$\frac{q}{\sin Q} = \frac{r}{\sin R}$$

$$\frac{q}{\sin 32} = \frac{23}{\sin 73}$$

$$q = \frac{23 \sin 32}{\sin 73}$$

$$q \approx 12.75 \text{ mm}$$

$$\frac{p}{\sin P} = \frac{r}{\sin R}$$

$$\frac{p}{\sin 75} = \frac{23}{\sin 73}$$

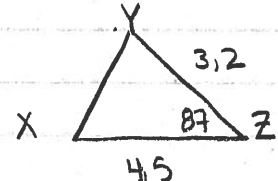
$$p = \frac{23 \sin 75}{\sin 73}$$

$$p \approx 23.23 \text{ mm}$$

$$P = 180 - 73 - 32 = 75^\circ$$

(ASTT)

d.



$$z^2 = x^2 + y^2 - 2xy \cos Z$$

$$= (3.2)^2 + (4.5)^2 - 2(3.2)(4.5) \cos 87$$

$$z = \sqrt{30.49 - 28.8 \cos 87}$$

$$z \approx 5.38 \text{ inches.}$$

$$\frac{\sin Y}{y} = \frac{\sin Z}{z}$$

$$\frac{\sin Y}{4.5} = \frac{\sin 87}{5.38}$$

$$\sin Y = \frac{4.5 \sin 87}{5.38}$$

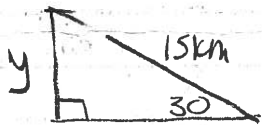
$$Y = \sin^{-1}\left(\frac{4.5 \sin 87}{5.38}\right)$$

$$Y \approx 57^\circ$$

$$X = 180 - 87 - 57 = 36^\circ$$

(ASTT)

2.



Let y be the height of the ramp.

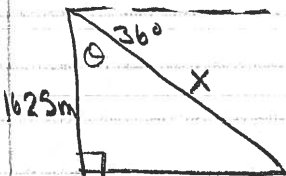
$$\sin 30 = \frac{y}{15}$$

$$y = 15 \sin 30$$

$$= 7.5 \text{ m}$$

\therefore The ramp is 7.5m high.

3.



Let x be the distance bwn the helicopter and landing pad.

$$\theta = 90 - 36$$

$$= 54^\circ$$

(CAT)

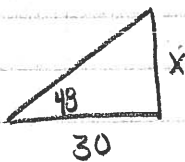
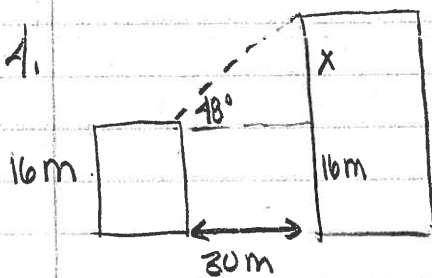
$$\cos 54 = 1625/x$$

$$x \cos 54 = 1625$$

$$x = 1625 / \cos 54$$

$$x \approx 2764.62 \text{ m}$$

4.



$$\tan 48 = x/30$$

$$x = 30 \tan 48$$

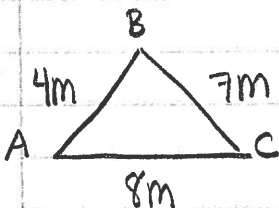
$$x \approx 33.32$$

$$\text{building} = 33.32 + 16$$

$$= 49.32 \text{ m}$$

\therefore The building is 49.32m tall.

5.



$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$4^2 = 7^2 + 8^2 - 2(7)(8) \cos C$$

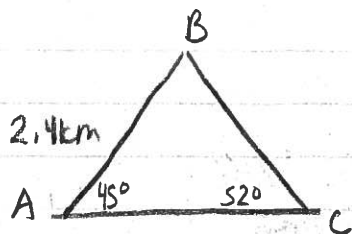
$$16 = 113 - 112 \cos C$$

$$\frac{-97}{-112} = \frac{-112 \cos C}{-112}$$

$$C = \cos^{-1} \left(\frac{-97}{-112} \right)$$

$$C \approx 30^\circ$$

6.



$$B = 180 - 45 - 52$$

$$= 83^\circ$$

(ASTT)

Let b be the width of the lake & all else as shown.

$$\frac{b}{\sin B} = \frac{c}{\sin C}$$

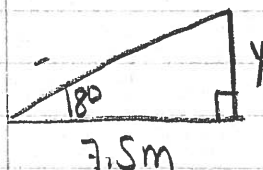
$$\frac{b}{\sin 83} = \frac{2.4}{\sin 52}$$

$$b = \frac{2.4 \sin 83}{\sin 52}$$

$$b \approx 3.02$$

\therefore The lake is 3.02 km wide.

7.



Let y be the height & all else as shown.

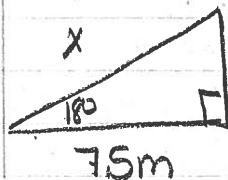
$$\tan 18 = \frac{y}{7.5}$$

$$y = 7.5 \tan 18$$

$$y \approx 2.44 \text{ m}$$

The ramp is
2.44 m high.

b.



Let x be the distance from top to bottom of the ramp & all else as shown.

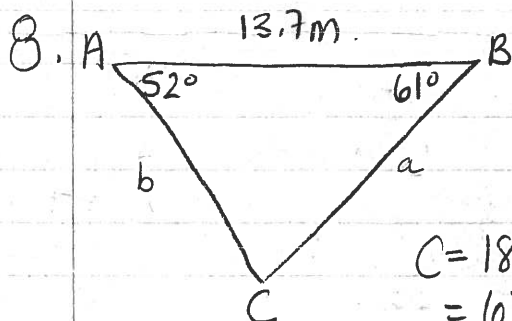
$$\cos 18 = \frac{7.5}{x}$$

$$x \cos 18 = 7.5$$

$$x = \frac{7.5}{\cos 18}$$

$$x \approx 7.89 \text{ m}$$

The ramp is
7.89 m from
bottom to top.



Let a and b represent the distance b/w each student and the rock below.

$$C = 180 - 52 - 61$$

$$= 67^\circ$$

(ASTT)

$$\frac{a}{\sin A} = \frac{c}{\sin C}$$

$$\frac{a}{\sin 52} = \frac{13.7}{\sin 67}$$

$$a = \frac{13.7 \sin 52}{\sin 67}$$

$$a \approx 11.73 \text{ m}$$

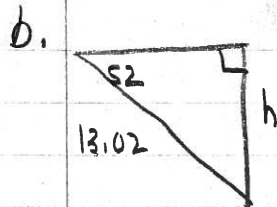
$$\frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{b}{\sin 61} = \frac{13.7}{\sin 67}$$

$$b = \frac{13.7 \sin 61}{\sin 67}$$

$$b \approx 13.02 \text{ m}$$

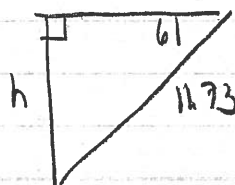
∴ The math student who had an angle of depression of 52° is 13.02 m from the rock & the other was 11.73 m.



$$\sin 52 = \frac{h}{13.02}$$

$$h = 13.02 \sin 52$$

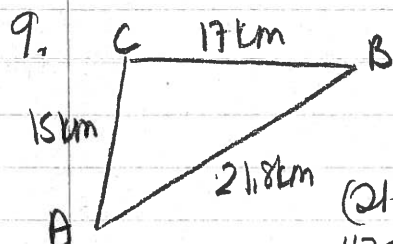
$$h \approx 10.26 \text{ m}$$



$$\sin 61 = \frac{h}{11.73}$$

$$h = 11.73 \sin 61$$

$$h \approx 10.26 \text{ m}$$



$$c^2 = a^2 + b^2 - 2ab \cos C$$

$$(21.8)^2 = (17)^2 + (15)^2 - 2(17)(15) \cos C$$

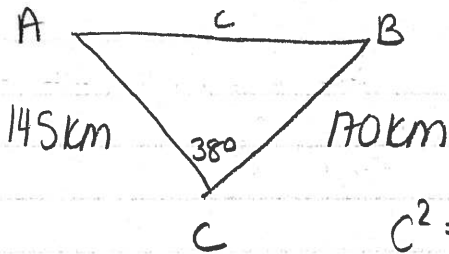
$$475.24 = 514 - 510 \cos C$$

$$\frac{-38.76}{-510} = \frac{-510 \cos C}{-510}$$

$$C = \cos^{-1} \left(\frac{-38.76}{-510} \right)$$

$$C \approx 86^\circ$$

10.



Let c represent the distance bwn the planes

$$\begin{aligned}
 c^2 &= a^2 + b^2 - 2ab \cos C \\
 &= (170)^2 + (145)^2 - 2(170)(145) \cos 38^\circ \\
 c &= \sqrt{49925 - 49300 \cos 38^\circ} \\
 c &\approx 105.24
 \end{aligned}$$

\therefore The planes are 105.24 km apart from each other.

