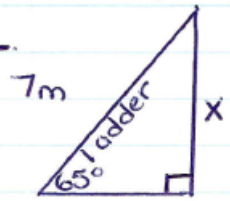
SOLUTIONS => Trigonometry Worksheet #4.

1.



$\sin 65° = \frac{\text{opp}}{\text{hyp}}$

$\sin 65° = \frac{x}{7m}$

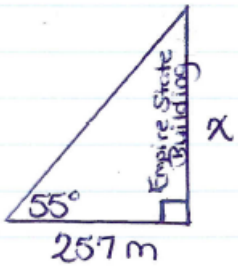
$(7m)(\sin 65°) = x$

$(7m)(0.9063) = x$

$6.3m = x$

The ladder will reach 6.3m up the wall.

2.



$\tan 55° = \frac{\text{opp}}{\text{adj}}$

$\tan 55° = \frac{x}{257m}$

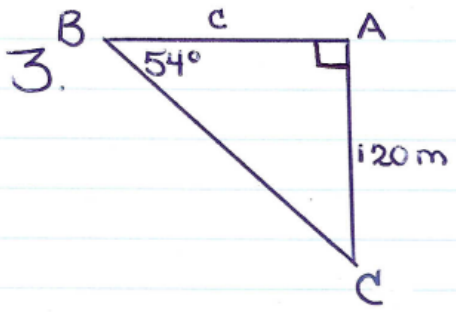
$(257m)(\tan 55°) = x$

$(257m)(1.4281) = x$

$367.0m = x$

The Empire State Building is 367.0m high.

3.



$\tan 54° = \frac{\text{opp}}{\text{adj}}$

$\tan 54° = \frac{120\text{m}}{c}$

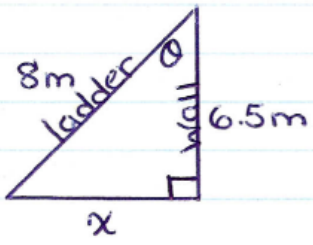
$c \cdot \frac{\tan 54°}{\tan 54°} = \frac{120\text{m}}{\tan 54°}$

$c = \frac{120\text{m}}{1.3764}$

$c = 87.2\text{m}$

The distance across the gorge is 87.2 m.

4.



a) $\cos\theta = \frac{adj}{hyp}$

$\cos\theta = \frac{6.5m}{8m}$

$\cos\theta = 0.8125$

$\theta = \cos^{-1}(0.8125)$

$\theta = 36°$

The ladder will make an angle of 36° with the wall.

b) $c^2 = a^2 + b^2$

$(8)^2 = a^2 + (6.5)^2$

$64 = a^2 + 42.25$

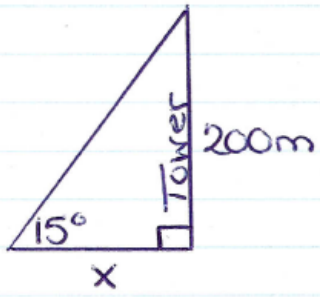
$64 - 42.25 = a^2$

$21.75 = a^2$

$4.7m = a$

The foot of the ladder is 4.7m from the wall.

5.



$\tan 15° = \frac{opp}{adj}$

$\tan 15° = \frac{200m}{x}$

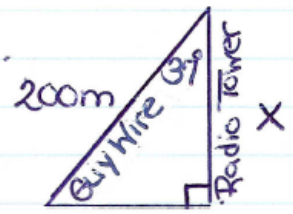
$\frac{x \tan 15°}{\tan 15°} = \frac{200m}{\tan 15°}$

$x = \frac{200m}{0.2679}$

$x = 746.5m$

It is 746.5m to the foot of the tower.

6.



$\cos 37° = \frac{adj}{hyp}$

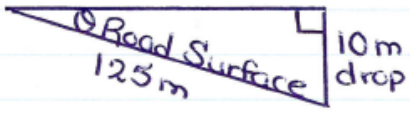
$\cos 37° = \frac{x}{200m}$

$(200m)(\cos 37°) = x$

$(200m)(0.7986) = x$

$159.7m = x$

The radio tower is 159.7 m high.

7. 

$\sin\theta = \frac{opp}{hyp}$

$\sin\theta = \frac{10m}{125m}$

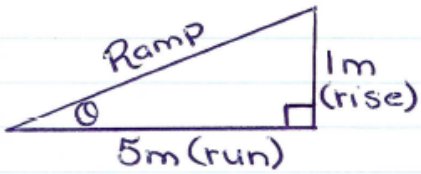
$\sin\theta = 0.0800$

$\theta = \sin^{-1}(0.0800)$

$\theta = 5°$

Angle of Inclination
||
Angle of Elevation

The angle of inclination of the road is 5°.

8. 

$\tan\theta = \frac{opp}{adj}$

$\tan\theta = \frac{1m}{5m}$

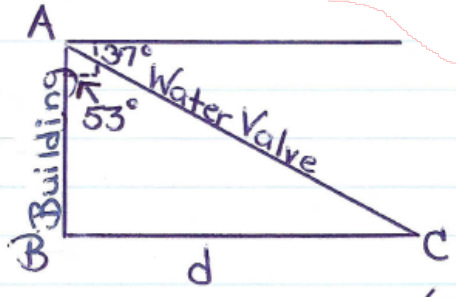
$\tan\theta = 0.2000$

$\theta = \tan^{-1}(0.2000)$

$\theta = 11°$

The angle of inclination of the ramp is 11°.

9.



$\tan 53° = \frac{opp}{adj}$

$\tan 53° = \frac{d}{3.26m}$

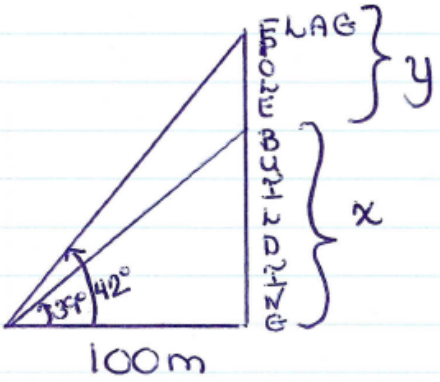
$(3.26m)(\tan 53°) = d$

$(3.26m)(1.3270) = d$

$4.3m = d$

The valve is 4.3 m from the building.

13.



a) $\tan 39° = \frac{\text{opp}}{\text{adj}}$

$\tan 39° = \frac{x}{100m}$

$(100m)(\tan 39°) = x$

$(100m)(0.8098) = x$

$81.0m = x$

The building is 81.0m high

b) $\tan 42° = \frac{\text{opp}}{\text{adj}}$

$\tan 42° = \frac{(x+y)}{100m}$

$(100m)(\tan 42°) = x+y$

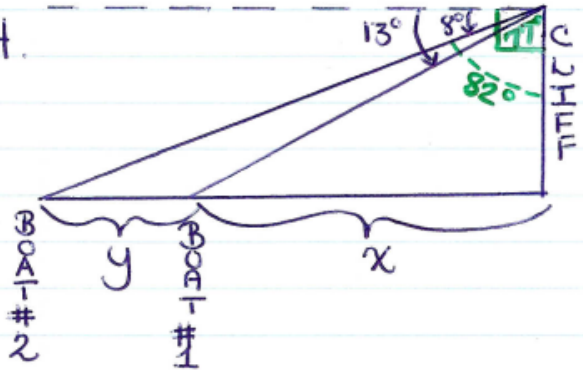
$(100m)(0.9004) = x+y$

$90.0m = x+y$

Building + Flagpole

It is 90.0m to the tip of the flagpole.

14.



a) $\tan 77° = \frac{\text{opp}}{\text{adj}}$

$\tan 77° = \frac{x}{70m}$

$(70m)(\tan 77°) = x$

$(70m)(4.3315) = x$

$303.2m = x$

The distance from the bottom of the cliff to the closer boat is 303.2m.

b) $\tan 82° = \frac{\text{opp}}{\text{adj}}$

$\tan 82° = \frac{(x+y)}{70m}$

$(70m)(\tan 82°) = x+y$

$(70m)(7.1154) = x+y$

$498.1m = x+y$

Since $x = 303.2m$

Then $y = 498.1m - 303.2m$

$= 194.9m$

The distance between the two boats is 194.9 m.