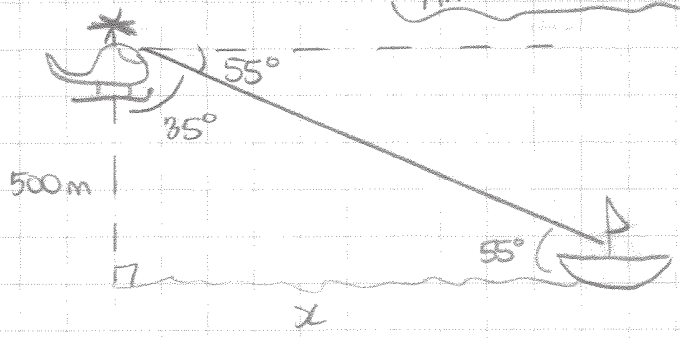
APPLICATIONS OF TRIG - SOLUTIONS

1.



$\tan 55 = \frac{500}{x}$

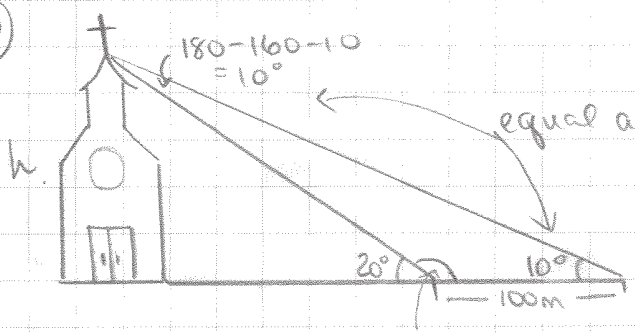
$x \tan 55 = 500$

$x = \frac{500}{\tan 55}$

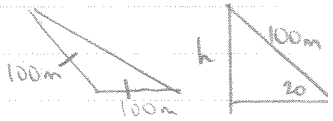
$x \doteq 350\text{m}$

∴ the horizontal distance from the helicopter to ship is 350m.

2.



equal angles ∴ isosceles triangle.

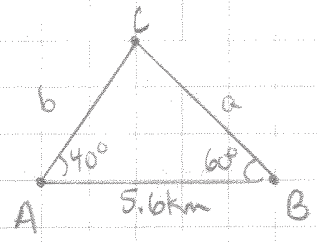


$\sin 20 = \frac{h}{100}$

$h = 100 \sin 20$

$h = 34.2\text{m}$

3.



① Solve for angle C.

$\angle C = 180 - 40 - 60$

$\angle C = 80°$

② Solve for a.

$\frac{a}{\sin 40} = \frac{5.6}{\sin 80}$

$a = \frac{5.6 \sin 40}{\sin 80}$

$a = 3.7\text{km}$

③ Solve for b.

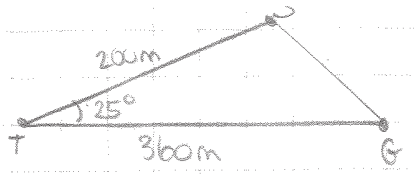
$\frac{b}{\sin 60} = \frac{5.6}{\sin 80}$

$b = \frac{5.6 \sin 60}{\sin 80}$

$b = 4.9\text{km}$

∴ Island C is 4.9km from island A and 3.7km from island B.

④



$t^2 = g^2 + s^2 - 2gs\cos T$

$t^2 = 200^2 + 360^2 - 2(200)(360)\cos 25$

$t = \sqrt{(200^2 + 360^2 - 2(200)(360)\cos 25)}$

$t = 197.7\text{m}$

Short of Hole $= 197.7 - 160$

$= 37.7\text{m}$

∴ he is short by approximately 38m

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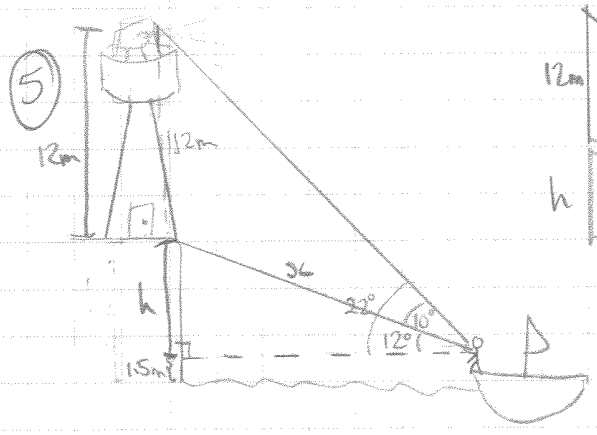
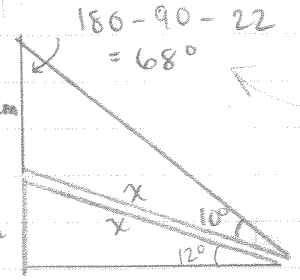
⑤





① Solve for angle in obtuse Δ

② Solve for x.

$\frac{x}{\sin 68} = \frac{12}{\sin 10}$

$x = \frac{12\sin 68}{\sin 10}$

$x = 64\text{m}$

③ Solve for h.

$\sin 12 = \frac{h}{64}$

$h = 64\sin 12$

$h = 13.3$

+ observer height

$h = 14.8\text{m}$ (to base of lighthouse)

or 26.8m (to top of lighthouse)

∴ It is 26.8m to the top of the lighthouse or 14.8m to the bottom of the lighthouse.

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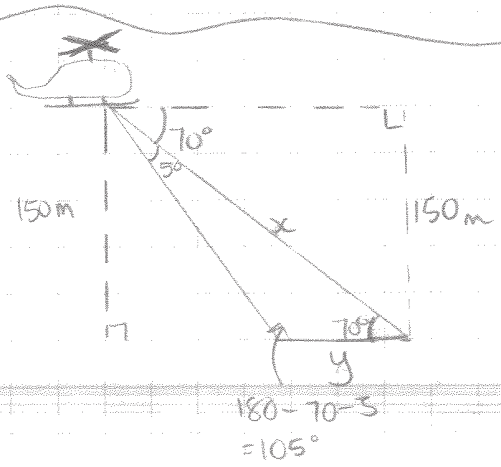
⑥



① Solve for x

$\sin 70 = \frac{150}{x}$

$x\sin 70 = 150$

$x = \frac{150}{\sin 70}$

$x = 159.6\text{m}$

② Solve for y.

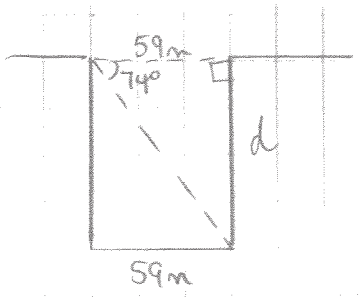
$\frac{y}{\sin 5} = \frac{159.6}{\sin 105}$

$y = \frac{159.6\sin 5}{\sin 105}$

$y = 14.4\text{m}$

∴ the beam spreads 14.4m

7.



a) $\tan 74 = \frac{d}{59}$

$d = 59 \tan 74$

$d \doteq 206\text{m}$

$\therefore$ the gorge is 206m deep.

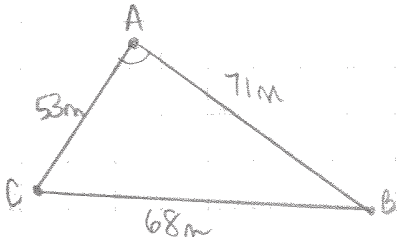
b) $\tan A = \frac{35}{100}$

$A = \tan\left(\frac{35}{100}\right)$

$A = 19.3°$

$\therefore$ angle of depression is 19.3°

8.



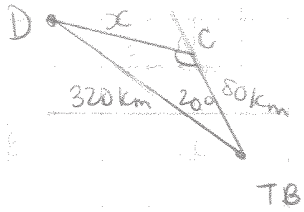
$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

$A = \cos^{-1}\left(\frac{53^2 + 71^2 - 68^2}{2(53)(71)}\right)$

$A = 64.6°$

$\therefore$ the security camera pans 64.6° from B to C.

9.



a) $x^2 = 320^2 + 80^2 - 2(320)(80)\cos 20$

$x = \sqrt{320^2 + 80^2 - 2(320)(80)\cos 20}$

$x = 246.3\text{km}$

b) $\frac{\sin C}{320} = \frac{\sin 20}{246.3}$

$\sin C = \frac{320 \sin 20}{246.3}$

$C = \sin^{-1}\left(\frac{320 \sin 20}{246.3}\right)$

$C = 26°$