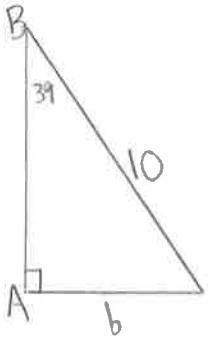
4.4 2-DIMENSIONS
WORKSHEET SOLUTIONS

① a)

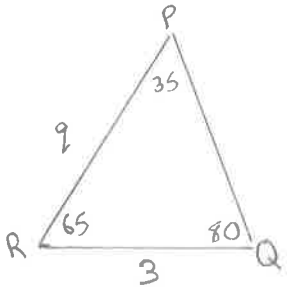


$\sin 39 = \frac{b}{10}$

$b = 10 \sin 39$

$b = 6.3 \text{ cm}$

b)

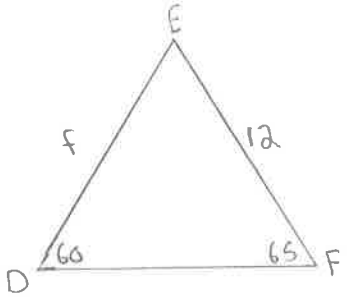


$\frac{q}{\sin 80} = \frac{3}{\sin 35}$

$q = \frac{3 \sin 80}{\sin 35}$

$q = 5.2 \text{ m}$

c)

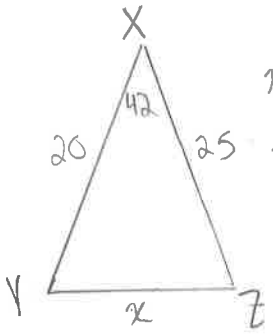


$\frac{f}{\sin 65} = \frac{12}{\sin 60}$

$f = \frac{12 \sin 65}{\sin 60}$

$f = 12.6 \text{ cm}$

d)

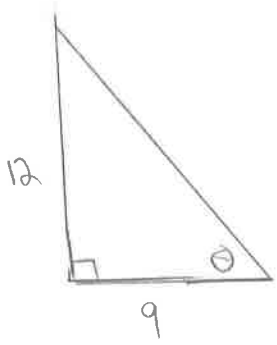


$x^2 = 20^2 + 25^2 - 2(20)(25)\cos 42$

$x^2 = 241.855$

$x = 16.8 \text{ km}$

②



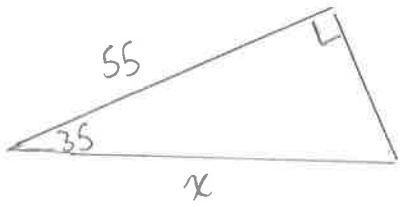
$\tan\theta = \frac{12}{9}$

$\theta = \tan^{-1}\left(\frac{12}{9}\right)$

$\theta = 53.1°$

∴ The angle of elevation of the sun is 53°.

(3)



$\cos 35 = \frac{55}{x}$

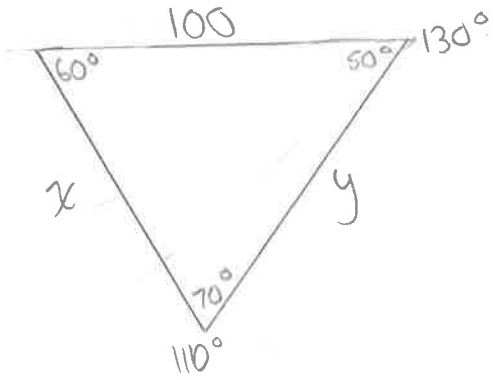
$x = \frac{55}{\cos 35}$

$x = 67\text{ m}$

Go for the direct shot!

(4)

a)



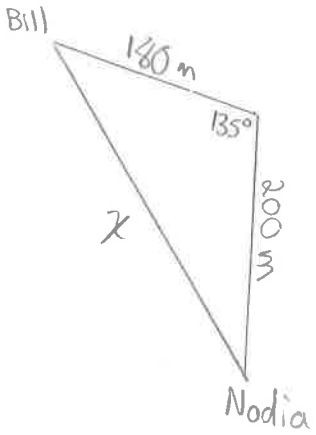
$\frac{y}{\sin 60} = \frac{100}{\sin 70}$ $\qquad$ $\frac{x}{\sin 50} = \frac{100}{\sin 70}$

$y = \frac{100 \sin 60}{\sin 70}$ $\qquad$ $x = 82\text{ km}$

$y = 92\text{ km}$

∴ The total length of the flight was $100 + 98 + 82 = 274\text{ km}$

(5)



$x^2 = 180^2 + 200^2 - 2(180)(200)\cos 135$

$x^2 = 72400 - 72000\left(-\frac{1}{\sqrt{2}}\right)\left(\frac{\sqrt{2}}{\sqrt{2}}\right)$ ← rationalize denominator

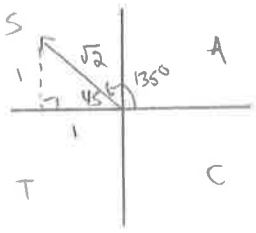
$x^2 = 72400 - 72000\left(-\frac{\sqrt{2}}{2}\right)$

$x^2 = 72400 + 36000\sqrt{2}$

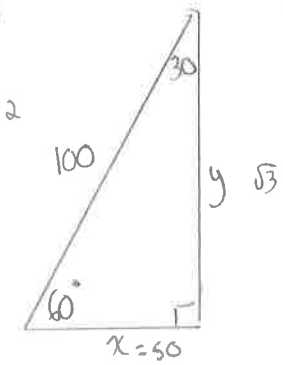
$x^2 = 400\left(181 + 90\sqrt{2}\right)$

$x = \sqrt{400(181 + 90\sqrt{2})}$

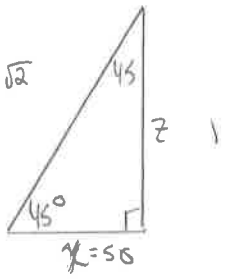
$x = 20\sqrt{181 + 90\sqrt{2}}\text{ m}$



(6)



1



1

$\frac{y}{100} = \frac{\sqrt{3}}{2}$

$y = 50\sqrt{3}$

$\frac{1}{1} = \frac{z}{50}$

$z = 50$

Distance between wires $= y - z$

$= 50\sqrt{3} - 50$

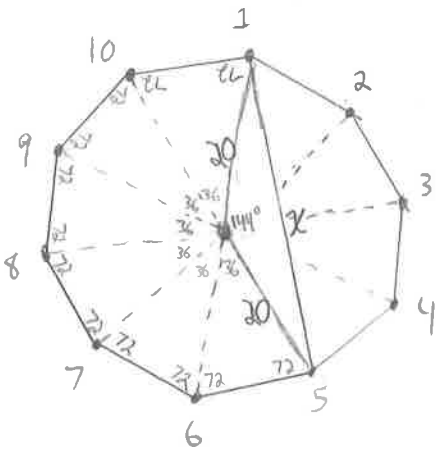
$= 50(\sqrt{3} - 1)$ m.

$\cos 60 = \frac{x}{100}$

$x = 100 \cos 60$

$x = 50$

(7)



Each central angle $= \frac{360}{10}$

$= 36°$

$x^2 = 20^2 + 20^2 - 2(20)(20)\cos 144$

$x = 38$ m