Answer.

Pure 18 - Trigonometry

Section 1

1a) $2x^3 + 2x + c$ (b) $\frac{3}{4}x^{4/3} + c$

c) $2x + \frac{2}{3}x^{3/2} + c$ (d) $-2x^{-2} + c$

e) $-3x^{-1} + c$

2a) $x^{3/2}$ b) $\frac{2}{5}x^{5/2} + c$

3a) 4.5 b) 28

4a) $36 = 2x^2 + 4xL$ c) $x = L = \sqrt{6}$

Section 2   (Total 36)

1. $\dfrac{\sin 80}{14} = \dfrac{\sin A}{9} \Rightarrow \sin A = 9 \times \dfrac{\sin 80}{14} = 0.633\cdots$

(4) $A = 39.3°$

2. $\dfrac{1}{2} \times 4 \times 6 \times \sin 72 = 11.4$

(2)

3. $BC^2 = 6^2 + 8^2 - 2 \times 6 \times 8 \times \cos 52$

(4) $= 40.896$ $\Rightarrow$ $BC = 6.40$

4. $\dfrac{\sin R}{8} = \dfrac{\sin 71}{13} \Rightarrow \sin R = \dfrac{8 \times \sin 71}{13} = 0.581\cdots$

(4) $R = 35.6°$

5. $\dfrac{AB}{\sin 23} = \dfrac{16}{\sin 84} \Rightarrow AB = \dfrac{\sin 23 \times 16}{\sin 84} = 6.29$

(3)

6. $BC^2 = 21^2 + 16^2 - 2 \times 21 \times 16 \times \cos 38$

(4) $= 167.456\ldots$ $\Rightarrow$ $BC = 12.9$

7. $24^2 = 10^2 + 15^2 - 2 \times 10 \times 15 \times \cos B$

   $251 = -300 \cos B$

(4) $\cos B = \dfrac{-251}{300}$ $\Rightarrow$ $B = 147°$

8a) $\dfrac{AC}{\sin 75} = \dfrac{6}{\sin 65} \Rightarrow AC = \dfrac{6}{\sin 65} \times \sin 75 = 6.89$

b) $\dfrac{1}{2} \times 6 \times 6.39\ldots \times \sin 40 = 12.3$

(5)

9.

$9.7^2 = 10.4^2 + 11.0^2 - 2 \times 10.4 \times 11.0 \times \cos A$ ✓

$-135.07 = -228.8$ ✓

(6)

$\cos A = \dfrac{1089}{1760}$ ✓ $\Rightarrow$ $A = 53.8°$ ✓

$\dfrac{1}{2} \times 10.4 \times 11.0 \times \sin 53.8 = 46.2$ ✓

Alternatively

$10.4^2 = 9.7^2 + 11.0^2 - 2 \times 9.7 \times 11 \times \cos C$ $\Rightarrow$ $C = 59.9°$

$\frac{1}{2} \times 9.7 \times 11 \times \sin 59.9.... = 46.2$
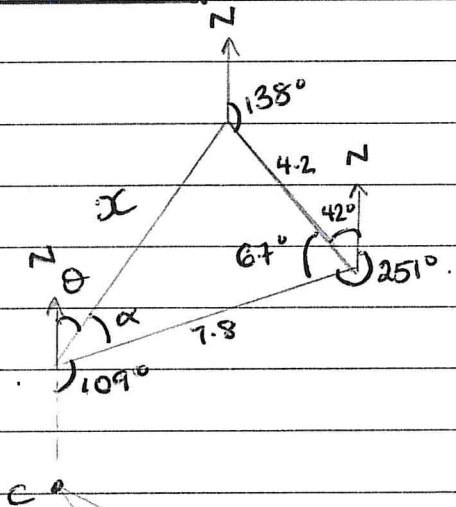
OR

$11^2 = 10.4^2 + 9.7^2 - 2 \times 10.4 \times 9.7 \times \cos B$

$\frac{1}{2} \times 10.4 \times 9.7 \times \sin 66.2... = 46.2$

Section 3.

1)

a) $x^2 = 4.2^2 + 7.8^2 - 2 \times 4.2 \times 7.8 \times \cos 67$
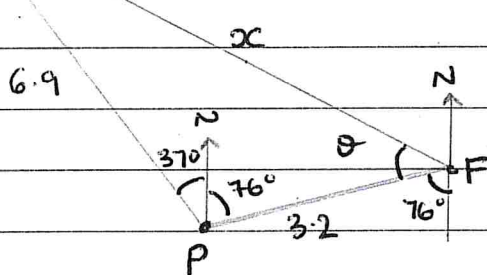
$= 52.879...$

$x = 7.27 \, km$

b) $\dfrac{\sin \alpha}{4.2} = \dfrac{\sin 67}{"x"}$

$\sin \alpha = 0.532...$ $\alpha = 32.1°$

$\theta = 180 - 109 - "\alpha" = 38.9$

$\theta = 039°$

2)

a) $x^2 = 6.9^2 + 3.2^2 - 2 \times 6.9 \times 3.2 \cos 113$

$= 75.105$

$x = 8.67 \, km$

b) $\dfrac{\sin \theta}{6.9} = \dfrac{\sin 113}{"x"}$ $\sin \theta = \dfrac{\sin 113 \times 6.9}{"x"} = 0.732...$

$\theta = 47.1$

Bearing $= 180 + 76 + "\theta" = 303°$

3) $\frac{1}{2} \times 22.5 \times YZ \times \sin 34 = 100$

$$YZ = 15.896$$

$$XZ^2 = "YZ"^2 + 22.5^2 - 2 \times "YZ" \times 22.5 \times \cos 34$$

$$= 165.9$$

$$XZ = 12.9$$