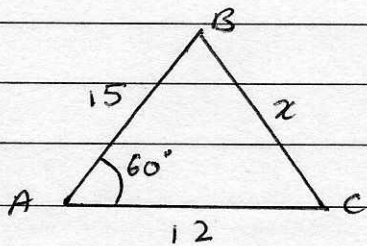


1)



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

$$x^2 = (15)^2 + (12)^2 - 2(15)(12) \cos(60)$$

$$x^2 = 189$$

$$x = 3\sqrt{21} \text{ cm}$$

$$= 13.7 \text{ cm (3sf)}$$

by

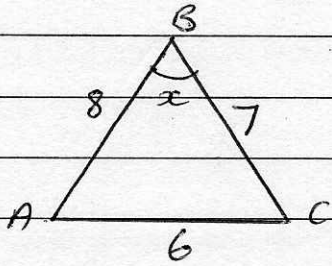
$$\text{Area} = \frac{1}{2} ab \sin C$$

$$= \frac{1}{2} (15)(12) \sin(60)$$

$$= 45\sqrt{3} \text{ cm}^2$$

$$= 77.9 \text{ cm}^2 \text{ (3sf)}$$

2a)



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

$$\cos x = \frac{(7)^2 + (8)^2 - (6)^2}{2(7)(8)}$$

$$\cos x = \frac{11}{16}$$

$$x = \cos^{-1}\left(\frac{11}{16}\right)$$

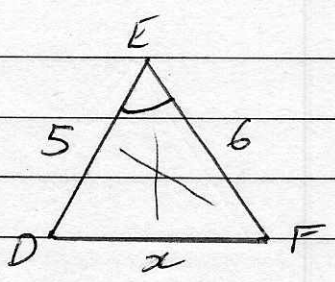
$$= \underline{\underline{46.6^\circ}} \quad (3sf)$$

b/

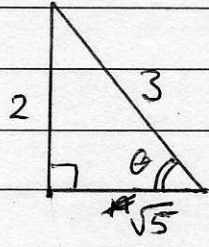
$$\text{Area} = \frac{1}{2}(8)(7)\sin(46.6)$$

$$= \underline{\underline{20.3 \text{ cm}^2}} \quad (3sf)$$

3



a)  $\sin(DEF) = \frac{2}{3}$



$\sin \theta = \frac{2}{3}$

$\sin \theta = \frac{2}{3}$

$\cos(DEF) = \frac{A}{H}$   
 $= \frac{\sqrt{5}}{3}$

$A = \sqrt{3^2 - 2^2} = \sqrt{5}$

b)  $x^2 = (5)^2 + (6)^2 - 2(5)(6) \cos \theta$

$= (5)^2 + (6)^2 - 2(5)(6) \left(\frac{\sqrt{5}}{3}\right)$

$= 16.2786...$

$x = \underline{\underline{4.03 \text{ cm}}}$  (3sf)

c)  $\frac{\sin EFD}{5} = \frac{\sin DEF}{4.03}$

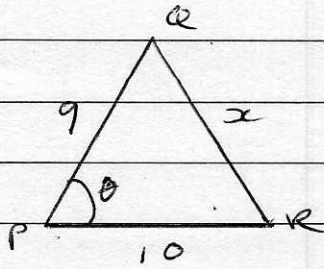
$\sin EFD = \frac{2/3}{4.03} \times 5$

$= 0.826...$

$\angle EFD = \sin^{-1}(0.826)$

$= \underline{\underline{55.7^\circ}}$  (3sf)

4/



$$\text{Area of triangle} = 30$$

$$\frac{1}{2} (9)(10) \sin \theta = 30$$

$$\sin \theta = \frac{2}{3}$$

$$\theta = \sin^{-1}\left(\frac{2}{3}\right)$$

$$\theta = 41.8^\circ$$

$$x^2 = (9)^2 + (10)^2 - 2(9)(10) \cos(41.8)$$

$$= 46.8\dots$$

$$x = 6.84 \text{ cm (3sf)}$$

b/

$$\frac{\sin PQR}{10} = \frac{\sin 41.8}{6.84}$$

$$\sin PQR = \frac{\sin 41.8 \times 10}{6.84}$$

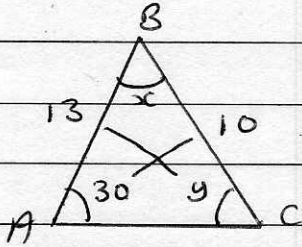
$$\sin PQR = 0.974\dots$$

$$\angle PQR = \sin^{-1}(0.974\dots)$$

$$= \underline{\underline{76.9^\circ}} \text{ (3sf)}$$

$$\underline{\underline{77.0^\circ}} \text{ (3sf)}$$

5/



$$\frac{\sin y}{13} = \frac{\sin 30}{10}$$

$$\sin y = \frac{\sin 30 \times 13}{10}$$

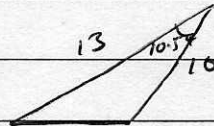
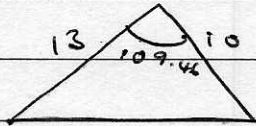
$$= \frac{13}{20}$$

$$y = \sin^{-1}\left(\frac{13}{20}\right)$$

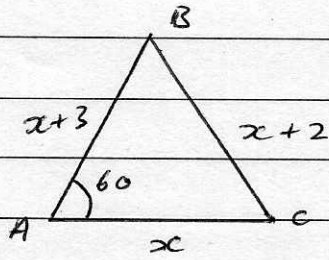
$$= 40.54^\circ, 139.46^\circ$$

$$x = 180 - 30 - 40.54, 180 - 30 - 139.46$$

$$x = \underline{\underline{109.46^\circ}}, \underline{\underline{10.54^\circ}}$$



6



$$(x+2)^2 = x^2 + (x+3)^2 - 2(x)(x+3)\cos(60)$$

$$(x+2)(x+2) = x^2 + (x+3)(x+3) - 2(x)(x+3)\left(\frac{1}{2}\right)$$

$$x^2 + 2x + 2x + 4 = x^2 + x^2 + 3x + 3x + 9 - x(x+3)$$

$$x^2 + 4x + 4 = 2x^2 + 6x + 9 - x^2 - 3x$$

$$x^2 + 4x + 4 = x^2 + 3x + 9$$

$$4x + 4 = 3x + 9$$

$$x + 4 = 9$$

$$\underline{\underline{x = 5}}$$