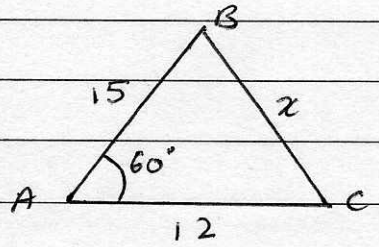
1)



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

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

$x^2 = 189$

$x = 3\sqrt{21}$ cm

$= 13.7$ cm (3sf)

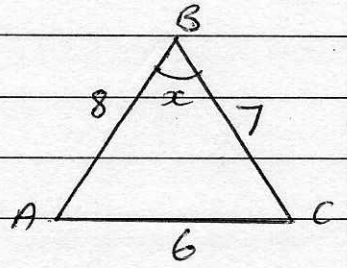
b/ Area $= \frac{1}{2}ab\sin C$

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

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

$= 77.9$ cm^2 (3sf)

2a/



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

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

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

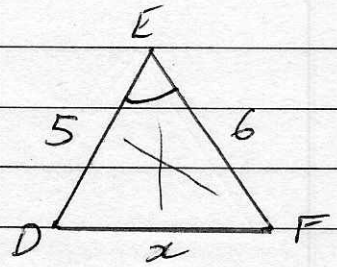
$$x = \cos^{-1}\left(\frac{11}{16}\right)$$

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

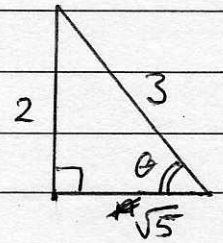
b/ $\text{Area} = \frac{1}{2}(8)(7)\sin(46.6)$

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

3



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



$\sin\theta = \frac{O}{H}$

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

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

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

$= \frac{\sqrt{5}}{3}$

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

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

$= 16.2786...$

$x = 4.03$ cm (3sf)

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

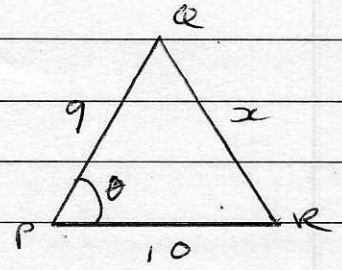
$\sin EFD = \frac{\frac{2}{3}}{4.03} \times 5$

$= 0.826...$

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

$= 55.7°$ (3sf)

4/



Area of triangle = 30

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

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

$\theta = \sin^{-1}(2/3)$

$\theta = 41.8°$

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

$= 46.8...$

$x = 6.84$ cm (3sf)

b/

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

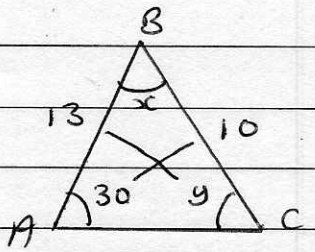
$\sin PQR = \frac{\sin 41.8}{6.84} \times 10$

$\sin PQR = 0.974...$

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

$= 76.9°$ (3sf)

5)



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

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

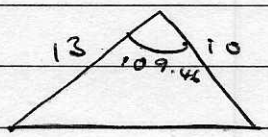
$$= 13/20$$

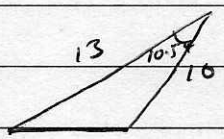
$$y = \sin^{-1}(13/20)$$

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

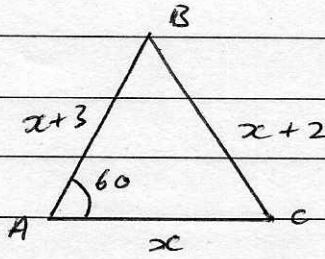
$$x = 180 - 30 - 40.54,\ 180 - 30 - 139.46$$

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





6



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

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

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

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

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

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

$$x + 4 = 9$$

$$x = 5$$