2/ $\cos\theta = \dfrac{\sqrt{3}}{2}$

ref $\theta = 30°$

$\theta = 30°$

$\theta = 360° - 30° = 330°$

$\Rightarrow \theta = 30°, 330°$

3/
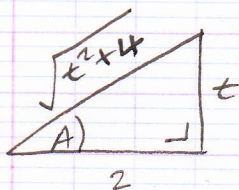
$\sin A = \dfrac{t}{\sqrt{t^2+4}}$

4/ π radians = $180°$

$1\ '' = \dfrac{180}{\pi}$

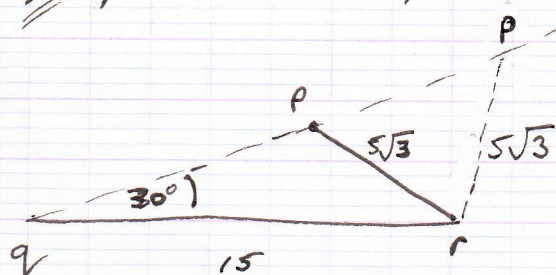$0.7\ '' = \dfrac{0.7(180)}{\pi} =$

0.7 radians $= 40.13°$

(i) Area $\Delta POQ = \frac{1}{2}ab\sin C$

$= \frac{1}{2}(4.8)(4.8)\sin 40.13°$

$= 7.42\ cm^2$

(ii) $A = kL$

$\frac{1}{2}r^2\theta = k r\theta$

$\frac{1}{2}r = k$

$k = 2.4$

2/ p can have 2 positions

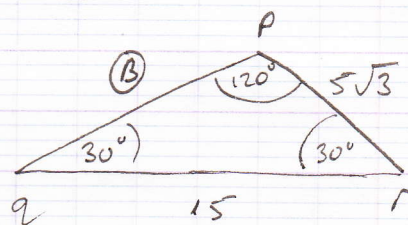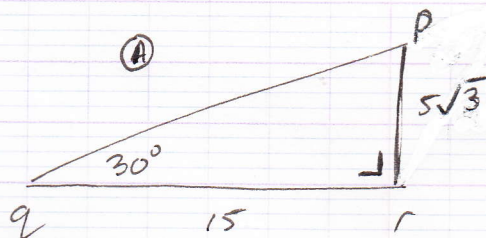
$\dfrac{\sin|\angle qpr|}{15} = \dfrac{\sin 30°}{5\sqrt{3}}$

$\sin|\angle qpr| = \dfrac{15\sin 30°}{5\sqrt{3}} = \dfrac{15(\frac{1}{2})}{5\sqrt{3}}$

$\sin|\angle qpr| = \dfrac{\sqrt{3}}{2}$

$\Rightarrow |\angle qpr| = 60°$ or $120°$

Ⓐ

Ⓑ

Area Ⓐ : Area Ⓑ

$\frac{1}{2}(15)\,5\sqrt{3}\,\sin 90°$: $\frac{1}{2}(15)(5\sqrt{3})\sin 30°$

$1 : \frac{1}{2}$

$2 : 1$

5

$$ax^2 + bx(x-4) + c(x-4) = x^2 + 13x - 20$$

$$ax^2 + bx^2 - 4bx + cx - 4c = x^2 + 13x - 20$$

$$(a+b)x^2 + (c-4b)x - 4c = x^2 + 13x - 20$$

$a + b = 1$	$c - 4b = 13$	$-4c = -20$
$a - 2 = 1$	$5 - 4b = 13$	$c = 5$
$a = 3$	$-4b = 8$	
	$b = -2$	

6

$$2\log_3(x+2) - \log_3(x+1) = \log_3(x+5)$$

$$\log_3(x+2)^2 - \log_3(x+1) = \log_3(x+5)$$

$$\log_3\left(\frac{(x+2)^2}{x+1}\right) = \log_3(x+5)$$

$$\frac{x^2 + 4x + 4}{x+1} = x+5$$

$$x^2 + 4x + 4 = x^2 + 6x + 5$$

$$2x = -1$$

$$x = \frac{-1}{2}$$

7 (I) If roots are equal

$$\Rightarrow b^2 - 4ac = 0$$

$$(2t-2)^2 - 4(1)(2t+1) = 0$$

$$4t^2 - 8t + 4 - 8t - 4 = 0$$

$$4t^2 - 16t = 0$$

$$t = 0 \; / \; t = 4 \checkmark$$

(II)

$$x^2 + 2tx - 2x + 2t + 1 = 0$$

$t = 4:$

$$x^2 + 6x + 9 = 0$$

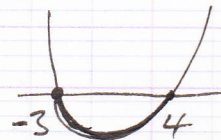$$(x+3)(x+3) = 0$$

$$x = -3$$

8

$$x^2 - x - 12 \leq 0$$

$$\boxed{\begin{array}{l} x^2 - x - 12 = 0 \\ (x-4)(x+3) = 0 \\ x = 4 \; / \; x = -3 \end{array}}$$

$$\boxed{-3 \leq x \leq 4}$$
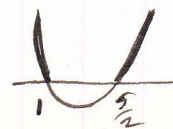
$$\frac{x+2}{x-1} < 3$$

$$\frac{x+2}{x}(x-1)^2 < 3(x^2 - 2x + 1)$$

$$x^2 + x - 2 < 3x^2 - 6x + 3$$

$$2x^2 - 7x + 5 > 0$$

$$\boxed{\begin{array}{l} 2x^2 - 7x + 5 = 0 \\ (2x-5)(x-1) = 0 \\ x = \frac{5}{2} \; / \; x = 1 \end{array}}$$

$$\boxed{\begin{array}{l} x < 1 \\ x > \frac{5}{2} \end{array}}$$

9/ See Problem Set 6 Solutions   Period $= \dfrac{2\pi}{2} = \pi$

Range $= [3, -3]$

10/ $I = A e^{-ks}$

(i) $I = 6000$ lux when $s = 0\,m$

$$6000 = A e^{-k(0)} = A e^{0} = A$$

$$\Rightarrow \quad A = 6000 \text{ lux}$$

(ii) $I = 1000$ lux when $s = 6\,m$

$$1000 = 6000 \, e^{-k(6)}$$

$$\frac{1}{6} = e^{-6k}$$

$$\ln\left(\frac{1}{6}\right) = \ln\left(e^{-6k}\right)$$

$$-1.7918 = -6k$$

$$k = 0.299$$