$\frac{M}{50}$.

Assignment 1 – Solutions

2

(1)(a) $x^2+12x-1 = (x+6)^2 - 37$

(b) $2x^2+8x-5 = 2\left[x^2+4x-\frac{5}{2}\right]$ 1

$= 2\left[(x+2)^2 - \frac{13}{2}\right]$ 1

$= 2(x+2)^2 - 13$ 1

4

$4+p = -\frac{5}{2}$

$p = -\frac{5}{2} - 4 = -\frac{13}{2}$

6

(2)(b) $x^2 - 3x - 11 = 0$

$\left(x - \frac{3}{2}\right)^2 - \frac{53}{4} = 0$

$+\frac{9}{4} + p = -11$

$p = -11 - \frac{9}{4} = \frac{-53}{4}$

$\left(x-\frac{3}{2}\right)^2 = \frac{53}{4}$

$x - \frac{3}{2} = \pm\sqrt{\frac{53}{4}}$

$x = \frac{3}{2} \pm \sqrt{\frac{53}{4}}$ 1

either $x = \frac{3}{2} + \sqrt{\frac{53}{4}} = 5.14$ 1

or $x = \frac{3}{2} - \sqrt{\frac{53}{4}} = -2.14$ 1

(a) $x^2 - 10x + 19 = 0$

$(x-5)^2 - 6 = 0$ 1

$(x-5)^2 = 6$

$(x-5) = \pm\sqrt{6}$

$x = 5 \pm \sqrt{6}$ 1

either $x = 5+\sqrt{6} = 7.45$ 1

or $x = 5-\sqrt{6} = 2.55$ 1

9

③ $5x - 3y = 11$ —①
$4x + y = 19$ —②

From ② $y = 19 - 4x$ —③ 1

in ① $5x - 3(19 - 4x) = 11$ 1

$5x - 57 + 12x = 11$

$17x = 68$

$x = \frac{68}{17} = 4$ 1

in ③ $y = 19 - 4(4)$
$= 19 - 16$
$= 3$ 1

④

④ $y = 3x - 1$ —①
$y^2 - xy = 15$ —②

Sub ① in ② $(3x-1)^2 - x(3x-1) = 15$ 1

$9x^2 - 6x + 1 - 3x^2 + x - 15 = 0$ 1

$6x^2 - 5x - 14 = 0$ 1

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4 \times 6 \times -14}}{2 \times 6}$$

$$x = \frac{5 \pm \sqrt{25 + 336}}{12}$$

$$x = \frac{5 \pm 19}{12}$$

$\therefore$ either $x = \frac{5+19}{12} = \frac{24}{12} = 2$ 1 or $x = \frac{5-19}{12} = \frac{-14}{12} = \frac{-7}{6}$ 1

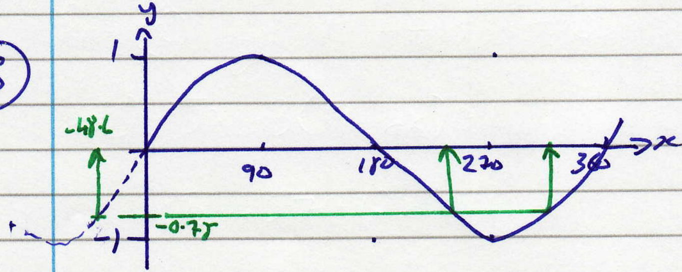
Now in ① when $x = 2$, $y = 3 \times 2 - 1 = 5$ 1

when $x = \frac{-7}{6}$ $y = 3 \times \left(\frac{-7}{6}\right) - 1 = \frac{-7}{2} - 1 = \frac{-9}{2}$ 1

$\therefore$ line intersects curve at $(2, 5)$ and $\left(\frac{-7}{6}, \frac{-9}{2}\right)$ 1 ⑧

(5) $8^{\frac{2}{3}} \times 25^{-\frac{1}{2}} = (\sqrt[3]{8})^2 \times \dfrac{1}{\sqrt{25}} = 2^2 \times \dfrac{1}{5} = \dfrac{4}{5}$ (4)

(6)



From calculator, $\sin x = -0.75$

$x = \sin^{-1}(-0.75) = -48.6°$

From symmetry of graph $x = 360 - 48.6 = 311.4°$

$x = 180 + 48.6 = 228.6°$ (4)

(7) $f(x) = 8 + 5x - 2x^2$, $g(x) = 5x - 4$

(a) $f(4) = 8 + 5(4) - 2(4)^2 = 8 + 20 - 32 = -4$

(b) $g(x) = 21$ $\quad 5x - 4 = 21$

$5x = 25$

$x = \dfrac{25}{5} = 5$

(c) $g(f(4)) = g(-4) = 5(-4) - 4 = -20 - 4 = -24$

(d) $gf(x) = 5(8 + 5x - 2x^2) - 4$

$= 40 + 25x - 10x^2 - 4$

$= 36 + 25x - 10x^2$

(e) $5x - 4 = 8 + 5x - 2x^2$

$2x^2 + 5x - 5x - 4 - 8 = 0$

$2x^2 - 12 = 0$

$2x^2 = 12$

$x^2 = \dfrac{12}{2}$

$x^2 = 6$

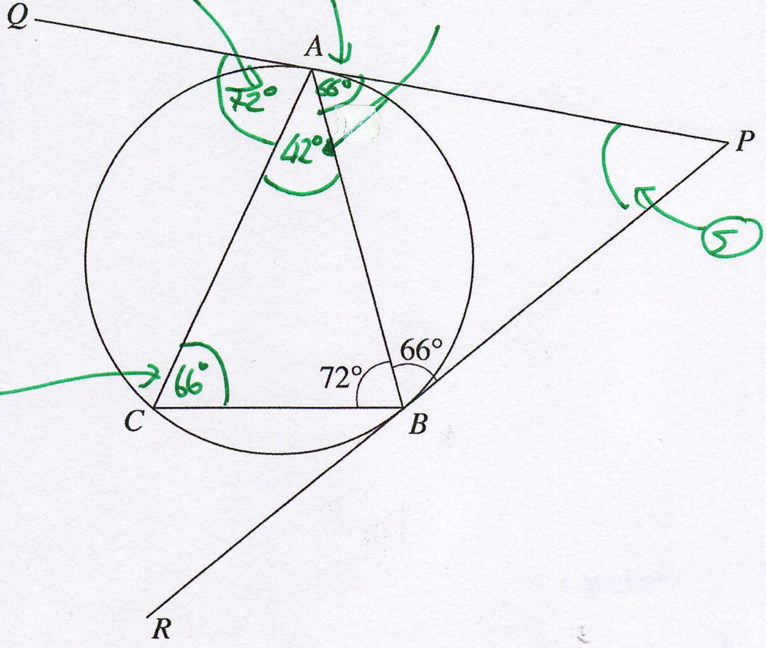
$x = \pm\sqrt{6}$ as required (11)

(8).

(3) ΔAPB is isosceles, so $P\hat{A}B = P\hat{B}A = 66^\circ$

(4) $180 - 42 - 66 = 72^\circ$

(2) Angles in a Δ add up to 180°



(1) Alternate segment theorem – same as $A\hat{B}P$

(5) $A\hat{P}B = 180 - 66 - 66 = 48^\circ$ (Angles in a Δ add up to 180°)

So (a) $Q\hat{A}C = 72^\circ$ (Could've got it in one step – alternate segment theorem $Q\hat{A}C = A\hat{B}C$) 2

(b) $A\hat{P}B = 48^\circ$ 2

(4).