

U3/L2 HW p.177 4, p.177, 5 Practice the derivation of QF!

4. a) $2x^2 - 3x = x^2 + 7x$

$$x^2 - 10x = 0$$

$$x(x-10) = 0$$

$$\therefore x = 0, 10$$

b) $4x^2 + 6x + 1 = 0$

$$x = \frac{-6 \pm \sqrt{36 - 16}}{8}$$

$$= \frac{-6 \pm \sqrt{20}}{8}$$

$$= \frac{-6 \pm 2\sqrt{5}}{8}$$

$$= \frac{-3 \pm \sqrt{5}}{4}$$

Check

$$L.S. = 4 \left(\frac{-3 + \sqrt{5}}{4} \right)^2 + 6 \left(\frac{-3 + \sqrt{5}}{4} \right) + 1$$

$$= \frac{4(-3 + \sqrt{5})^2}{16} - \frac{18 + 6\sqrt{5} + 4}{4}$$

$$= \frac{9 - 6\sqrt{5} + 5}{4} - \frac{14 + 6\sqrt{5}}{4}$$

$$= \frac{14 - 6\sqrt{5}}{4} - \frac{14 + 6\sqrt{5}}{4}$$

$$= 0$$

$$= R.S.$$

Check

$$L.S. = 4 \left(\frac{-3 - \sqrt{5}}{4} \right)^2 + 6 \left(\frac{-3 - \sqrt{5}}{4} \right) + 1$$

$$= \frac{4(-3 - \sqrt{5})^2}{16} - \frac{18 - 6\sqrt{5} + 4}{4}$$

$$= \frac{9 + 6\sqrt{5} + 5}{4} - \frac{14 - 6\sqrt{5}}{4}$$

$$= \frac{14 + 6\sqrt{5}}{4} - \frac{14 - 6\sqrt{5}}{4}$$

$$= 0$$

$$= R.S.$$

4. c) $x^2 + 4x - 3 = 0$

$$(x^2 + 4x + 4) - 4 - 3 = 0$$

$$(x+2)^2 = 7$$

$$x+2 = \pm\sqrt{7}$$

$$x = -2 \pm \sqrt{7}$$

d) $(x+3)^2 = -2x$

$$x^2 + 8x + 9 = 0$$

$$(x^2 + 8x + 16) - 16 + 9 = 0$$

$$(x+4)^2 - 7 = 0$$

$$(x+4)^2 = 7$$

$$x = -4 \pm \sqrt{7}$$

e) $3x^2 - 5x = 2x^2 + 4x + 10$

$$x^2 - 9x - 10 = 0$$

$$(x-10)(x+1) = 0$$

$$x = -1, 10$$

f) $2(x+3)(x-4) = 6x+6$

$$2x^2 - 2x - 24 = 6x + 6$$

$$2x^2 - 8x - 30 = 0$$

$$x^2 - 4x - 15 = 0$$

$$(x^2 - 4x + 4) - 4 - 15 = 0$$

$$(x+2)^2 = 19$$

$$x = -2 \pm \sqrt{19}$$

$$5. a) f(x) = 3x^2 - 7x - 2$$

$$\underline{x\text{-int, } f(x) = 0}$$

$$0 = 3x^2 - 7x - 2$$

$$\therefore x = \frac{7 + \sqrt{73}}{6}, \frac{7 - \sqrt{73}}{6}$$

$$\text{or } \approx 2.59, -0.26$$

$$\begin{aligned} & \text{RW} \\ X &= \frac{7 \pm \sqrt{49 + 24}}{6} \\ &= \frac{7 \pm \sqrt{73}}{6} \end{aligned}$$

$$b) f(x) = -4x^2 + 25x - 21$$

$$\underline{x\text{-int, } f(x) = 0}$$

$$0 = -4x^2 + 25x - 21$$

$$\therefore x\text{-int } \left(\frac{21}{4}, 0\right) \text{ and } (1, 0)$$

could factor

$$\text{i.e. } 0 = 4x^2 - 25x + 21$$

$$0 = (4x - 21)(x - 1)$$

$$x = \frac{21}{4}, 1$$

$$\begin{array}{r|l} \textcircled{1}24 & \textcircled{1}3 \\ \textcircled{4}21 & \textcircled{2}7 \\ \hline & \text{sum of 25} \end{array}$$

$$\begin{aligned} & \text{RW} \\ X &= \frac{-25 \pm \sqrt{625 - 4(-4)(-21)}}{-8} \\ &= \frac{-25 \pm \sqrt{625 - 336}}{-8} \\ &= \frac{-25 \pm \sqrt{289}}{-8} \\ &= \frac{25 \pm \sqrt{289}}{8} \\ &= \frac{25 \pm 17}{8} \\ &= \frac{42}{8} \text{ or } \frac{21}{4} \text{ and } \frac{8}{8} \text{ or } 1 \end{aligned}$$