10CMR Homework Mon 14 Feb Solutions

Use the quadratic formula to solve

1) $3x^2 - 7x - 5 = 0$

2) $2x^2 + 9x + 5 = 0$

Complete the square and identify coordinates of minimum point

3) $x^2 - 7x + 6$

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

Solve by factorising:

5) $x^2 - 3x - 10 = 0$

6) $x^2 + 11x + 24 = 0$

7) $2x^2 + 9x - 5 = 0$

8) $3x^2 - 14x + 8 = 0$

Factorise

9) $16x^2 - 9$

10) $25x^2 - 4y^2$

Complete in small homework books and hand in on Wed 16 Feb.

Quadratic Homework Solutions

1) $3x^2 - 7x - 5 = 0$

$$x = \frac{7 \pm \sqrt{(-7)^2 - 4(3)(-5)}}{2(3)}$$

$$x = \frac{7 \pm \sqrt{109}}{6}$$

$x = 2.91, \; x = -0.57$

2) $2x^2 + 9x + 5 = 0$

$$x = \frac{-9 \pm \sqrt{9^2 - 4(2)(5)}}{2(2)}$$

$$x = \frac{-9 \pm \sqrt{41}}{4}$$

$x = -0.65, \; x = -3.85$

3) $x^2 - 7x + 6$

$$= \left(x - \frac{7}{2}\right)^2 + 6 - \frac{49}{4}$$

$$= \left(x - \frac{7}{2}\right)^2 - \frac{25}{4}$$

Min point $\left(\frac{7}{2}, -\frac{25}{4}\right)$

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

$$= 2\left[x^2 + 3x + \frac{5}{2}\right]$$

$$= 2\left[\left(x + \frac{3}{2}\right)^2 + \frac{5}{2} - \frac{9}{4}\right]$$

$$= 2\left(x + \frac{3}{2}\right)^2 + 5 - \frac{9}{2}$$

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

Min point $\left(-\frac{3}{2}, \frac{1}{2}\right)$

5) $x^2 - 3x - 10 = 0$

$(x + 2)(x - 5) = 0$

6) $x^2 + 11x + 24 = 0$

$(x + 3)(x + 8) = 0$

$x = -2$ or $x = 5$

$x = -3$ or $x = -8$

7) $2x^2 + 9x - 5 = 0$

2×-5
$= -10$
$-1 \quad +10$

$2x^2 - x + 10x - 5 = 0$

$x(2x-1) + 5(2x-1) = 0$

$(x+5)(2x-1) = 0$

$x = -5$ or $x = \frac{1}{2}$

8) $3x^2 - 14x + 8 = 0$

$3 \times 8 = 24$

$-2 \quad -12$

$3x^2 - 2x - 12x + 8 = 0$

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

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

$x = 4$ or $x = \frac{2}{3}$

9) $16x^2 - 9$

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

$= (4x+3)(4x-3)$

10) $25x^2 - 4y^2$

$= (5x)^2 - (2y)^2$

$= (5x+2y)(5x-2y)$