Solving Quadratic Equations

1. By factorising

Ex1

$$x^2 + 5x + 6 = 0$$
$$(x + 2)(x + 3) = 0$$

+1	+6
-1	-6
+2	+3 ✓
-2	-3

Either $x + 2 = 0$ or $x + 3 = 0$

$$\underline{x = -2} \qquad \underline{x = -3}$$

Ex2

$$x^2 - 11x + 24 = 0$$
$$(x - 3)(x - 8) = 0$$

+1	+24
-1	-24
+2	+12
-2	-12
+3	+8
-3	-8 ✓

Either $x - 3 = 0$ or $x - 8 = 0$

$$\underline{x = 3} \qquad \underline{x = 8}$$

Ex3

$$x^2 - x - 12 = 0$$
$$(x + 3)(x - 4) = 0$$

+1	-12
-1	+12
+2	-6
-2	+6
+3	-4 ✓

Either $x + 3 = 0$ or $x - 4 = 0$

$$\underline{x = -3} \qquad \underline{x = 4}$$

Ex4

$$x^2 + 7x - 18 = 0$$
$$(x - 2)(x + 9) = 0$$

+1	-18
-1	+18
+2	-9
-2	+9

Either $x - 2 = 0$ or $x + 9 = 0$

$$\underline{x = 2} \qquad \underline{x = -9}$$

Exercise   Solve

1) $x^2 + 7x + 12 = 0$

$(x + 3)(x + 4) = 0$

Either $x + 3 = 0$ or $x + 4 = 0$

$\underline{x = -3}$ $\underline{x = -4}$

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

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

Either $x + 1 = 0$ or $x - 4 = 0$

$\underline{x = -1}$ $\underline{x = 4}$

3) $x^2 - 15x + 14 = 0$

$(x - 1)(x - 14) = 0$

Either $x - 1 = 0$ or $x - 14 = 0$

$\underline{x = 1}$ $\underline{x = 14}$

4) $x^2 + 8x - 20 = 0$

$(x - 2)(x + 10) = 0$

Either $x - 2 = 0$ or $x + 10 = 0$

$\underline{x = 2}$ $\underline{x = -10}$

5) $x^2 - 6x + 9 = 0$

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

Either $x - 3 = 0$ or $x - 3 = 0$

$\underline{x = 3}$ $\underline{x = 3}$

6) $x^2 + 7x + 6 = 0$

$(x + 1)(x + 6) = 0$

Either $x + 1 = 0$ or $x + 6 = 0$

$\underline{x = -1}$ $\underline{x = -6}$

Factorising With More Than One x^2

Ex1 $2x^2 + 7x + 3 = 0$

2×3
$= 6$

$+1$ $+6$

$2x^2 + x + 6x + 3 = 0$

$x(2x + 1) + 3(2x + 1) = 0$

$(x + 3)(2x + 1) = 0$

Either $x + 3 = 0$ or $2x + 1 = 0$

$\underline{x = -3}$ $2x = -1$

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

Ex2

$$3x^2 - 11x + 10 = 0$$

3x 10
= 30

+1 +30
-1 -30
+2 +15
-2 -15
+3 +10
-3 -10
+5 +6
-5 -6 ✓

$$3x^2 - 5x - 6x + 10 = 0$$

$$x(3x - 5) - 2(3x - 5) = 0$$

$$(x - 2)(3x - 5) = 0$$

Either $x - 2 = 0$ or $3x - 5 = 0$

$$x = 2$$

$$3x = 5$$

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

Classwork

1)

$$6x^2 + 13x + 5 = 0$$

$6 \times 5 = 30$
$+3 \quad +10$

$$6x^2 + 3x + 10x + 5 = 0$$

$$3x(2x + 1) + 5(2x + 1) = 0$$

$$(3x + 5)(2x + 1) = 0$$

Either $3x + 5 = 0$ or $2x + 1 = 0$

$$3x = -5$$

$$2x = -1$$

$$x = -\frac{5}{3}$$

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

2) $\quad 4x^2 + 8x - 5 = 0$

$4x - 5 = -20$

$-2 \quad +10$

$4x^2 - 2x + 10x - 5 = 0$

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

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

Either $\quad 2x+5 = 0 \qquad$ or $\qquad 2x-1 = 0$

$\qquad\qquad\quad 2x = -5 \qquad\qquad\qquad\quad 2x = 1$

$\qquad\qquad\quad x = -\dfrac{5}{2} \qquad\qquad\qquad\quad x = \dfrac{1}{2}$