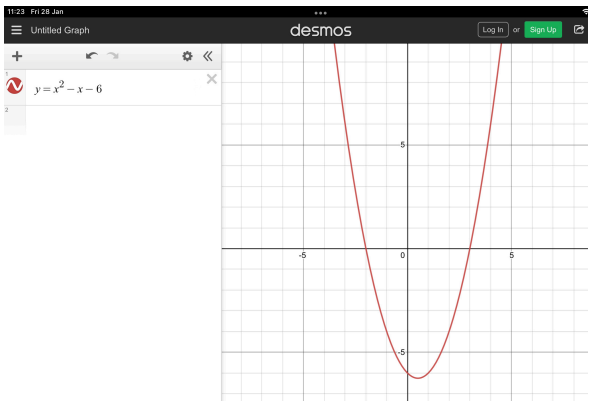
Quadratic Equations

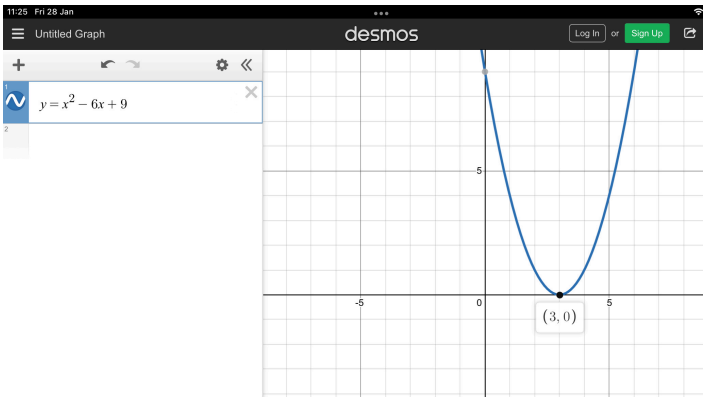
Ex 1 Solve $x^2 - x - 6 = 0$

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

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

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





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

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

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

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

Exercise Solve

1) $x^2 - 11x + 28 = 0$

$(x-4)(x-7) = 0$ Either $x - 4 = 0$ or $x - 7 = 0$

$\underline{x = 4}$ $\underline{x = 7}$

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

$(x-3)(x+7) = 0$ Either $x - 3 = 0$ or $x + 7 = 0$

$\underline{x = 3}$ $\underline{x = -7}$

3) $x^2 + 3x - 18 = 0$

$(x-3)(x+6) = 0$ Either $x - 3 = 0$ or $x + 6 = 0$

$\underline{x = 3}$ $\underline{x = -6}$

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

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

Either $x - 1 = 0$ or $x - 5 = 0$

$\underline{x = 1}$ $\underline{x = 5}$

5) $x^2 + 5x - 14 = 0$

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

Either $x - 2 = 0$ or $x + 7 = 0$

$\underline{x = 2}$ $\underline{x = -7}$

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

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

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

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

7) $x^2 + 11x + 10 = 0$

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

Either $x + 1 = 0$ or $x + 10 = 0$

$\underline{x = -1}$ $\underline{x = -10}$

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

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

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

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

9) $x^2 - 3x - 88 = 0$

$(x-8)(x+11) = 0$

Either $x - 8 = 0$ or $x + 11 = 0$

$\underline{x = 8}$ $\underline{x = -11}$

10) $x^2 + x - 30 = 0$

$(x-5)(x+6) = 0$

Either $x - 5 = 0$ or $x + 6 = 0$

$\underline{x = 5}$ $\underline{x = -6}$

Factorising Quadratic Expressions With Multiple x^2

Ex1 $6x^2 + 7x + 2$

$6 \times 2 = 12$

$+3 \quad +4$

$6x^2 + 3x + 4x + 2$

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

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

Ex2 $\quad 2x^2 + 9x - 5$

$2 \times -5 = -10$

$-1 \quad +10$

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

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

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

What if I had split the x term the other way round?

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

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

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

Ex3 $\quad 4x^2 + 39x - 10$

$4 \times -10 = -40$

$-1 \quad +40$

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

$$= x(4x-1) + 10(4x-1)$$

$$= (x+10)(4x-1)$$

Exercise $\quad$ Factorise

1) $3x^2 + 10x - 8$ $\quad 3 \times -8 = -24 \quad -2 \quad +12$

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

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

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

2) $4x^2 - 11x + 6$ $\quad 4 \times 6 = 24 \quad -3 \quad -8$

$$= 4x^2 - 3x - 8x + 6$$

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

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

3) $10x^2 + 17x + 3$ $\quad 10 \times 3 = 30 \quad +2 \quad +15$

$= 10x^2 + 2x + 15x + 3$

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

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

4) $6x^2 - x - 1$ $\quad 6 \times -1 = -6 \quad +2 \quad -3$

$= 6x^2 + 2x - 3x - 1$

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

5) $3x^2 + 11x - 20$ $\quad 3 \times -20 = -60 \quad -4 \quad +15$

$= 3x^2 - 4x + 15x - 20$

$= x(3x-4) + 5(3x-4)$

$= (x+5)(3x-4)$

Homework

Factorise

6) $8x^2 - 2x - 15$

7) $3x^2 + 5x + 2$

8) $4x^2 - 16x + 15$

9) $7x^2 - 5x - 2$

10) $6x^2 + 19x + 15$