OGUN DIGICLASS

SUBJECT: MATHEMATICS

TOPIC: QUADRATIC EQUATION

The Quadratic Equation

$$ax^2 + bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Learning Objectives

- Substitute values correctly

- Apply quadratic formula to solve quadratic equations

Substituting Quiz

Write 1 to 10 in your margin

20 seconds for each question

Q1

If a=2 and b=4 find..

2a + b

If a=2 and b=4 find..

5b + a

Q3

If a=2 and b=4 find..

$a^2 - b$

Q4 If a=2 and b=4 find..

$$3(a + b)$$

Q5

$$a = b^2 - c$$

Find a if
b = 5 and c = 2

Q6

$$a = b^2 - c$$

Find a if

b = 2 and c = 6

Answer = -2

$$a = b^2 - c$$

Find a if

b= 3 and c= -1

Answer = 10

Q8

$$a = b^2 - c$$

Find a if

b = 0 and c = 10

Answer = -10

$$a=b(c + d)$$

Find a if

b= 2 and c=3 and

d=5

Answer = 16

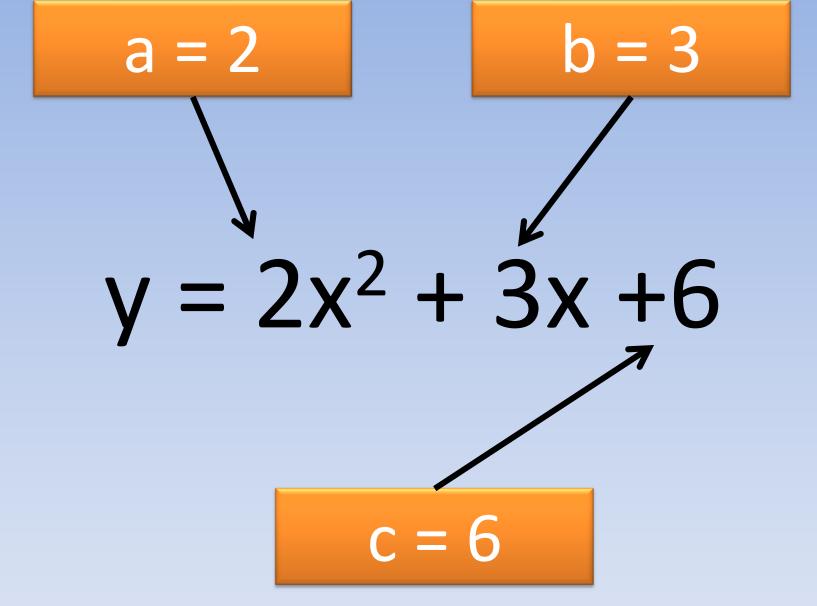$$a = b(c + d)$$
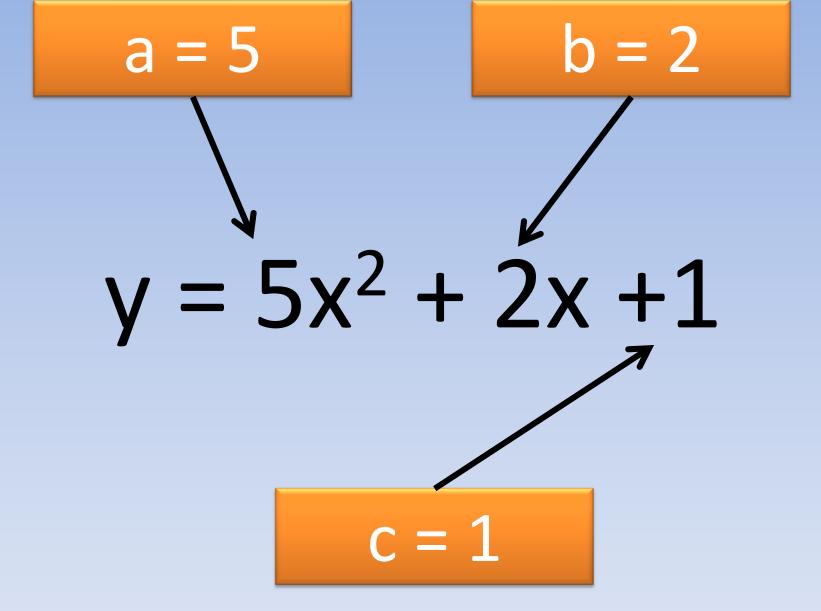
Find a if

b= 4 and c=3 and

d=-2

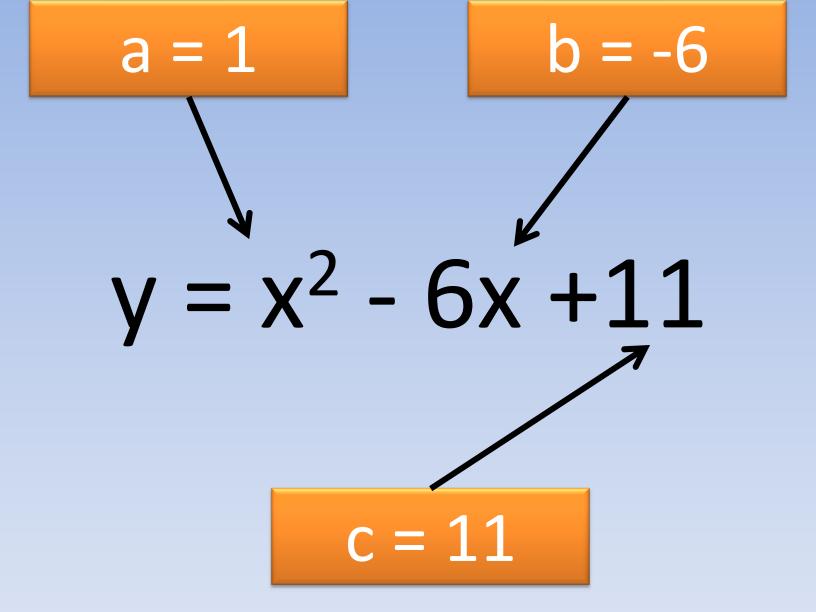Answer = 4

The Quadratic Equation

- This can be used to find out what values of x will make the equation equal zero
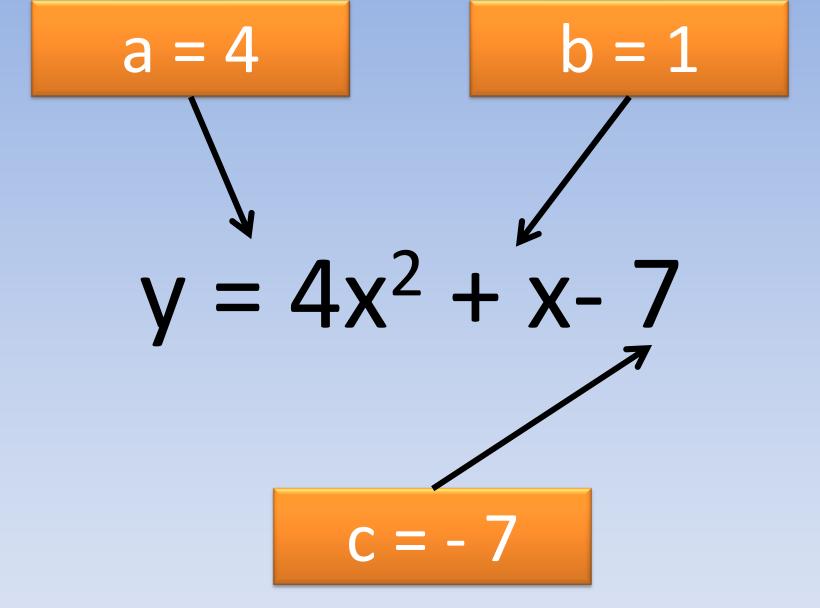
- You need it for questions where 2 is the biggest power of x and you are asked to solve the equation or find the intersection with the x axis
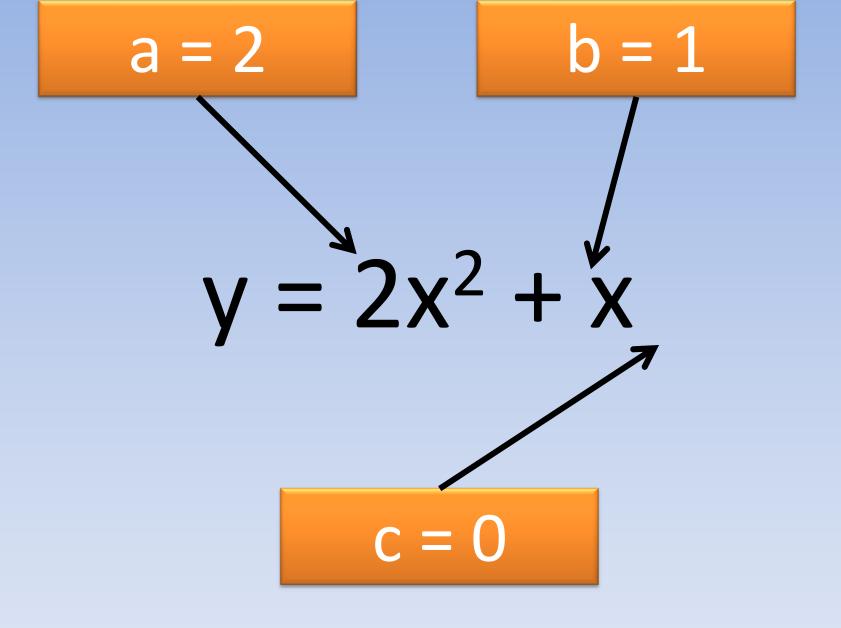
- E.g. Find where $y=2x^2 + 5x -3$ crosses the x axis

a = 2

b = 3

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

c = 6

a = 5

b = 2

$$y = 5x^2 + 2x + 1$$

c = 1

a = 1

b = -6

$$y = x^2 - 6x + 11$$

c = 11

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

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Start with the quadratic equation

$$x = \frac{-4 \pm \sqrt{4^2 - 4 \times 1 \times -2}}{2 \times 1}$$

Put in our values for a, b and c

$$x = \frac{-4 \pm \sqrt{16 - -8}}{2}$$

Tidy up

$$x = \frac{-4 \pm \sqrt{24}}{2}$$

You need to do this twice, once adding and once taking away

$$X = \frac{-4 \pm 4.899}{2}$$

$$X = \frac{-4 + 4.899}{2} \quad \text{Or} \quad X = \frac{-4 - 4.899}{2}$$

X = 4.4 or -0.4

x = -4.4 (1dp) and x = 0.4 (1dp)

$$2x^2 + 4x + 2 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Start with the quadratic equation

$$x = \frac{-4 \pm \sqrt{4^2 - 4 \times 2 \times 2}}{2 \times 2}$$

Put in our values for a, b and c

Tidy up

$$x = \frac{-4 \pm \sqrt{16 - 16}}{4}$$

The square root of zero is zero

$$x = \frac{-4 \pm \sqrt{0}}{4}$$

$$x = \frac{-4 - 0}{2} \quad \text{and} \quad x = \frac{-4 + 0}{2}$$

x = -2

They both give $\quad x = \dfrac{-4}{2}$

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

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Start with the quadratic equation

$$x = \frac{-3 \pm \sqrt{3^2 - 4 \times 2 \times 6}}{2 \times 2}$$

Put in our values for a, b and c

$$x = \frac{-3 \pm \sqrt{9 - 48}}{4}$$

Tidy up

$$x = \frac{-3 \pm \sqrt{-39}}{4}$$

We can't find the square roots of a negative so there is no solution

$x^2 + 4x - 2 = 0$ has 2 solutions

$2x^2 + 4x + 4 = 0$ has 1 solution

$2x^2 + 3x + 6 = 0$ has no solutions

The quadratic equation

1. **For each of these equations, what is a, b and c? (the first one has been done for you)**
   a) $2x^2 + 4x - 3 = 0$ a=2   b=4   c=-3
   b) $6x^2 + x - 10 = 0$
   c) $x^2 - 4x - 5 = 0$

2. The length in cm of the sides of a right angle triangle are x,(x+2) and (x+1) where x>0. Find in cm the length of its hypotenuse

Assignment

Using quadratic formula, solve correct to 2 d.p

$$\frac{x-2}{4} = \frac{x+2}{2x}$$