

Hi Angela,

In today's maths lesson we practised "Section Two - Algebra" from the *GCSE Edexcel Mathematics Foundation Level*:

Factorising p38:

We revised factorising simple operations and the more complex *Difference of Two Squares*, where $a^2 - b^2 = (a + b)(a - b)$, and you correctly answered the following 2 questions:

Q2: Factorise $6y + 15y^2$

Q4: Factorise $36x^2 - 49y^2$

Quadratic Equations p54:

We revised the standard format $x^2 + bx + c = 0$ and worked through the following two examples:

Example 1:

Solve $x^2 - x = 12$ (we are trying to find out the value(s) of x).

Therefore $x^2 - x - 12 = 0$ (rearrange the equation to match the quadratic equation standard format) and now determine the factors of 12 (i.e. 1×12 , 2×6 , 3×4) for use in the next step.

Try $(x + 2)(x - 6) = 0$ (factorise the quadratic equation so that we have 2 terms $(x +/- A)(x +/- B)$ whose products match those of the quadratic equation, using factors from the previous step (e.g. 2, 6)).

$x^2 - 6x + 2x - 12 = 0$ (let's test our factors).

$x^2 - 4x - 12 = 0$ does NOT match $x^2 - x - 12 = 0$ (therefore factors 2, 6 are WRONG, let's try again!)

Try $(x + 3)(x - 4) = 0$ (we use different factors (i.e. 3, 4)).

$x^2 - 4x + 3x - 12 = 0$ DOES match $x^2 - x - 12 = 0$ (therefore $(x + 3)(x - 4) = 0$ is correct).

Note: when a product of 2 terms equals 0 (i.e. $A \times B = 0$), we know that either $A=0$, or $B=0$.

So, either $(x + 3) = 0$, where $x = -3$.

TEST $x = -3$ in $x^2 - x - 12 = 0$ results in $9 + 3 - 12 = 0$, so $x = -3$ is OK

Or $(x - 4) = 0$, where $x = 4$

TEST $x = 4$ in $x^2 - x - 12 = 0$ results in $16 - 4 - 12 = 0$, so $x = 4$ is OK

Example 2:

Solve $x^2 - 9x + 20 = 0$ (we are trying to find out the value(s) of x)

Determine the factors of 20 (i.e. 1×20 , 2×10 , 4×5) for use in the next step.

Try $(x - 4)(x - 5) = 0$ (factorise the quadratic equation so that we have 2 terms $(x +/- A)(x +/- B)$ whose products match those of the quadratic equation, using factors from the previous step (e.g. 4, 5))

$x^2 - 5x - 4x + 20 = 0$ DOES match $x^2 - 9x + 20 = 0$ (therefore $(x - 4)(x - 5) = 0$ is correct).

Note: when a product of 2 terms equals 0 (i.e. $A \times B = 0$), we know that either $A=0$, or $B=0$.

So, either $(x - 4) = 0$, where $x = 4$.

TEST $x = 4$ in $x^2 - 9x + 20 = 0$ results in $16 - 36 + 20 = 0$, so $x = 4$ is OK

Or $(x - 5) = 0$, where $x = 5$

TEST $x = 5$ in $x^2 - 9x + 20 = 0$ results in $25 - 45 + 20 = 0$, so $x = 5$ is OK

Simultaneous Equations p55:

I showed you how to solve simultaneous equations using *SUBSTITUTION*, a slightly different method to that shown in the book:

Example 1:

$$2x + 4y = 6 \text{ (equation 1).}$$

$$4x + 3y = -3 \text{ (equation 2).}$$

We have two equations with two unknowns (x , y) so let's find x in terms of y for equation 1.

$$2x + 4y = 6 \text{ (equation 1).}$$

$$\text{So } 2x = 6 - 4y$$

Therefore $x = 3 - 2y$ (now we have x in terms of y in equation 1).

Let's now substitute x in terms of y from equation 1 into equation 2.

$$4x + 3y = -3 \text{ (equation 2).}$$

$$4(3 - 2y) + 3y = -3 \text{ ('4(3 - 2y)' is 4x where } x = 3 - 2y \text{ from equation 1).}$$

$$12 - 8y + 3y = -3 \text{ (now we have equation 2 with only one unknown 'y' - we can solve this!)}$$

$$12 - 5y = -3$$

$$12 = -3 + 5y$$

$$15 = 5y$$

$$\underline{y = 3}$$

From equation 1 we know that $x = 3 - 2y$

So, $x = 3 - 6$ and therefore $\underline{x = -3}$ (we have found the value of x !).

Finally, we substitute for both x and y values in both equations 1 and 2 to double-check.

$$2x + 4y = 6 \text{ (equation 1).}$$

$$\underline{-6 + 12 = 6 \text{ OK!}}$$

$$4x + 3y = -3 \text{ (equation 2).}$$

$$\underline{-12 + 9 = -3 \text{ OK!}}$$

Remember! With all mathematics calculations:

1. Ask yourself: Am I answering the question? (e.g. if the question is about weight and your answer is a volume then you have made a mistake somewhere!)

2. Does my answer look realistic? (e.g. if the question is to calculate the price of a loaf of bread and your answer is £1000 then you've made a mistake somewhere!)

3. How can I verify my answer using another method? (e.g. does estimating or using a different mathematical method arrive at the near, or same answer?)

4. Look for the easiest method to answer the question (don't make it harder than necessary by over complicating it!)