GCSE HIGHER · REVISION MAT 4

Simplifying, expanding & factorising

1 Expand

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

2 Factorise

$$x^2 - 2x - 15$$

3 Mia expands $(x - 4)(x + 2)$ and gets $x^2 - 2x + 8$.

Find her mistake and correct it.

4 Kai thinks of a number n, adds 3, then squares the result.

Ella squares n, then adds 9.

Their answers differ by 42.

Find the value of n.

5 Show that

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

can be written as $4(2x + 1)(x - 2)$.

6 A cube has edges of $(x + 2)$ cm.

A cuboid measures

$$x \times (x + 4) \times (x + 6) \text{ cm}$$

Find how much larger the cuboid's volume is when $x = 5$.

7 Show that

$$\frac{2x^2 + x - 6}{3x^2 + 7x + 2} \times \frac{3x + 1}{2x - 3}$$

is equal to 1 for all valid x.

8 Prove that the product of two consecutive even numbers is always a multiple of 8.

Mr&Mrs MATHS

ANSWERS · REVISION MAT 4

Simplifying, expanding & factorising

1 **$12x^2 - 8x$**

2 **$(x - 5)(x + 3)$**

3 $-4 \times 2 = -8$, not $+8$

$x^2 - 2x - 8$

4 $(n + 3)^2 - (n^2 + 9)$

$= n^2 + 6n + 9 - n^2 - 9 = 6n$

$6n = 42$

$n = 7$

5 $9x^2 - 6x + 1 - (x^2 + 6x + 9)$

$= 8x^2 - 12x - 8$

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

$= 4(2x + 1)(x - 2)$

6 Cube: $x^3 + 6x^2 + 12x + 8$

Cuboid: $x^3 + 10x^2 + 24x$

Difference: $4x^2 + 12x - 8$

When $x = 5$: 152 cm³

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

$3x^2 + 7x + 2 = (3x + 1)(x + 2)$

$$\frac{(2x - 3)(x + 2)}{(3x + 1)(x + 2)} \times \frac{3x + 1}{2x - 3}$$

$= 1$

8 $2n(2n + 2) = 4n(n + 1)$

$n(n + 1)$ is the product of two consecutive integers, so it is even.

So $4n(n + 1)$ is a multiple of 8.

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