GCSE HIGHER · REVISION MAT 1

Simplifying, expanding & factorising

1 Expand and simplify

$$3(2x - 5) - 4(x - 2)$$

2 Factorise fully

$$12x^2y - 18xy^2$$

3 Show that

$$(x + 4)(x - 3) - x(x + 1)$$

is constant for all values of x.

State its value.

4 A rectangle measures

$$(x + 5) \text{ cm by } (x - 2) \text{ cm}$$

A square has sides of $(x + 1)$ cm.

The rectangle's area is 4 cm^2 more than the square's area.

Find the perimeter of the rectangle.

5 Jo simplifies this fraction:

$$\frac{x^2 - 9}{x^2 + x - 6} = \frac{-9}{x - 6}$$

(a) Explain Jo's mistake.

(b) Simplify the fraction correctly.

6 A cuboid measures

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

Its volume is 84 cm^3.

Show that $x^3 - 7x - 90 = 0$.

Hence find the value of x.

7 Show that

$$\frac{2x^2 + 5x - 3}{4x^2 - 1} \div \frac{x + 3}{4x + 2}$$

is equal to 2 for all valid x.

8 n is an integer greater than 1.

Prove that $n^3 - n$ is always a multiple of 6.

Mr&Mrs MATHS

ANSWERS · REVISION MAT 1

Simplifying, expanding & factorising

1 $6x - 15 - 4x + 8$

$= 2x - 7$

2 **$6xy(2x - 3y)$**

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

$= -12$ (no x terms remain)

4 $(x+5)(x-2) = x^2 + 3x - 10$

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

$x - 11 = 4 \Rightarrow x = 15$

Rectangle 20 cm by 13 cm

Perimeter = 66 cm

5 (a) Jo cancelled the x^2 terms, but only factors can cancel.

(b) $\frac{(x-3)(x+3)}{(x+3)(x-2)} = ! \frac{x-3}{x-2}$

6 $(x+1)(x+2) = x^2 + 3x + 2$

$\times (x-3)$: $x^3 - 7x - 6$

$x^3 - 7x - 6 = 84$

$\Rightarrow x^3 - 7x - 90 = 0$

$x = 5$ (125 – 35 – 90 = 0)

7 $2x^2 + 5x - 3 = (2x-1)(x+3)$

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

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

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

8 $n^3 - n = n(n^2 - 1) = (n-1)n(n+1)$

Three consecutive integers, so one is even and one is a multiple of 3.

So the product is a multiple of 6.