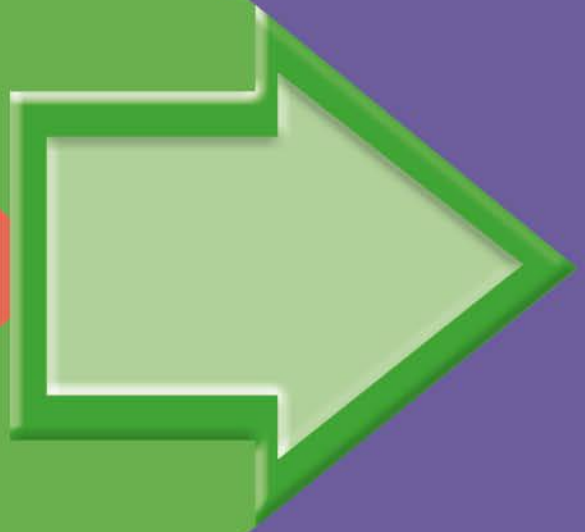
"SHOW THAT" WITH ALGEBRA



White Rose Maths

GET READY

White Rose Maths

1) Substitute $x = 4$ into each of these expressions.

a) $3x + 14$ b) $14 - 3x$ c) $3x - 14$

2) a) Expand the brackets

i) $5(2x + 3y)$ ii) $-3(5x + 2y)$ iii) $-2(3x - 5y)$

b) Factorise

i) $12x + 15y$ ii) $18x + 24y$ iii) $x^2 + 2x - 15$

3) Expand and simplify

a) $(x + 1)(x - 4)$ b) $(x + 1)^2$ c) $(x - 4)^2$

4) Line A has equation $y = 5x + 3$

Line B has equation $10x - 2y = 2$

a) Work out the gradient of each line.

b) Are lines A and B parallel?

1) Substitute $x = 4$ into each of these expressions.

a) $3x + 14$

$3(4) + 14$

$12 + 14 = 26$

b) $14 - 3x$

$14 - 3(4)$

$14 - 12 = 2$

c) $3x - 14$

$3(4) - 14$

$12 - 14 = -2$

2) a) Expand the brackets

i) $5(2x + 3y)$

$\equiv 10x + 15y$

ii) $-3(5x + 2y)$

$\equiv -15x - 6y$

iii) $-2(3x - 5y)$

$\equiv -6x + 10y$

b) Factorise

i) $12x + 15y$

$\equiv 3(4x + 5y)$

ii) $18x + 24y$

$\equiv 6(3x + 4y)$

iii) $x^2 + 2x - 15$

$\equiv (x - 3)(x + 5)$

3) Expand and simplify

a) $(x+1)(x-4)$ $\equiv x^2-3x-4$

b) $(x+1)^2$ $\equiv x^2+2x+1$

c) $(x-4)^2$ $\equiv x^2-8x+16$

4) Line A has equation $y=5x+3$

Line B has equation $10x-2y=2$

a) Work out the gradient of each line.

b) Are lines A and B parallel?

$y=5x+3$

Gradient of line A is 5

$10x-2y=2$

$10x-2=2y$

$5x-1=y$

$y=5x-1$

Gradient of line B is 5

The lines are parallel as the gradients are equal.

LET'S LEARN

White Rose Maths

Show that when $x = 4$, $3x - 1 < 2x + 5$

Provide evidence that leads to a result.

Have a think

When $x = 4$,

$$3x - 1 = 3 \times 4 - 1$$
$$= 11$$

When $x = 4$,

$$2x + 5 = 2 \times 4 + 5$$
$$= 13$$

$11 < 13$, so $3x - 1 < 2x + 5$ for $x = 4$

Find the set of values for which $3x - 1 < 2x + 5$

Have a think

$3x - 1 < 2x + 5$

$-2x$ $-2x$

$x - 1 < 5$

$+1$ $+1$

$x < 6$

Show that $3(5x - 2y) - 2(3x - 5y) \equiv 9x + 4y$

Have a think 

$3(5x - 2y) \equiv 15x - 6y$

$-2(3x - 5y) \equiv -6x + 10y$

$3(5x - 2y) - 2(3x - 5y) \equiv 15x - 6y - 6x + 10y$

$\equiv 9x + 4y$

So $3(5x - 2y) - 2(3x - 5y) \equiv 9x + 4y$

Show that the point $(3\ ,13)$ lies on the line $y = 5x - 2$

x y

Have a think

When $x = 3$,

$$5x - 2 = 5 \times 3 - 2$$
$$= 13$$

So the point $(3\ ,13)$ lies on the line $y = 5x - 2$

YOUR TURN

Have a go at questions 1 to 6 on the worksheet

White Rose Maths

Show that $x = 4, y = 11$ is a solution to the simultaneous equations.

$$2x + 3y = 41$$
$$7x - 2y = 6$$

Have a think

$$2(4) + 3(11)$$
$$8 + 33 = 41$$

$$7(4) - 2(11)$$
$$28 - 22 = 6$$

So $x = 4, y = 11$ is a solution to the simultaneous equations.

Show that the formula $F = \frac{5g+k}{2}$ can be rearranged to $g = \frac{2F-k}{5}$

Have a think

$\times 2$ $F = \frac{5g+k}{2}$ $\times 2$

$2F = 5g + k$

$-k$ $2F - k = 5g$ $-k$

$\div 5$ $g = \frac{2F-k}{5}$ $\div 5$

So the formula $F = \frac{5g+k}{2}$ can be rearranged to $g = \frac{2F-k}{5}$

YOUR TURN

Have a go at the rest of the questions on the worksheet

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