Inequalities and substitution (1)
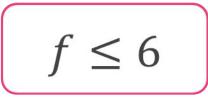
Mr Millar
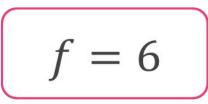
Try this
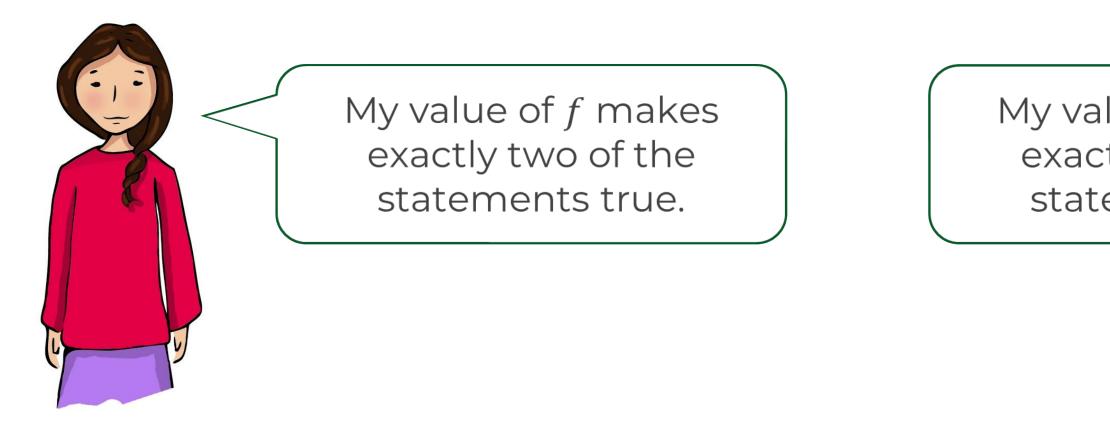
Students are trying out values of f.

What numbers could they be thinking of?

$f \leq 6$

$6 \leq f$

$f < 6$

$f = 6$

$-6 = f$

$f > 6$

My value of f makes exactly two of the statements true.

My value of f makes exactly half of the statements true.

Connect

Given that $x = 3$ and $y = 2$, which of the following inequalities are TRUE?

$$x + y < 6$$

$$3x - y \geq 7$$

$$1 - x > -y + 1$$

Independent task

1. Given that a = 5 and b = −2, which of the following inequalities are TRUE?

$$3a > 15 \qquad b + 8 \leq 10 \qquad b - a \geq -7$$

2. Find three different pairs of values of f and g which satisfy the inequality

$$f + g \leq 3$$

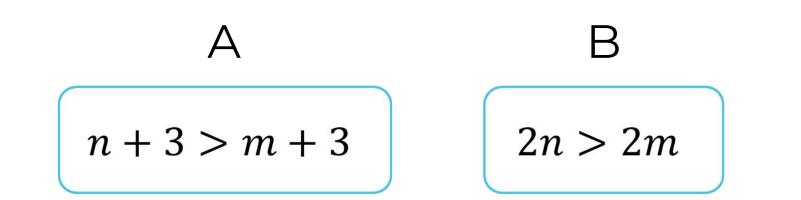3. Given that p = 10 and q = −10, fill in the gaps with a <, > or = sign

$$3p \qquad 40 \qquad\qquad 3q \qquad 3p \qquad\qquad -3q \qquad 3p$$

Explore

Look at these 3 inequalities.

A	B	C
$n + 3 > m + 3$	$2n > 2m$	$n^2 > m^2$

Find pairs of values for m and n so that:

- A, B and C are all true

- A and B are true, but not C

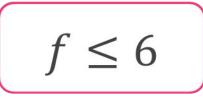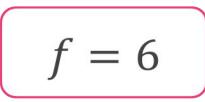- C is true, but not A and B

Can you **generalise**?

Answers

Try this

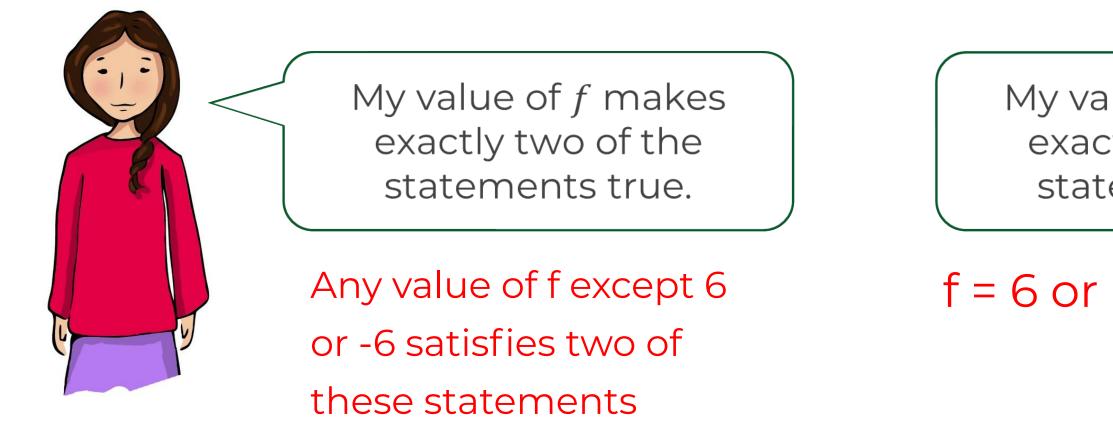Students are trying out values of f.

What numbers could they be thinking of?

$f \leq 6$

$6 \leq f$

$f < 6$

$f = 6$

$-6 = f$

$f > 6$

My value of f makes exactly two of the statements true.

My value of f makes exactly half of the statements true.

Any value of f except 6 or -6 satisfies two of these statements

f = 6 or -6

Try this

Given that $x = 3$ and $y = 2$, which of the following inequalities are TRUE?

$x + y < 6$ $\qquad$ 3 + 2 < 6

TRUE

$3x - y \geq 7$ $\qquad$ 9 – 2 ≥ 7

TRUE

$1 - x > -y + 1$ $\qquad$ 1–3 > -2 +1

FALSE

Independent task

1. Given that a = 5 and b = −2, which of the following inequalities are TRUE?

$$3a > 15$$

15 > 15 (F)

$$b + 8 \leq 10$$

$6 \leq 10$ (T)

$$b - a \geq -7$$

-7 ≥ -7(T)

2. Find three different pairs of values of f and g which satisfy the inequality

Eg: f = 2, g = 1 OR f = 3, g = 0 OR f = -2, g = 1 etc.

$$f + g \leq 3$$

3. Given that p = 10 and q = −10, fill in the gaps with a <, > or = sign

$$3p \quad < \quad 40$$

$$3q \quad < \quad 3p$$

$$-3q \quad = \quad 3p$$

Try this

Look at these 3 inequalities.

A $\qquad$ B $\qquad$ C

$$n + 3 > m + 3 \qquad 2n > 2m \qquad n^2 > m^2$$

Find pairs of values for m and n so that:

- A, B and C are all true — Any positive values of m and n where n > m (eg n = 5, m = 4)

- A and B are true, but not C — Any negative values of m and n where n > m (eg n = -4, m = -5)

- C is true, but not A and B — n must be negative, and smaller than m, eg n = -5, m = -4. Also if m is positive, its square can't be bigger than n, eg n = -5, m = 4 would work but not n = -5, m = 6

Can you **generalise**?