YOU & MATHS **Possible values** Could the fraction $\frac{3}{x-2}$ take on the value $\frac{3}{2}$ (that is, can $\frac{3}{x-2} = \frac{3}{2}$)?

For what value of x? Give another example of a value it can take on and an example of a value it cannot take on.

The fraction exists only if $x \neq 2$; so $x - 2$ is not 0, and to solve $\frac{3}{x-2} = \frac{3}{2}$ you can multiply both sides of the equation by $2(x-2)$, which gives $3 \cdot 2 = (x-2) \cdot 3$.

This is equivalent to

$$3x - 6 = 6.$$

So $3x = 12$, and $x = 4$, which is an acceptable value.

To find an example of another value that the fraction $\frac{3}{x-2}$ can take on, we can proceed by trials.

Let $\frac{3}{x-2}$ be equal to 6. Then

$$\frac{3}{x-2} = 6 \rightarrow 3 = 6(x-2) \text{ for } x \neq 2.$$

This is equivalent to

$$3 = 6x - 12 \rightarrow 6x = -15 \rightarrow x = -\frac{15}{6},$$

which is an acceptable value.

The only time when we will not be able to find a value that $\frac{3}{x-2}$ can take on is when the solution of the equation is not an acceptable value, i.e. when $x = 2$.