Simplifying expressions

For an unknown number x, the **expression** $2x + 3$ means '2 lots of x with 3 added' or 'add 3 to 2 lots of x'. '2 lots of x' is the same as '$2 \times x$' or '$x + x$' and is written as $2x$.

Expressions that involve $\times$ and $\div$ should be simplified where possible.

Multiplying expressions

To multiply together two or more algebraic expressions, first multiply any number parts and then multiply the letters.

SNAPIT! Algebraic notation

$3a$ is used for $3 \times a$
ab is used for $a \times b$
a^2 is used for $a \times a$
a^3 is used for $a \times a \times a$
a^2b is used for $a \times a \times b$
$\dfrac{a}{b}$ is used for $a \div b$

WORKIT!

Simplify:

a $a \times a$

a^2

> Use indices to show a letter multiplied by itself. a^2 is read as 'a squared'.

b $b \times b \times b$

b^3

> Use indices to show the same letter multiplied together three times. b^3 is read as 'b cubed'.

c $2 \times j \times k \times 6$

$12jk$

> Multiply the numbers together: $2 \times 6 = 12$
> Multiply the letters together by writing them next to each other: $j \times k = jk$
> Write the number in front of the letters.

d $2d \times 4d$

$8d^2$

Dividing expressions

Dividing algebraic expressions is similar to cancelling fractions. If necessary, write the division as a fraction first. Cancel any number parts where possible and then cancel any letters where possible.

WORKIT!

Simplify:

a $6a \div 2$

$\dfrac{\cancel{6}^3 a}{\cancel{2}} = 3a$

b $12xy \div 4y$

$\dfrac{\cancel{12}^3 x\cancel{y}}{\cancel{4}\cancel{y}} = 3x$

> Write the division as a fraction.
> Cancel the number parts by dividing the top and bottom by 2.

> This is the same as $\dfrac{12 \times x \times y}{4 \times y}$.
> Cancel the number parts by dividing the top and bottom by 4.
> y appears on the top and bottom, so cancel.

✓ CHECKIT!

1 Simplify:

a $p \times p \times p$

b $4 \times b \times c \times 7$

c $4a \times 3b$

d $5x \times 4x$

e $2g \times (-4g)$

f $2p \times 3q \times r$

2 Simplify:

a $10x \div 2$

b $\dfrac{14w}{-2}$

c $6p \div p$

d $8mn \div 2m$

e $\dfrac{12xy}{3y}$

f $9abc \div bc$