

Do now on writing expressions

WALT Dividing algebraic terms

Success Criteria

When dividing algebraic terms containing pronumerals and numbers, follow these steps. *Step 1: Write the division as a fraction.*

Step 2: Cancel the numbers, if possible.

Step 3: Cancel the pronumerals, if possible.

Step 4: Write your answer as a fraction. (Remember: Cancel means divide the numerator and denominator by the same number or pronumeral.)

Step 4: Write your answer as a fraction.

Video On dividing algebraic terDividing Algebraic Termsms

1 Complete the following to simplify.

$$\begin{aligned} \text{a } 10y \div 15 &= \frac{10y}{\square} \\ &= \frac{2y}{\square} \end{aligned}$$

$$\begin{aligned} \text{b } 8m \div 12m &= \frac{\square}{12m} \\ &= \frac{\square}{3} \end{aligned}$$

$$\begin{aligned} \text{c } 6x \div 8xy &= \frac{\square}{8xy} \\ &= \frac{\square}{4y} \end{aligned}$$

2 Simplify the following.

$$\text{a } 9x \div 18$$

$$\text{b } 3m \div 12$$

$$\text{c } 5p \div 25$$

$$\text{d } 16d \div 4$$

$$\text{e } \frac{10c}{2}$$

$$\text{f } \frac{8a}{4}$$

$$\text{g } \frac{6a}{12a}$$

$$\text{h } \frac{44m}{22m}$$

$$\text{i } \frac{12a}{15a}$$

$$\text{j } \frac{20d}{10d}$$

$$\text{k } \frac{3f}{9f}$$

$$\text{l } \frac{4t}{20t}$$

$$\text{m } \frac{18p}{20d}$$

$$\text{n } \frac{6xy}{15x}$$

$$\text{o } \frac{24ab}{36bc}$$

$$\text{p } \frac{16r}{20qr}$$

$$\text{q } \frac{8yz}{40xyz}$$

$$\text{r } \frac{70dkl}{10klm}$$

$$\text{s } \frac{15pqr}{12q}$$

$$\text{t } \frac{14mn}{35mp}$$

Challenge


EXAMPLE 2

Simplify the following.

$$\text{a } \frac{-xy}{-y}$$

$$\text{b } \frac{40ac}{-10ac}$$

$$\text{c } \frac{-16x^2y}{-8x}$$

Remember: When dividing two integers:
If the signs are the same, the result is positive. 
If the signs are different, the result is negative.

$$\begin{aligned} \text{a } \frac{-xy}{-y} &= \frac{\cancel{-}xy}{\cancel{-}y} \\ &= x \end{aligned}$$

$$\begin{aligned} \text{b } \frac{40ac}{-10ac} &= \frac{\cancel{4}0ac}{\cancel{-}10ac} \\ &= -4 \end{aligned}$$

$$\begin{aligned} \text{c } \frac{-16x^2y}{-8x} &= \frac{\cancel{-}16x^2y}{\cancel{-}8x} \\ &= 2xy \end{aligned}$$

3 Complete the following to simplify.

$$\begin{aligned} \text{a } \frac{15ab}{-20ac} &= \frac{15ab}{\square} \\ &= \frac{3b}{\square} \\ &= -\frac{3b}{\square} \end{aligned}$$

$$\begin{aligned} \text{b } \frac{-x}{xy} &= \frac{\square}{xy} \\ &= \frac{\square}{y} \\ &= -\frac{\square}{y} \end{aligned}$$

4 Simplify the following.

$$\text{a } \frac{-50d}{10d}$$

$$\text{b } \frac{-12fg}{-18g}$$

$$\text{c } \frac{-6kl}{9l}$$

$$\text{d } \frac{12fg}{-3gh}$$

$$\text{e } \frac{-36lm}{9m}$$

$$\text{f } \frac{-90y}{99x}$$

$$\text{g } \frac{-45c}{-15ac}$$

$$\text{h } \frac{-a^2bc}{b^2c}$$

$$\text{i } \frac{-mn}{n^2}$$

$$\text{j } \frac{x^2yz^2}{-y^2x}$$

$$\text{k } -64p \div -16q$$

$$\text{l } -6ac \div -9c$$

$$\text{m } -2mn \div -8mn$$

$$\text{n } -10 \div 5mn$$

$$\text{o } -3q \div q$$

$$\text{p } 21pq \div -3p^2$$

Extension

Simplify the following divisions by cancelling any common factors.

$$\text{a } \frac{5a}{10a}$$

$$\text{b } \frac{7x}{14y}$$

$$\text{c } \frac{10xy}{12y}$$

$$\text{d } \frac{ab}{4b}$$

$$\text{e } \frac{7xyz}{21yz}$$

$$\text{f } \frac{2}{12x}$$

$$\text{g } \frac{4xy}{7x}$$

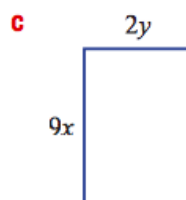
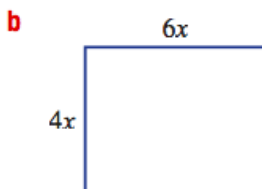
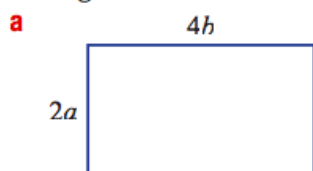
$$\text{h } \frac{3abc}{6b}$$

Cancel numbers and pronumerals where possible



Problem-solving and Reasoning

Write a simplified expression for the area of the following shapes. Recall that rectangle area = width \times length.



Simplify the following completely.

$$\text{a } 2a \times 3b + 5ab$$

$$\text{b } 6q \times 2r + 4q \times 3r$$

$$\text{c } 10x \times 2y - 3y \times 6x$$

You can combine any like terms.



Fill in the missing terms to make the following equivalences true.

$$\text{a } 3x \times \square \times z = 6xyz$$

$$\text{b } 4a \times \square = 12ab$$

$$\text{c } \frac{\square}{4r} = 7s$$

$$\text{d } \frac{\square}{2ab} = 4b$$

Joanne claims that the following three expressions are equivalent: $\frac{2a}{5}$, $\frac{2}{5} \times a$, $\frac{2}{5a}$.

a Is she right? Try different values of a .

b Which two expressions are equivalent?

c There are two values of a that make all three expressions are equal. State one of them.

Check if you can work on it

- a** Simplify $2a \times 3b + 5b \times 2a$ to a single term.
- b** State another way to fill in the blanks to make the simplification correct:
 $\square a \times \square b + \square b \times \square a = 16ab$
- c** Give an example of an even longer expression that is equivalent to $16ab$.

Check your answers

1 a $\frac{{}^2 10y}{{}^3 15} = \frac{2y}{3}$ c $\frac{{}^2 8^1 m}{{}^3 12^1 m} = \frac{2}{3}$ e $\frac{{}^3 6^1 x}{{}^4 8^1 xy} = \frac{3}{4y}$

2 a $\frac{x}{2}$ b $\frac{m}{4}$ c $\frac{p}{5}$ d $4d$ e $5c$
 f $2a$ g $\frac{1}{2}$ h 2 i $\frac{4}{5}$ j 2
 k $\frac{1}{3}$ l $\frac{1}{5}$ m $\frac{9p}{10d}$ n $\frac{2y}{5}$ o $\frac{2a}{3c}$
 p $\frac{4}{5q}$ q $\frac{1}{5x}$ r $\frac{7d}{m}$ s $\frac{5pr}{4}$ t $\frac{2n}{5p}$

3 a $\frac{{}^3 15^1 ab}{{}^{-4} 20^1 ac} = -\frac{3b}{4c}$ b $\frac{{}^{-1} x}{{}^1 xy} = -\frac{1}{y}$

4 a -5 b $\frac{2f}{3}$ c $-\frac{2k}{3}$ d $-\frac{4f}{h}$
 e $-4l$ f $-\frac{10y}{11x}$ g $\frac{3}{a}$ h $-\frac{a^2}{b}$
 i $-\frac{m}{n}$ j $-\frac{xz^2}{y}$ k $\frac{4p}{q}$ l $\frac{2a}{3}$
 m $\frac{1}{4}$ n $-\frac{2}{mn}$ o -3 p $-\frac{7q}{p}$

Extension answers

a $\frac{1}{2}$	b $\frac{x}{2y}$	c $\frac{5x}{6}$	d $\frac{a}{4}$
e $\frac{x}{3}$	f $\frac{1}{6x}$	g $\frac{4y}{7}$	h $\frac{ax}{2}$
a $8ab$	b $24x^2$	c $18xy$	
a $11ab$	b $24qr$	c $2xy$	
a $2y$	b $3b$	c $28rs$	d $8ab^2$
a no	b $\frac{2a}{5}$ and $\frac{2}{5} \times a$	c $a = 1$ or $a = -1$	
a $16ab$	b 2, 5, 6, 1 others possible		
c $2a \times 3b + 3a \times 2b + 4a \times b$. Others possible.			