



KING EDWARD VI  
HANDSWORTH GRAMMAR  
SCHOOL FOR BOYS



KING EDWARD VI  
ACADEMY TRUST  
BIRMINGHAM

# Year 8

## 2024 Mathematics 2025

### Unit 6 Booklet

HGS Maths



Tasks



Dr Frost Course



Name: \_\_\_\_\_

Class: \_\_\_\_\_

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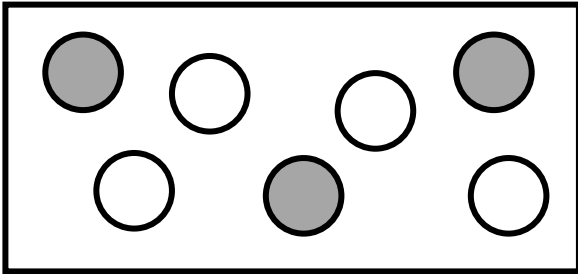
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# 1 Ratio

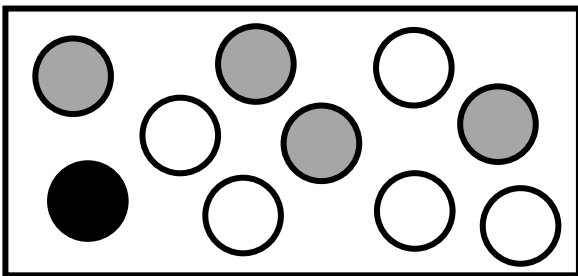
# 1.1 Writing Ratios

## Worked Example

- a) Write down the ratio of shaded circles to unshaded circles in the diagram below.

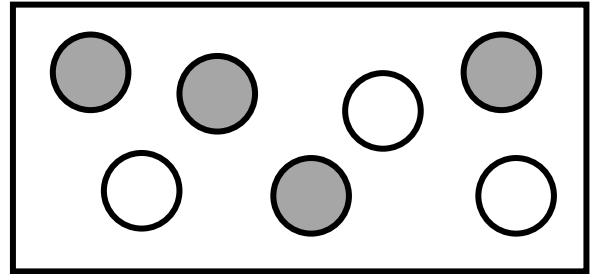


- b) Write down the ratio of White : Grey : Black in the diagram below.

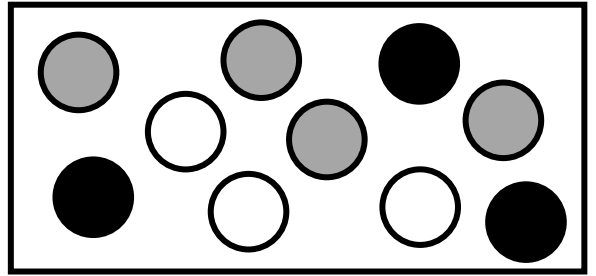


## Your Turn

- a) Write down the ratio of shaded circles to unshaded circles in the diagram below.



- b) Write down the ratio of White : Grey : Black in the diagram below.



## 1.2 Equivalent Ratios

## Worked Example

All the ratios below are equivalent.

Complete the gaps below:

$$1 : 3$$

$$\underline{\quad} : 6$$

$$\underline{\quad} : 12$$

$$24 : \underline{\quad}$$

$$\underline{\quad} : 36$$

$$\underline{\quad} : 3.6$$

## Your Turn

All the ratios below are equivalent.

Complete the gaps below:

$$1 : 4$$

$$\underline{\quad} : 8$$

$$\underline{\quad} : 16$$

$$12 : \underline{\quad}$$

$$\underline{\quad} : 12$$

$$\underline{\quad} : 1.2$$

## Worked Example

All the ratios below are equivalent.

Complete the gaps below:

$$2 : 3$$

$$\_ : 9$$

$$\_ : 18$$

$$24 : \_$$

$$\_ : 54$$

$$\_ : 0.54$$

## Your Turn

All the ratios below are equivalent.

Complete the gaps below:

$$2 : 5$$

$$\_ : 15$$

$$\_ : 30$$

$$24 : \_$$

$$\_ : 0.6$$

$$\_ : 4.8$$



## 1.3 Simplifying Ratios

## Worked Example

Simplify:

- a)  $25 : 30$
- b)  $45 : 75$
- c)  $15 : 20 : 35$
- d)  $150 \text{ cm} : 1 \text{ m}$

## Your Turn

Simplify:

- a)  $42 : 35$
- b)  $24 : 60$
- c)  $16 : 32 : 72$
- d)  $450 \text{ g} : 1.3 \text{ kg}$

## Worked Example

Simplify:

- a) 15300 mm : 45 cm
- b) 140000 g : 300 kg
- c) 96000 cl : 360 litres

## Your Turn

Simplify:

- a) 60 cm : 13000 mm
- b) 100 kg : 80000 g
- c) 1530 litres : 108000 cl

## 1.4 Ratios to Fractions and Percentages

## Worked Example

- a) The ratio of  $p : q$  is  $3 : 4$   
 $p$  is  $\frac{?}{?}$  of the whole
- b) The ratio of  $p : q$  is  $3 : 4$   
 $p$  is  $\frac{?}{?}$  of  $q$

## Your Turn

- a) The ratio of  $p : q$  is  $5 : 4$   
 $p$  is  $\frac{?}{?}$  of the whole
- b) The ratio of  $p : q$  is  $5 : 4$   
 $p$  is  $\frac{?}{?}$  of  $q$

## Worked Example

The ratio of blue and red counters in a bag is 4 : 3

- a) What fraction of the counters are blue?
- b) What fraction of the counters are red?

## Your Turn

The ratio of blue and red counters in a bag is 5 : 7

- a) What fraction of the counters are blue?
- b) What fraction of the counters are red?

## Worked Example

The ratio of blue, red and yellow counters in a bag is 4 : 3 : 13

- a) What percentage of the counters are blue?
- b) What percentage of the counters are red?
- c) What percentage of the counters are yellow?

## Your Turn

The ratio of blue, red and yellow counters in a bag is 5 : 7 : 13

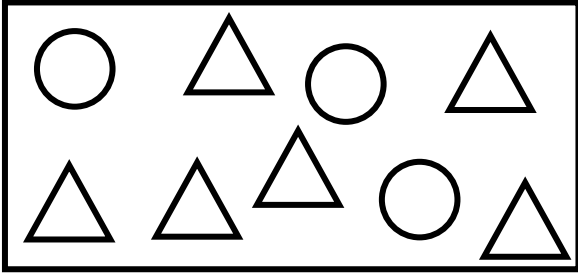
- a) What percentage of the counters are blue?
- b) What percentage of the counters are red?
- c) What percentage of the counters are yellow?

# 1.5 n:1 and 1:n Ratios



## Worked Example

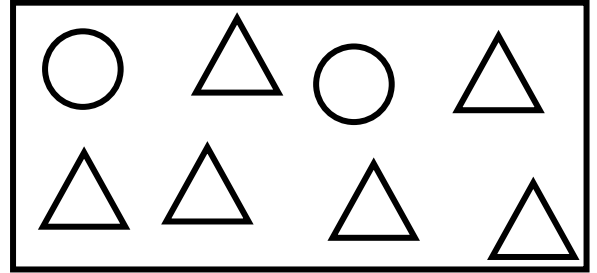
The diagram below shows a number of circles and triangles.



- Write the ratio of circles to triangles in the ratio  $1 : n$
- Write the ratio of circles to triangles in the ratio  $n : 1$

## Your Turn

The diagram below shows a number of circles and triangles.



- Write the ratio of circles to triangles in the ratio  $1 : n$
- Write the ratio of circles to triangles in the ratio  $n : 1$

## Worked Example

- a) Write the ratio  $2 : 5$  in the ratio  $1 : n$
- b) Write the ratio  $2 : 5$  in the ratio  $n : 1$
- c) Write the ratio  $12 : 18$  in the ratio  $n : 1$

## Your Turn

- a) Write the ratio  $4 : 5$  in the ratio  $1 : n$
- b) Write the ratio  $4 : 5$  in the ratio  $n : 1$
- c) Write the ratio  $16 : 24$  in the ratio  $n : 1$

## 1.6 Ratio in Different Forms

## Worked Example

$$a : b$$

$$7 : 1$$

$a$  as a fraction of the whole

$a$  as a fraction of  $b$

In the form  $1 : n$

In the form  $n : 1$

## Your Turn

$$a : b$$

$$8 : 1$$

$a$  as a fraction of the whole

$a$  as a fraction of  $b$

In the form  $1 : n$

In the form  $n : 1$

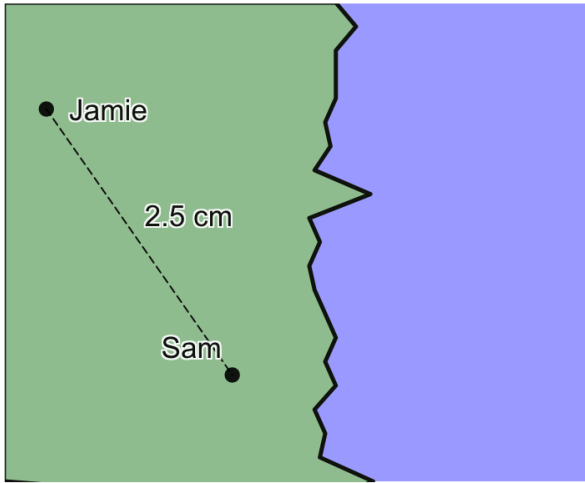
# Fill in the Gaps

Ratio $a : b$	a as a fraction of the whole	a as a fraction of b	In the form 1 : n	In the form n : 1
1 : 3				
	$1\frac{1}{3}$			
		$\frac{2}{5}$		
			1 : 5	
5 : 1				
	$5\frac{5}{7}$			
		$\frac{5}{7}$		
			1 : 0.7	
				$1\frac{4}{7} : 1$
				$\frac{7}{11} : 1$
$x : y$				

## 1.7 Scale Drawings

## Worked Example

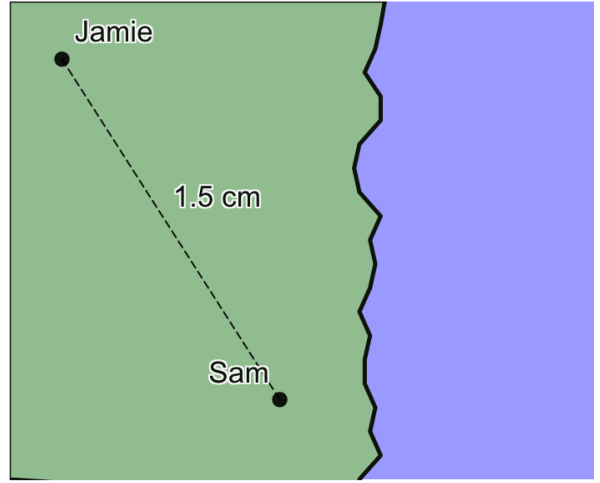
The scale of the map below is  
 $1 \text{ cm} : 5 \text{ km}$



Find the actual distance  
between Jamie and Sam.

## Your Turn

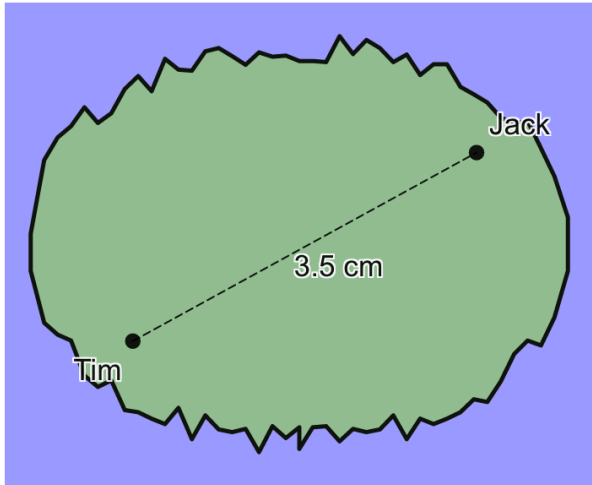
The scale of the map below is  
 $1 \text{ cm} : 6 \text{ km}$



Find the actual distance  
between Jamie and Sam.

## Worked Example

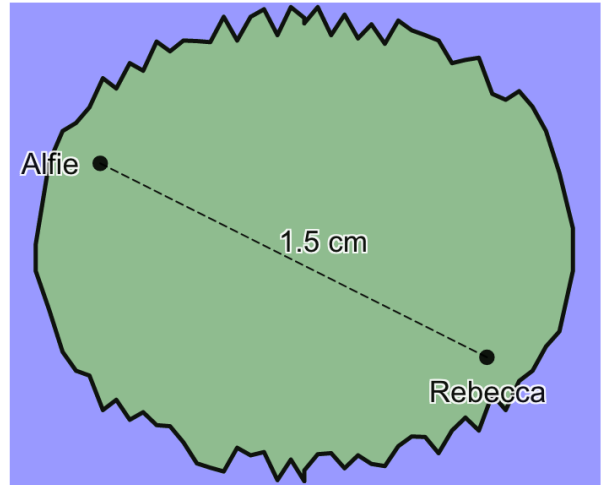
The scale of the map below is  
 $1 : 700000$



Find the actual distance  
between Tim and Jack. Give  
your answer in kilometres.

## Your Turn

The scale of the map below is  
 $1 : 300000$



Find the actual distance  
between Alfie and Rebecca. Give  
your answer in kilometres.



## 1.8 One Quantity Given

## Worked Example

Anju and Kieran share some money in the ratio 5 : 2. Anju receives £30. How much does Kieran receive?

## Your Turn

Anju and Kieran share some money in the ratio 5 : 3. Anju receives £30. How much does Kieran receive?

## 1.9 Difference Given

## Worked Example

Zach and Olivia share some money in the ratio 2 : 5. Olivia receives £30 more than Zach. How much do they each receive?

## Your Turn

Zach and Olivia share some money in the ratio 2 : 5. Olivia receives £15 more than Zach. How much do they each receive?

## 1.10 Total Given

## Worked Example

Arjun and Tiago share £30 in the ratio 2 : 3. Find how much money each of them will receive.

## Your Turn

Arjun and Tiago share £45 in the ratio 8 : 1. Find how much money each of them will receive.

## 1.11 Mixed Ratios

## Worked Example

Jenny and Ben share £12 in the ratio 2 : 1

Jenny's amount

Ben's amount

Jenny gets \_\_\_\_ more

Jenny gets  $\frac{?}{?}$  of the whole

## Your Turn

Jenny and Ben share £12 in the ratio 3 : 1

Jenny's amount

Ben's amount

Jenny gets \_\_\_\_ more

Jenny gets  $\frac{?}{?}$  of the whole



# Fill in the Gaps

Ratio Jenny : Ben	Amount to share	Jenny's amount	Ben's amount	Jenny gets ? more/less	Jenny's amount as a fraction of the whole
3 : 2	£30				
3 : 2		£24			
		£24		£8 less	
	£40		£32		
3 : 4				£5 less	
	£33	£9			
— : 8	£33			The same	
8 : —			£8		$\frac{?}{?} = \frac{2}{3}$
				£12 less	$\frac{?}{?} = \frac{2}{7}$
— : 7	£28	£15.75			

# Fill in the Gaps

Amount	Ratio	Number of Parts	Amount per Part	First Share	Second Share
£50	4 : 1	5	£10	£40	£10
£100	3 : 2	5	£20		
£100	3 : 7	10			
£100	1 : 4				
£60	2 : 1				
£60	5 : 1				
£60	5 : 7				
£72	7 : 5				
£48	3 : 5				
	:		£5	£25	£15
	:	7		£100	£75
£20	:	10			£6
£90	:	9		£20	
£64	5 :		£8		
	: 1			£35	£7
	3 :	8		£7.50	

# Fill in the Gaps

e.g.	Simplest Form	Fractions			Decimals		Total = 24	Total = 1	Total = $\frac{2}{3}$	Difference = 30	Difference = $\frac{3}{4}$
		$1:n$	$n:1$	$1:n$	$n:1$						
	3 : 5	$1:\frac{5}{3}$	$\frac{3}{5}:1$	$1:1.\dot{6}$	$0.6:1$	9 : 15	$\frac{3}{8}:\frac{5}{8}$	$1:\frac{5}{4}$	45 : 75	$\frac{9}{8}:\frac{15}{8}$	
1.	2 : 3										
2.	5 : 4										
3.	9 : 10										
4.		$1:\frac{1}{3}$									
5.					1.2 : 1						
6.						20 : 4					
7.							$\frac{5}{13}:\frac{8}{13}$				
8.								$\frac{1}{3}:\frac{1}{3}$	<del>        </del>	<del>        </del>	
9.									60 : 30		
10.										$\frac{45}{4}:12$	

## 1.12 Combining Ratios

## Worked Example

There are red, yellow and blue counters in a bag. Find the ratio Red : Yellow : Blue if

- a) The ratio of Red : Yellow is 1 : 2 and the ratio of Yellow : Blue is 2 : 3
- b) The ratio of Red : Yellow is 1 : 5 and the ratio of Yellow : Blue is 10 : 7
- c) The ratio of Red : Yellow is 1 : 3 and the ratio of Yellow : Blue is 8 : 5

## Your Turn

There are red, yellow and blue counters in a bag. Find the ratio Red : Yellow : Blue if

- a) The ratio of Red : Yellow is 1 : 3 and the ratio of Yellow : Blue is 3 : 4
- b) The ratio of Red : Yellow is 2 : 5 and the ratio of Yellow : Blue is 10 : 3
- c) The ratio of Red : Yellow is 2 : 5 and the ratio of Yellow : Blue is 7 : 1

## Worked Example

A pencil case contains pens, pencils and crayons.

The ratio of pens to pencils is  $11n : 8$ .

The ratio of pencils to crayons is  $6 : 7n$ .

Work out the ratio of pens to crayons.

Give your answer in its simplest form.

## Your Turn

A biscuit tin contains shortbread, cookies and bourbons.

The ratio of shortbread to cookies is  $11n : 12$ .

The ratio of cookies to bourbons is  $8 : 3n$ .

Work out the ratio of shortbread to bourbons.

Give your answer in its simplest form.

## Worked Example

In a school,  
The ratio of Year 7 to Year 8 to  
Year 9 is  $6 : 7 : 3$   
The ratio of Year 9 to Year 10 to  
Year 11 is  $2 : 8 : 7$   
Find the ratio Year 7 : Year 11  
Give your ratio in its simplest  
form.

## Your Turn

In a school,  
The ratio of Year 7 to Year 8 to  
Year 9 is  $2 : 5 : 6$   
The ratio of Year 9 to Year 10 to  
Year 11 is  $5 : 2 : 5$   
Find the ratio Year 8 : Year 10  
Give your ratio in its simplest  
form.

## Worked Example

A pencil case contains only red, green and blue pencils.  
The ratio of red pencils to green pencils is  $20 : 3$ .  
The ratio of green pencils to blue pencils is  $1 : 9$ .  
Calculate the percentage of pencils that are green.

## Your Turn

A box contains only blue, purple and pink pens.  
The ratio of blue pens to purple pens is  $4 : 9$ .  
The ratio of purple pens to pink pens is  $3 : 4$ .  
Calculate the percentage of pens that are blue.



## Worked Example

In a pencil case,  
number of blue pencils : purple  
pencils = 3 : 4  
number of purple pencils : green  
pencils = 5 : 3  
There are 90 blue pencils in the  
pencil case.  
Work out the number of green  
pencils in the pencil case.

## Your Turn

In a bag,  
number of red marbles : green  
marbles = 1 : 6  
number of green marbles : blue  
marbles = 5 : 3  
There are 36 blue marbles in  
the bag.  
Work out the number of red  
marbles in the bag.

## Worked Example

A pencil case contains pens, pencils and crayons.

The ratio of pens to pencils is  $2 : 1$ .

The ratio of pencils to crayons is  $3 : 4$ .

There are less than 70 items in the pencil case.

Find the greatest possible number of pens in the pencil case.

## Your Turn

A bag contains jellies, mints and toffees.

The ratio of jellies to mints is  $6 : 5$ .

The ratio of mints to toffees is  $2 : 3$ .

There are less than 112 sweets in the bag.

Find the greatest possible number of mints in the bag.

## Worked Example

The points  $A, B, C$  and  $D$  lie in order on a straight line.

$$AB : BD = 5 : 9$$

$$AC : CD = 6 : 1$$

Work out  $AB : BC : CD$

## Your Turn

The points  $A, B, C$  and  $D$  lie in order on a straight line.

$$AB : BD = 10 : 11$$

$$AC : CD = 5 : 2$$

Work out  $AB : BC : CD$

## 2 Algebra Recap

## 2.1 Collecting Like Terms

# Conventions and Definitions

The conventions include:

- We tend to use single lowercase letters for variables, either using the English alphabet or using the Greek alphabet.
- An algebraic  $x$  is written using two back-to-back  $c$ 's. Do NOT write it as a  $\times$  symbol.
- Do NOT include the multiplication sign, for example  $3 \times p = 3p$
- Write division as fractions, for example  $3 \div p = \frac{3}{p}$
- Write numbers first in products, for example  $p \times 3 = 3p$
- Write letters in products in alphabetical order, for example  $4 \times q \times r \times p = 4pqr$
- $1x$  is written simply as  $x$

The definitions include:

- **Variable** is a letter used to represent an unknown number.
- **Coefficient** is the number in front of a variable.
- **Constant** is a number that cannot change its value.
- **Term** is either a constant, a variable or a constant multiplied by a variable.
- **Expression** is terms and operators (+ and -) grouped together.

## Like Terms

$3p$	$p$	Like	Unlike
$x^2$	$3x^2$	Like	Unlike
$x^2$	$2x$	Like	Unlike
$-3\sqrt{x}$	$27\sqrt{x}$	Like	Unlike
$7a$	$7b$	Like	Unlike

$3a$	$3a$	Like	Unlike
$a$	$2a$	Like	Unlike
$2a$	$2A$	Like	Unlike
$-3a$	$2a$	Like	Unlike
$4a$	$4b$	Like	Unlike
$3a$	$3a^2$	Like	Unlike
$2a^2$	$7a^2$	Like	Unlike
$-3a^2$	$7a^2$	Like	Unlike
$2a^2$	$2a^{-2}$	Like	Unlike
$2^a$	$a^2$	Like	Unlike
$x$	$\sqrt{x}$	Like	Unlike
$1$	$2$	Like	Unlike

# Like Terms

	<u>Term 1</u>	<u>Term 2</u>	<u>Like Terms/Not Like Terms?</u>
a)	$6t$	$5t$	
b)	$3a$	$3b$	
c)	$3a$	$-3a$	
d)	$3ab$	$5ab$	
e)	$3a^2$	$5b^2$	
f)	$10a^2$	$4a^2$	
g)	$10a^2$	$4a$	
h)	$3a$	$5$	
i)	$m$	$5m$	
j)	$-6a^3$	$5a^3$	
k)	$10ab$	$10ba$	
l)	$8$	$6$	
m)	$\frac{1}{2}b$	$\frac{1}{5}b$	
n)	$-3a$	$-5ab$	
o)	$4512g$	$4512gh$	
p)	$a^2$	$a^3$	
q)	$2a$	$a^2$	



## 2.2 Multiplying Terms

## 2.3 Dividing Terms

## 2.4 Substitution

# 3 Index Laws

## 3.1 Notation

The diagram shows the mathematical expression  $2^4$ . A red arrow labeled "Base" points to the number 2. A green arrow labeled "Index/Exponent/Power" points to the number 4.

We say, 'two to the power of four'.

The diagram shows the mathematical expression  $2x^4$ . A blue arrow labeled "Coefficient" points to the number 2. A green arrow labeled "Index/Exponent/Power" points to the number 4. A red arrow labeled "Base" points to the letter x.

We say, 'two x to the power of four'.

## Fill in the Gaps

We say	We write	We work out	Answer
2 to the power of 4	$2^4$	$2 \times 2 \times 2 \times 2$	
3 to the power of 4		$3 \times 3 \times 3 \times 3$	
	$4^4$		256
5 to the power of 2			
	$6^5$		7776
		$8 \times 8 \times 8 \times 8$	
		$9 \times 9 \times 9$	
	$3^9$		
10 to the power of 2			
2 to the power of 10			

## 3.2 Multiplying

Complete the following:

$$3^4 \times 3 =$$

$$3^4 \times 3^2 =$$

$$3^4 \times 3^3 =$$

$$3^4 \times 3^n =$$

$$3^m \times 3^n =$$

## Worked Example

Simplify

a)  $9^5 \times 9^2$

b)  $9^5 \times 9^{-2}$

c)  $9^a \times 9^{-b}$

## Your Turn

Simplify

a)  $8^6 \times 8^3$

b)  $8^6 \times 8^{-3}$

c)  $8^{-c} \times 8^{-d}$



# Multiplying

Complete the following:

$$x^3 \times x^2 =$$

$$x^3 \times x^3 =$$

$$x^3 \times x^4 =$$

$$x^3 \times x^n =$$

$$x^m \times x^n =$$

## Worked Example

Simplify

a)  $x^7 \times x^8$

b)  $3x^4 \times 2x^5$

c)  $6x^7y^4 \times 9x^8y^5$

## Your Turn

Simplify

a)  $x^9 \times x^2$

b)  $4x^3 \times 5x^7$

c)  $8x^9y^3 \times 6x^2y^7$

## 3.3 Dividing

Complete the following:

$$3^4 \div 3 =$$

$$3^4 \div 3^2 =$$

$$3^4 \div 3^3 =$$

$$3^4 \div 3^n =$$

$$3^m \div 3^n =$$

## Worked Example

Simplify

a)  $9^5 \div 9^2$

b)  $9^5 \div 9^{-2}$

## Your Turn

Simplify

a)  $8^{12} \div 8^3$

b)  $8^{12} \div 8^{-3}$

# Dividing

Complete the following:

$$x^5 \div x =$$

$$x^5 \div x^2 =$$

$$x^5 \div x^3 =$$

$$x^5 \div x^n =$$

$$x^m \div x^n =$$

## Worked Example

Simplify

a)  $y^{12} \div y^4$

b)  $12y^{11} \div 6y^7$

c)  $\frac{5y^{11}}{12y^7}$

d)  $21y^{12}z^4 \div 3y^{11}z^7$

## Your Turn

Simplify

a)  $p^{14} \div p^9$

b)  $56y^4 \div 8y^2$

c)  $\frac{8y^4}{56y^2}$

d)  $20y^{14}z^2 \div 4y^4z^9$

## 3.4 The Power Zero

Complete the following:

$$3^4 =$$

$$3^3 =$$

$$3^2 =$$

$$3^1 =$$

$$3^0 =$$

## Worked Example

Simplify

a)  $7^0$

b)  $-(7)^0$

c)  $\left(\frac{1}{7}\right)^0$

d)  $(7x)^0$

e)  $0^7$

## Your Turn

Simplify

a)  $(9xy)^0$

b)  $0^9$

c)  $(-9)^0$

d)  $9^0$

e)  $\left(\frac{1}{9}\right)^0$



## 3.5 Powers of Powers

Complete the following:

$$(3^2)^1 =$$

$$(3^2)^2 =$$

$$(3^2)^3 =$$

$$(3^2)^4 =$$

$$(3^2)^5 =$$

$$(3^2)^n =$$

$$(3^m)^n =$$

## Worked Example

- a) Simplify  $(2^4)^3$
- b) Write  $(8^7)^9$  in the form  $8^k$  where  $k$  is an integer to be found

## Your Turn

- a) Simplify  $(3^4)^9$
- b) Write  $(8^9)^6$  in the form  $8^k$  where  $k$  is an integer to be found

# Powers of Powers

Complete the following:

$$(y^3)^1 =$$

$$(y^3)^2 =$$

$$(y^3)^3 =$$

$$(y^3)^4 =$$

$$(y^3)^5 =$$

$$(y^3)^n =$$

$$(y^m)^n =$$

## Worked Example

Simplify

a)  $(c^4)^2$

b)  $-(c^4)^2$

c)  $(-c^4)^2$

## Your Turn

Simplify

a)  $(c^4)^3$

b)  $-(c^4)^3$

c)  $(-c^4)^3$

## Worked Example

Simplify

a)  $(3c^4)^2$

b)  $(-3c^4)^2$

c)  $(3c^4d^5)^4$

d)  $(3c^{\frac{4}{3}}d^{\frac{5}{6}})^3$

## Your Turn

Simplify

a)  $(5c^{-4})^2$

b)  $(-5c^{-4})^2$

c)  $(5c^{-4}d^6)^3$

d)  $(5c^{-\frac{4}{3}}d^{\frac{6}{7}})^3$

## 3.6 Mixed Indices

## Worked Example

Simplify

a)  $y^{11} \times y^5$

b)  $6y^3 \times 2y^5$

c)  $y^5 \div y^2$

d)  $8y^3 \div 2y$

e)  $(y^3)^7$

f)  $(3y^4)^2$

g)  $(4a^6b^3)^2$

h)  $\frac{8a^5b^3}{4ab^7}$

## Your Turn

Simplify:

a)  $x^5 \times x^{-2}$

b)  $7x^5 \times 8x^{-3}$

c)  $y^5 \div y^4$

d)  $15y^3 \div 3y$

e)  $(y^7)^8$

f)  $(5y^4)^3$

g)  $(2a^6b^3)^4$

h)  $\frac{12a^2b^3}{4ab^7}$

## Worked Example

Simplify

a)  $\frac{9^8}{9^3 \times 9^4}$

b)  $\frac{9^8}{(9^3)^4}$

## Your Turn

Simplify:

a)  $\frac{8^{10}}{8^2 \times 8^6}$

b)  $\frac{8^{10}}{(8^2)^6}$



## Worked Example

Simplify

a)  $\frac{r^{10}}{r^6 \times r^2}$

b)  $\frac{q^{\frac{3}{4}}}{q^{\frac{1}{4}} \times q^{\frac{5}{6}}}$

c)  $\frac{q^{\frac{3}{5}}}{\left(q^{\frac{5}{4}}\right)^{\frac{2}{5}}}$

## Your Turn

Simplify:

a)  $\frac{x^{10}}{x^4 \times x^3}$

b)  $\frac{r^{\frac{5}{2}}}{r^{\frac{1}{2}} \times r^{\frac{2}{3}}}$

c)  $\frac{r^{\frac{3}{2}}}{\left(r^{\frac{1}{3}}\right)^{\frac{6}{5}}}$

## Worked Example

Simplify

a)  $\frac{(r^2)^a}{r^5} = r^{13}$

b)  $\frac{p^5}{p^a \times p^6} = p^{-3}$

## Your Turn

Simplify:

a)  $\frac{(y^a)^5}{y^4} = y^{11}$

b)  $\frac{p^5}{p^m \times p^3} = p^{-4}$

## Worked Example

Simplify

a) 
$$\frac{30x^{10}y^8}{5x^6y^5 \times 3x^{\frac{1}{3}}y^{\frac{3}{4}}}$$

b) 
$$\frac{25m^{\frac{3}{2}}n^{14}}{\left(5m^{\frac{1}{3}}n^8\right)^3}$$

## Your Turn

Simplify:

a) 
$$\frac{21p^8q^4}{7p^6q^3 \times p^{\frac{2}{5}}q^{\frac{3}{4}}}$$

b) 
$$\frac{\left(2p^3q^{\frac{2}{5}}\right)^3}{8p^{\frac{3}{2}}q^3}$$

## 3.7 Negative Indices

Complete the following:

$$2^2 =$$

$$2^1 =$$

$$2^0 =$$

$$2^{-1} =$$

$$2^{-2} =$$

$$2^{-3} =$$

## Worked Example

Evaluate:

a)  $3^{-2}$

b)  $-3^{-2}$

c)  $(-3)^{-2}$

## Your Turn

Evaluate:

a)  $5^{-3}$

b)  $-5^{-3}$

c)  $(-5)^{-3}$

## Worked Example

Write  $\frac{1}{4^2}$  in index form

## Your Turn

Write  $\frac{1}{5^3}$  in index form

## Worked Example

Simplify:

a)  $\left(\frac{3}{10}\right)^{-2}$

b)  $\left(-\frac{3}{10}\right)^{-2}$

## Your Turn

Simplify:

a)  $\left(\frac{2}{5}\right)^{-3}$

b)  $\left(-\frac{2}{5}\right)^{-3}$