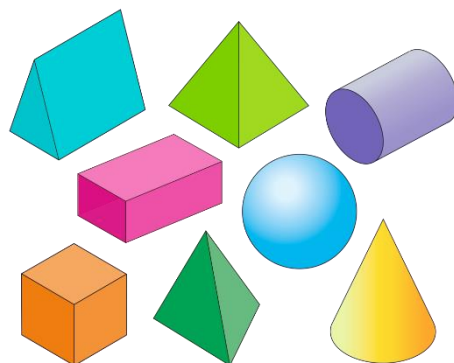
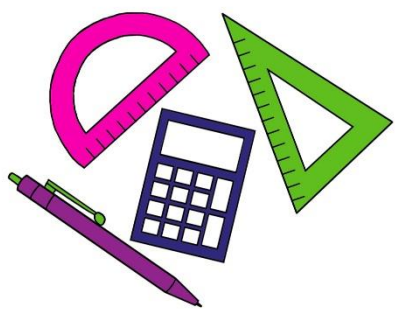


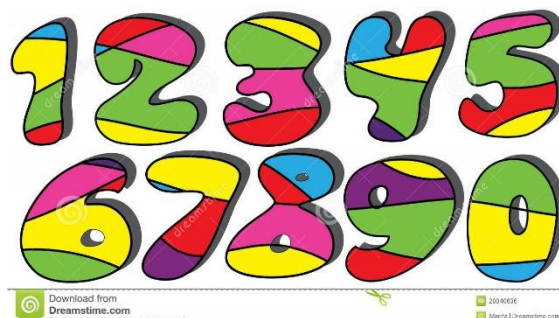


Level 1

Functional Skills

Content Area 1

Workbook



Name: _____

Contents

Read, write, order and compare large numbers (up to one million)

Positive and negative numbers

$\times$ powers of 10 with decimals

$\div$ powers of 10 with decimals

Square numbers

Cube numbers

Fractions

Fractions of whole numbers

Percentages

Percentages of amounts

Percentage increase or decrease (percentage Change)

Rounding

Adding Decimals

Subtracting Decimals

Fractions, Decimals and Percentages

Converting fractions to decimals to percentages

Ratio

Bidmas

Read, write, order and compare large numbers (up to one million)

Read, write, order and compare large numbers (up to one million)

Groups of three

Always look at big numbers in groups of three

4,521,396

So many So many AND THE
MILLION THOUSAND REST

i.e 4 Million, 521 thousand, 396 or written in words

Four million, five hundred & twenty one thousand, three hundred and ninety six

Read, write, order and compare large numbers (up to one million)

Always start from the extreme **Right hand side** of the number

Moving left, put a coma in **every 3** digits to break up into **groups of 3**

4,521,396

So many So many AND THE
MILLION THOUSAND REST

i.e 4 Million, 521 thousand, 396 or written in words

Four million, five hundred & twenty one thousand, three hundred and ninety six

Complete the table

Fill in the place value chart for each number. The first one has been done for you.

	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Units
816 958		8	1	6	9	5	8
1 254 958							
91 806							
3 048 787							
958 656							
1 362 055							

Circle the larger number:

a 7 240 547 / 7 241 253

b 8 519 476 / 8 591 476

c 4 353 537 / 4 453 540

d 3 525 461 / 3 525 614

e 2 512 444 / 2 512 333

f 2 432 498 / 2 433 498

Sequences

Write the next 3 numbers in each sequence:

a + 10 000

33 591

b + 1 000 000

2 459 012

c - 1 000

708 518

d - 100

4 000 524

Order these lists of numbers from smallest to largest.

- | | | | | | |
|----|----------|---------|---------|---------|---------|
| A) | 5262514 | 1726327 | 2736171 | 728381 | |
| | <hr/> | <hr/> | <hr/> | <hr/> | |
| | smallest | | | largest | |
| B) | 526154 | 2737186 | 72985 | 1527371 | |
| | <hr/> | <hr/> | <hr/> | <hr/> | |
| | smallest | | | largest | |
| C) | 812746 | 1028472 | 673281 | 1625163 | |
| | <hr/> | <hr/> | <hr/> | <hr/> | |
| | smallest | | | largest | |
| D) | 2637189 | 6261638 | 472716 | 3720928 | |
| | <hr/> | <hr/> | <hr/> | <hr/> | |
| | smallest | | | largest | |
| E) | 829417 | 2039813 | 1643728 | 683921 | 98726 |
| | <hr/> | <hr/> | <hr/> | <hr/> | <hr/> |
| | smallest | | | | largest |
| F) | 4536201 | 2738165 | 402716 | 1673827 | 893762 |
| | <hr/> | <hr/> | <hr/> | <hr/> | <hr/> |
| | smallest | | | | largest |
| G) | 764271 | 89372 | 3038374 | 563728 | 1263517 |
| | <hr/> | <hr/> | <hr/> | <hr/> | <hr/> |
| | smallest | | | | largest |
| H) | 3782106 | 3172638 | 3827614 | 3037261 | 384737 |
| | <hr/> | <hr/> | <hr/> | <hr/> | <hr/> |
| | smallest | | | | largest |

NUMBERS IN WORDS

1. Forty-one thousand and twenty-seven tickets are sold for a football match.

The number of tickets sold is

- A** 4 127
- B** 41 027
- C** 410 027
- D** 4 100 027

2. Thirty-two thousand, four hundred and eight people attend a concert for charity.

In figures this is

- A** 32408
- B** 32480
- C** 324008
- D** 3200408

3. A television programme attracts 875200 viewers.

The number of viewers written in words is

- A** eight million, seven hundred and fifty-two thousand
- B** eighty-seven thousand, five hundred and twenty
- C** eighty-seven thousand, fifty-two hundred
- D** eight hundred and seventy-five thousand, two hundred

4. The takings in the UK for one weekend for a film were £6.81 million.

This amount of money may also be written as

- A** £681 000
- B** £6 810 000
- C** £68 100 000
- D** £681 000 000

5. The jackpot in a lottery is £300 205.

How many pounds is this, in words?

- A** Three hundred and twenty five
- B** Thirty thousand twenty hundred and five
- C** Three hundred thousand two hundred and five
- D** Three million two hundred and five

6. A soccer club raises twenty one thousand and eight pounds.

What is this amount in figures?

- A** £2 108
- B** £21 008
- C** £21 800
- D** £210 008

7. Twenty three thousand six hundred and four people go to another match.

What is this number in figures?

- A** 23 604
- B** 23 640
- C** 236 004
- D** 2 300 604

8. P. Peters got fourteen thousand four hundred and four votes.

This can be written as

- A** 1 404
- B** 14 404
- C** 14 444
- D** 140 404

9. A large company makes £2½ million profit.

Which of the following is a correct way of writing this amount?

- A** £2.5 000 000
- B** £250 000
- C** £2 000 000.5
- D** £2 500 000

10. There are one million six thousand nine hundred and seventy Turkish Lira to the pound.

Written in figures this is

- A** 169 700
- B** 1 000 697
- C** 1 006 970
- D** 1 697 000

11. A newspaper sells 2 020 400 copies in one day.

The figure is written as

- A** Two million two thousand and forty
- B** Two million twenty thousand and four hundred
- C** Two million two hundred and four thousand
- D** Two million two thousand four hundred

12. The builder works out an estimate of the total cost of the extension and fittings as thirty thousand six hundred and fifty pounds.

In figures this is

- A** £3 650
- B** £30 650
- C** £300 650
- D** £30 000 650

13. The cost of the equipment supplied is \$110 000

In words this is

- A** eleven thousand dollars
- B** one hundred and ten thousand dollars
- C** one hundred and eleven thousand dollars
- D** one million ten thousand dollars

Adding and Subtracting Negative Numbers

- We apply certain rules to calculations involving negative numbers.

- These signs must be next to each other

Calculation		Becomes...
+	+	+
-	-	
+	-	-
-	+	

- Examples:

a) $6 + - 4 = 2$

b) $5 - - 7 = 12$

c) $-3 - 8 = -11$

ADDING NEGATIVE NUMBERS SHEET 1



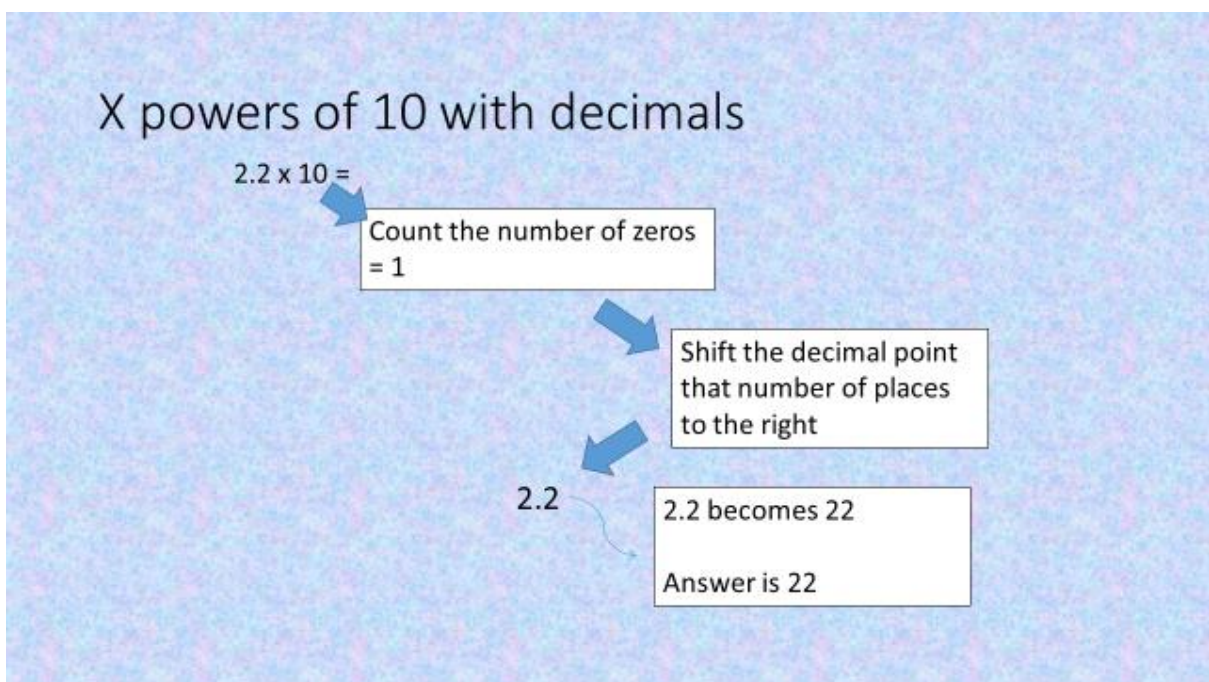
-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
-----	----	----	----	----	----	----	----	----	----	---	---	---	---	---	---	---	---	---	---

Use the number line above to help you work out these addition questions.

- | | |
|---------------------|---------------------|
| 1) $5 + (-3) =$ | 21) $5 + (-6) =$ |
| 2) $8 + (-2) =$ | 22) $(-4) + 7 =$ |
| 3) $3 + (-4) =$ | 23) $(-3) + (-3) =$ |
| 4) $6 + (-6) =$ | 24) $9 + (-7) =$ |
| 5) $1 + (-5) =$ | 25) $(-6) + (-4) =$ |
| 6) $(-2) + 5 =$ | 26) $(-2) + 5 =$ |
| 7) $(-7) + 4 =$ | 27) $1 + (-6) =$ |
| 8) $(-1) + 8 =$ | 28) $(-4) + (-4) =$ |
| 9) $(-6) + 3 =$ | 29) $8 + (-6) =$ |
| 10) $(-9) + 5 =$ | 30) $(-3) + (-4) =$ |
| 11) $(-1) + (-2) =$ | 31) $(-6) + 3 =$ |
| 12) $(-2) + (-3) =$ | 32) $(-10) + 5 =$ |
| 13) $(-5) + (-4) =$ | 33) $4 + (-9) =$ |
| 14) $(-1) + (-4) =$ | 34) $0 + (-7) =$ |
| 15) $(-4) + (-3) =$ | 35) $(-8) + 9 =$ |
| 16) $(-2) + 6 =$ | 36) $(-1) + (-6) =$ |
| 17) $7 + (-4) =$ | 37) $8 + (-9) =$ |
| 18) $3 + (-5) =$ | 38) $(-6) + 10 =$ |
| 19) $(-2) + 6 =$ | 39) $(-8) + 5 =$ |
| 20) $(-4) + 4 =$ | 40) $(-7) + (-3) =$ |

Multiplying by power of 10

X	8	9	10	3	4	11	20	7
10								
100								
1000								



$$2.5 \times 10 =$$

$$3.6 \times 10 =$$

$$23.3 \times 10 =$$

$$12.6 \times 10 =$$

$$32.3 \times 100 =$$

$$131.1 \times 100 =$$

$$32.51 \times 100 =$$

$$0.5 \times 10 =$$

$$3.1 \times 10 =$$

$$3.25 \times 10 =$$

$$22.3 \times 100 =$$

$$36.24 \times 100 =$$

$$233.6 \times 100 =$$

$$151.62 \times 100 =$$

÷ powers of 10 with decimals

$$22 \div 10 =$$

Count the number of zeros
= 1

Shift the decimal point
that number of places
to the left

22

22 becomes 2.2

Answer is 2.2

$$25 \div 10 =$$

$$36 \div 10 =$$

$$233 \div 10 =$$

$$126 \div 10 =$$

$$32.3 \div 100 =$$

$$131.1 \div 100 =$$

$$32.51 \div 100 =$$

$$5 \div 10 =$$

$$131 \div 10 =$$

$$325 \div 10 =$$

$$22.3 \div 100 =$$

$$36.24 \div 100 =$$

$$233.6 \div 100 =$$

Square number patterns

Square numbers get their name from the pattern they make.



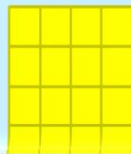
$$\text{Area} = 1 \times 1 = 1^2 = 1$$



$$\text{Area} = 2 \times 2 = 2^2 = 4$$



$$\text{Area} = 3 \times 3 = 3^2 = 9$$



$$\text{Area} = 4 \times 4 = 4^2 = 16$$

Complete the pattern above up to 10

Cube number patterns

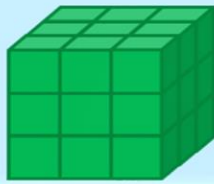
Cube numbers get their name from the pattern they make.



$$\text{Volume} = 1 \times 1 \times 1 = 1^3 = 1$$



$$\text{Volume} = 2 \times 2 \times 2 = 2^3 = 8$$



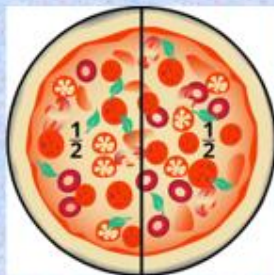
$$\text{Volume} = 3 \times 3 \times 3 = 3^3 = 27$$

Complete the pattern above up to 10

Fractions

- When something is split into 2 **equal** pieces, we call each piece a **half**

$$\frac{1}{2}$$



So, which is bigger a half or a quarter.

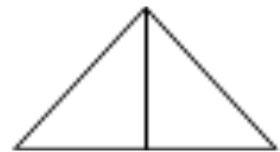
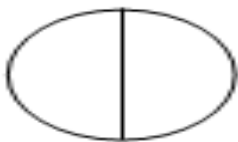
The higher the number on the bottom the more pieces there are, so they will be smaller

- When something is split into 4 **equal** pieces, we call each piece a **quarter**.

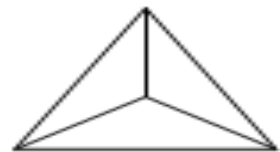
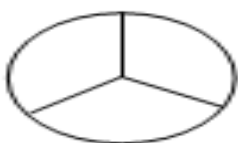
$$\frac{1}{4}$$



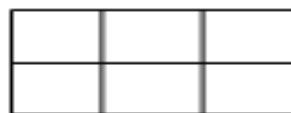
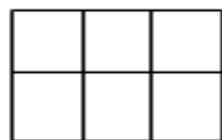
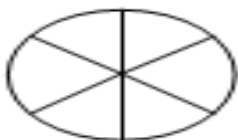
Can you colour in $\frac{1}{2}$ of these shapes?



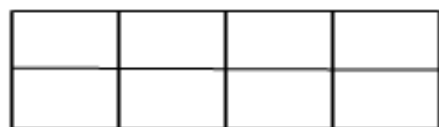
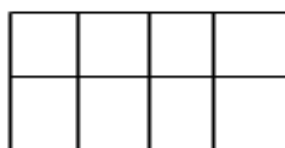
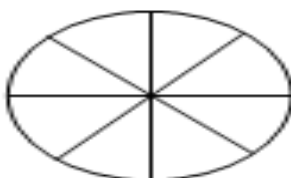
Can you colour in $\frac{1}{3}$ of these shapes?



Can you colour in $\frac{1}{6}$ of these shapes?



Can you colour in $\frac{1}{8}$ of these shapes?



Fractions

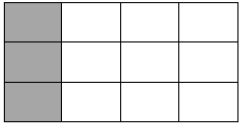
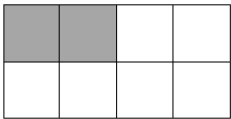
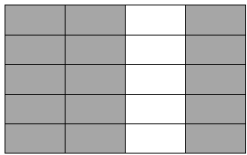
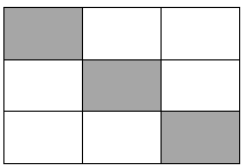
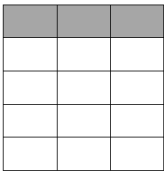
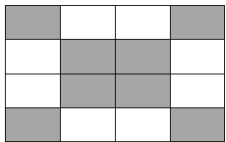
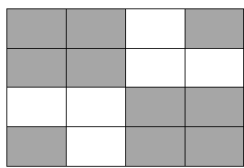
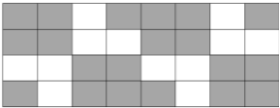
2

Shaded fractions



Complete this table:

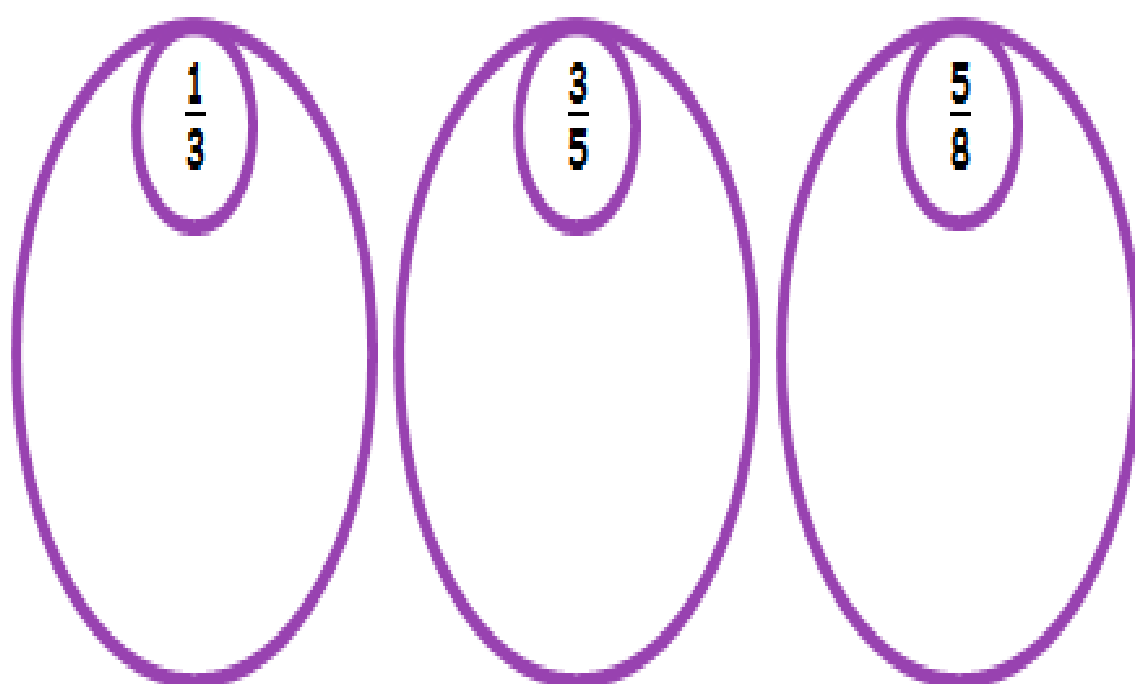
[illegible]

Shape	Shaded Fraction	Working	Simplest Fraction
	$\frac{3}{12}$	Divide 3 and 12 by 3 $\frac{3}{3} \div 3 = \underline{\quad}$ $12 \div 3 = \underline{\quad}$	$\underline{\quad}$
	$\frac{2}{8}$	Divide 2 and 8 by 2 $\frac{2}{2} \div \underline{\quad} = \underline{\quad}$ $8 \div \underline{\quad} = \underline{\quad}$	$\underline{\quad}$
	$\frac{15}{20}$	Divide 15 and 20 by ?	$\underline{\quad}$
	$\underline{\quad}$		$\underline{\quad}$
	$\underline{\quad}$		$\underline{\quad}$
	$\underline{\quad}$		$\underline{\quad}$
	$\underline{\quad}$		$\underline{\quad}$
	$\underline{\quad}$		$\underline{\quad}$

Simplify the fractions and then when you have found their lowest form put them into one of the equivalent circles. The first one has been done for you.

$$\frac{9}{15} \quad \frac{4}{12} \quad \frac{3}{9} \quad \frac{15}{25} \quad \frac{10}{30} \quad \frac{20}{32} \quad \frac{10}{16} \quad \frac{18}{30}$$

$$\frac{6}{10} \quad \frac{2}{6} \quad \frac{15}{24} \quad \frac{12}{20} \quad \frac{5}{15} \quad \frac{25}{40} \quad \frac{6}{18} \quad \frac{50}{80}$$



Finding Fractions of Numbers:

Remember our definition of a fraction: the bottom tells us how many pieces to split (divide) the shape (or number) into and the top tells us how many pieces we are using. So it follows, that we will **divide by the bottom number** and then **multiply by the top number**:

To find: $\frac{1}{2}$ of a number $\div$ by **2**

$\frac{1}{3}$ of a number $\div$ by **3**

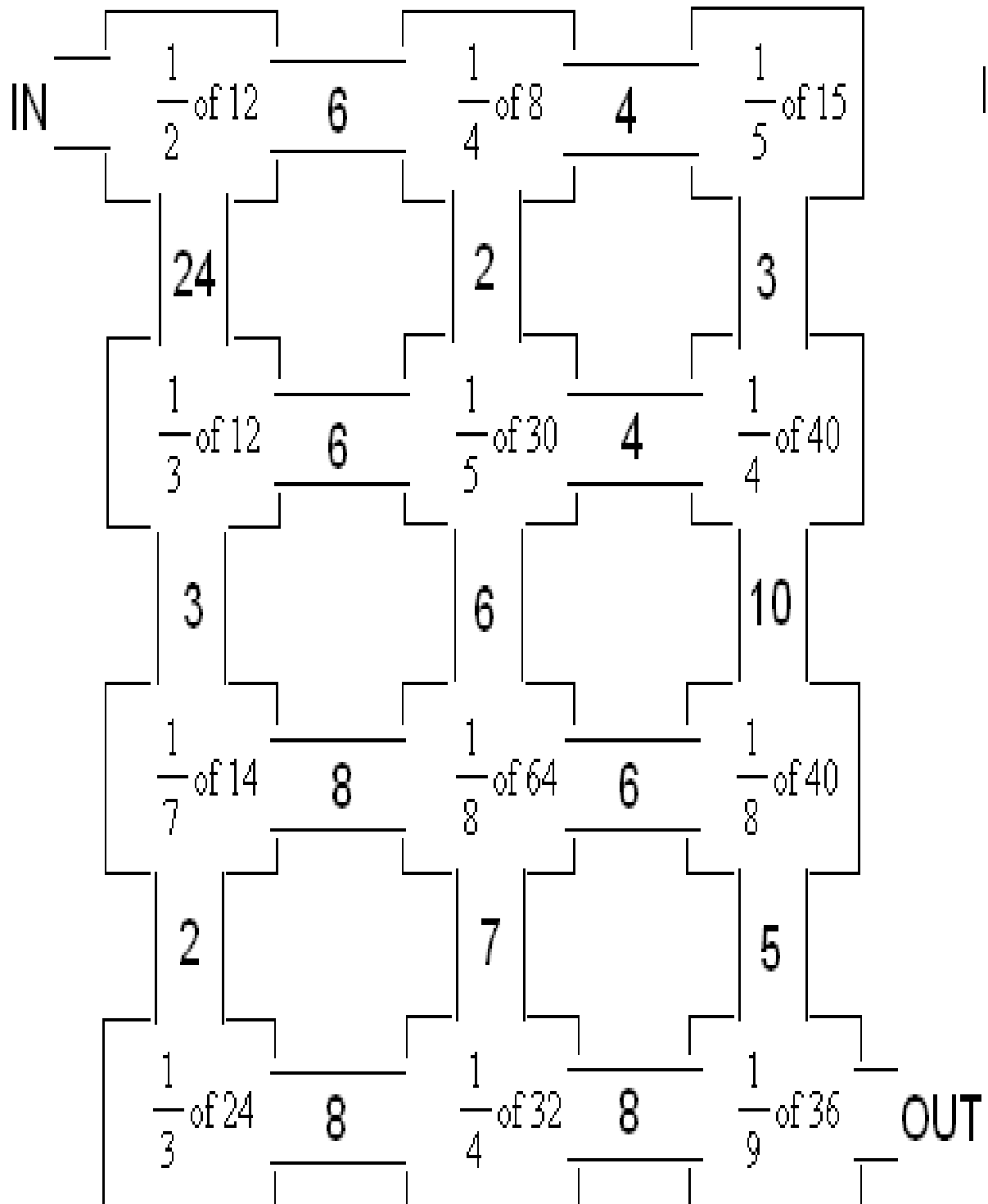
$\frac{1}{4}$ of a number $\div$ by **4**

Always divide by the bottom number:

$\frac{1}{3}$ of 12 = $12 \div 3 = 4$. (to find a third divide by 3 $\rightarrow$ the bottom number.)

$\frac{1}{5}$ of 35 = $35 \div 5 = 7$. (to find a fifth divide by 5 $\rightarrow$ the bottom number.)

Find your way around the maze by highlighting the correct answers....



When you need to find more than 1 part of a whole.

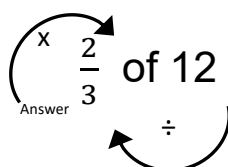
What is $\frac{2}{3}$ of 12?

Always divide by the bottom number:

$\frac{1}{3}$ of 12 = $12 \div 3 = 4$. (to find a third divide by 3 $\rightarrow$ the bottom number.)

$\frac{1}{5}$ of 35 = $35 \div 5 = 7$. (to find a fifth divide by 5 $\rightarrow$ the bottom number.)

Then multiply by the top number:



$\frac{2}{3}$ of 12 $12 \div 3 = 4$ $4 \times 2 = 8$
(to find 1 third $\div 3$) (x2 to find 2 thirds)
bottom number *top number*

$\frac{4}{7}$ of 42 $42 \div 7 = 6$ $6 \times 4 = 24$
(to find 1 seventh $\div 7$) (x4 to find 4 sevenths)

Examples:

- Work out $\frac{2}{3}$ of 42

$42 \div 3 = 14$ *then* $14 \times 2 = \underline{\underline{28}}$

- Work out $\frac{5}{9}$ of 63

$63 \div 9 = 7$ *then* $7 \times 5 = \underline{\underline{35}}$

Try these examples:

Working with fractions and whole numbers.

1) Find $\frac{1}{5}$ of 20 =

11) Find $\frac{4}{5}$ of 200 =

2) Find $\frac{1}{8}$ of 64 =

12) Find $\frac{3}{4}$ of 108 =

3) Find $\frac{3}{4}$ of 132 =

13) Find $\frac{10}{12}$ of 1320 =

4) Find $\frac{6}{8}$ of 288 =

14) Find $\frac{5}{6}$ of 360 =

5) Find $\frac{4}{10}$ of 80 =

15) Find $\frac{1}{10}$ of 40 =

6) Find $\frac{1}{3}$ of 21 =

16) Find $\frac{4}{12}$ of 144 =

7) Find $\frac{3}{8}$ of 168 =

17) Find $\frac{1}{6}$ of 48 =

8) Find $\frac{1}{6}$ of 72 =

18) Find $\frac{3}{4}$ of 108 =

9) Find $\frac{11}{12}$ of 264 =

19) Find $\frac{2}{3}$ of 18 =

10) Find $\frac{7}{10}$ of 350 =

20) Find $\frac{3}{5}$ of 150 =

Fractions of whole numbers

Level 1 Fraction Questions

Please circle the correct answers.

1. Ted wants to lose 20 kilograms.

After 4 months he has lost $\frac{2}{5}$ of this amount.

How much weight has he lost?

A 0.8 kg

C 2.5 kg

B 4 kg

D 8 kg

2. Eight out of 40 hospital patients had head injuries.

What fraction of the patients is this?

A $\frac{1}{3}$

C $\frac{1}{5}$

B $\frac{1}{4}$

D $\frac{1}{8}$



3. Janine is paid for each complete quarter hour she works.

She works 7 hours 50 minutes on one day.

How long will she be paid for?

A $7\frac{1}{2}$ hours

C $7\frac{3}{4}$ hours

B 7 hours

D 8 hours

4. Winston has been keeping a record of his withdrawals from a cash machine.

Over the past 10 weeks he has made the following withdrawals:

£50 £40 £50 £120 £70 £80 £40 £90 £20 £40

What fraction of his withdrawals are more than £40?

A $\frac{3}{5}$

C $\frac{1}{2}$

B $\frac{6}{9}$

D $\frac{7}{10}$



5. A local charity sells 5 000 raffle tickets. There are ten prizes to be won.

What fraction of tickets will win a prize?

A $\frac{1}{4990}$

C $\frac{1}{500}$

B $\frac{1}{50}$

D $\frac{1}{5000}$



6. An oil tank is three quarters full.

What fraction of the tank is empty?

A $\frac{3}{4}$

C $\frac{1}{4}$

B $\frac{1}{75}$

D $\frac{1}{25}$

7. The table shows the number of people who attend different showings of a film. One hundred of those who attend the 2:30pm showing are senior citizens.



What fraction is this of the total attending that session?

2:30pm	4:30pm	7:00pm	9:30pm
150	175	225	250

A $\frac{1}{3}$

C $\frac{2}{3}$

B $\frac{2}{5}$

D $\frac{4}{5}$

8. 20% of the audience at the 9:30pm showing are senior citizens.

What fraction of the audience is this?

A $\frac{2}{25}$

C $\frac{1}{4}$

B $\frac{1}{20}$

D $\frac{1}{5}$

Fraction Problems

1. Andy's having a party he has £200 to spend on it. He spends $\frac{1}{4}$ on pasties $\frac{3}{8}$ on drinks and $\frac{2}{10}$ on party hats. How much money does he have left to spend on balloons?
2. Susie has £150 wages. She spends $\frac{1}{3}$ on her rent, $\frac{4}{20}$ on her bills, $\frac{3}{12}$ on lots of shoes. How much does she have left to spend on clothes shopping?
3. Mary gives her son Alfie gets £5 pocket money per week. If he spends $\frac{2}{5}$ of it on sweets and $\frac{3}{10}$ of it on toys and saves the rest, how much will he have saved after 4 weeks?
4. A firm earns £1000 profit every day. $\frac{3}{4}$ of their profit comes from selling computers, and $\frac{1}{5}$ of their profit comes from selling phones. How much money do they make from selling everything else?

5. I have £250. If I spend $\frac{2}{5}$ of that money on going to watch football, $\frac{1}{4}$ on eating McDonalds and $\frac{2}{10}$ on drinking tea how much do I have left for buying take away Chinese?

6. John has £50 in his wallet. If he spends $\frac{1}{4}$ of his money on milk and $\frac{3}{8}$ of his money on baby food and £10 on having his hair cut and blow dried, how much money does he have left to spend?

7. Louise collects the Olympic 50p pieces. There are 30 different ones to collect. During the first week of collecting she managed to find $\frac{2}{5}$ of the total amount. How many does she still have left to find?

8. Vicki weighs 120kg. She has been on a diet and has lost $\frac{1}{6}$ of her body weight during the first month and a further $\frac{1}{5}$ of her starting weight during the second month. What does she weigh now?

Percentages

- **Per cent** means **out of 100**
- **So 20%** means **20 out of 100**

Example

What is 35% of 200

$$35 \div 100 = 0.35 \quad \text{then} \quad 0.35 \times 200 = 70$$

So 70 is 35% of 200

Be able to calculate percentage of amounts and percentage increase and decrease.

Percentages using the percentage button:

You can use the percentage button to work out percentages really quickly.

Example: 63 % of 765

Key into your calculator as follows:

765 x 63 % (DO NOT PRESS =)

£481.95



If using a scientific calculator or your phone you may need to press equals)

Now try these using your calculator

6% of 490		336.6
72% of 150		108
12% of 435		20.79
99% of 340		19.2
3% of 693		52.2
24% of 80		29.4

Match the percentages.

Percentage increase

You are paid £120 a week.

You get a pay rise of 2% a week

What is your new weekly income?

Find 2% = $120 \times 2\%$ (£2.40)

Add the 2% onto the old amount

$£120 + £2.40 = £122.40$

Percentage Decrease

You go for a meal which costs £35.80 in total

You have voucher for 20% off.

How much does the meal cost?

Find 20 % = $£35.80 \times 20\%$ (£7.16)

Take it away form the orignal amount

$£35.80 - £7.16 =$

Old amount	% change	Percentage amount?	Add or take away?	Workings out	New amount
£70	increase 45%	£31.50	Add	$70 + 31.50$	£101.50
£66	increase 22%				
£52	decrease 13%				
£26	increase 8%				
£26	increase 2%				
£72	increase 39%				
£50	decrease 95%				

Worded questions

1. A brand of cereal s usually sold in 750g packs. During a promotion an extra 15% is added to each box. What will the new weight be?
2. Joanne's car insurance is reduced by 10% for each year has has not had an accident. The normal cost of her insurance is £420, but she has a 3 years no claim bonus. How much is her insurance?
3. A new window costs £500 plus vat. Ow much is the total bill?(VAT is 20%)
4. A new TV costs £375. You have already paid a deposit of 35%. How much is left to pay?

Percentage of amount: Problems

1. Carol receives £5 pocket money. How much pocket money does she get if she receives an increase of 15%?
2. A man on a weekly wage of £210 receives an increase of 3.5%. A woman on a weekly wage of £142 receives an increase of 5%. Who receives the highest increase and what is the difference?
3. A museum gives a discount of 10% of the normal price to everyone who has a season ticket. How much does a person with a season ticket pay for a book which costs £9.90?
4. A shop bought a camera for £214 and sold it making a profit of 32%. Find out the selling price of the camera.
5. The price of a computer without VAT is £996. What is the price of the computer including VAT at 17.5%?
6. A car tyre costs £22.50 without VAT. How much will 4 tyres cost including VAT at 17.5%?

7. 95% of the school's children are present today. If there are 640 children on the school register, how many children are present? How many children are absent?

Percentages Multiple Choice

1. There are 600 first year students at a college and 60% of them live within walking distance. How many students live within walking distance of the college?
A 60 B 100 C 360 D 540

2. A coat normally costs £44. In a sale it is marked '25% off'.
How much does the coat cost in the sale?
A £11 B £19 C £22 D £33

3. A supermarket has 900 customers in one day.
60% of these buy milk.
How many customers buy milk?
A 150 B 360 C 540 D 600

4. A manicure costs £15
There is a 20% reduction in the cost every Wednesday.
How much does a manicure cost on a Wednesday?
A £3 B £5 C £10 D £12

5. The club records show that two-fifths of members are over 30 years of age. Two-fifths as a percentage is
A 12% B 20% C 25% D 40%

6. A shoe shop had 44 customers in one hour. Of these 11 were men.
What percentage of the customers were men?
A 4% B 20% C 25% D 44%

A neighbour pays £402.00 for electricity in a year.

She can save 20% by changing supplier.

How much can she save in a year by changing supplier?

- A £8.04
B £20.10
C £40.20
7. D £80.40

The cook at the home provides meals for 80 people.

30% of the people have a special diet meal.

How many of the people have a special diet meal?

- A 24
B 30
C 50
D 56

9. The table shows the number of people at different showings of a film.

2:30pm	4:30pm	7:00pm	9:30pm
150	300	225	250

The cinema manager expects 40% of people at the 4:30pm showing to buy a bag of popcorn. How many bags of popcorn is this?

- A 40 B 80 C 120 D 150

10. 3 000 people were asked whether they chose to use 'Soapysuds' or

'Greenclean' to do their washing up. 60% chose 'Greenclean'.

How many people chose 'Greenclean'?

- A 50 B 60 C 600 D 1 800

11. At a theme park on Thursday, 750 rides were taken. On Friday the total was

20% more than Thursday's total. How many rides were taken on Friday?

A 150 B 770 C 900 D 950

12. In 2002 a supermarket chain made £50 million in profit. In 2003 the supermarket chain only made £30 million in profit.

What percentage of the 2002 profit is this?

A 20% B 30% C 50% D 60%

13. The normal price of a carpet is £200.

What is the price of the carpet in the sale?

A £20 B £140 C £160 D £180

SALE
Carpets 20% off today

14. There are 3 000 people at a concert.

70% of these bought their tickets in advance.

How many people at the concert bought tickets in advance?

A 300 B 700 C 2100 D 2700

15. A supermarket advertises in a local newspaper. They pay £200 for a black and white advert. A colour advert costs 40% more. How much extra is it for a colour advert?

A £8 B £20 C £40 D £80

16. The table shows the number of young people who took part in the Duke of Edinburgh Award in two different years.

	Numbers (in thousands)	
	Year 1	Year 2
Total Entrants	122	200
Bronze Award	18	23
Silver Award	7	10
Gold Award	3	7

What percentage of the total entrants in Year 2 gained the Silver Award?

A 5% **B** 10% **C** 20% **D** 25%

17. A building society pays 4% per year interest on a savings account.

The interest on £200 for one year is

A 80p **B** £8 **C** £80 **D** £800

18. The gardener wants to buy a new barbecue that normally costs £80.

He sees it in a sale with ‘20% off’.

What is the sale price?

A £16 **B** £20 **C** £60 **D** £64

19. The table shows the percentage of students unemployed one year after leaving college.

Subject	Number of Students studying subject	Percentage unemployed one year after leaving college
Engineering	2812	2.2%
Physics	2047	4.1%
Chemistry	3090	4.7%
Sociology	3028	12.7%
Theatre Studies	2560	20.0%

2560 students studied 'Theatre Studies'.

How many of these students were unemployed one year after leaving college?

A 46 **B** 51 **C** 512 **D** 2 048

20. A daily newspaper charges £30 000 for a black and white advert.

A colour advert costs 40% more.

How much extra is it for a colour advert?

A £750 **B** £1 200 **C** £4 000 **D** £12 000



Fractions and Percentages

Code Breaker



Miss	Pat	Did	To	Why	One	Culator	Out	Bad	Best
1289	880	62	24	88	27	1045	36	143	35
Choose	With	Cow	Same	Type	Is	By	A	Sheep	You
12	132	1157	40	450	30	108	38	95	7.5
Difference	How	Cows	The	Count	What	Way	Round	Black	Was
201.6	75	92	7	48	72	45	6	8	130

Solve the problems below, then look up your answer in the table above. This gives you the word in the code which you should fill in the gaps at the bottom to crack the code.

a) $\frac{3}{5}$ of 120 b) 20% of 150 c) $\frac{1}{9}$ of 63 d) $\frac{5}{12}$ of 84 e) 1% of 4500

f) 75% of 32 f) Reduce 60 by 20% g) Increase 80 by 15%

h) In Year 7, $\frac{11}{20}$ of the 240 students are male. How many male students are there?

i) Of a student in Year 7's 95 merits, 40% are for effort in class. How many merits for effort in class has this student received?

j) The population of a village fell by 11%. If it was 1300, what is it now?

k) The price of gold fell by 5% between 1990 and 2000, then rose by 10% between 2000 and 2010. If a gold bar was worth £1000 in 1990, what was it worth in 2010?

_____ ? _____

Remember 5 or more it goes up 4 or less it goes down

Round these numbers to the nearest 10

1) 47 → _____ 2) 64 → _____ 3) 128 → _____
4) 93 → _____ 5) 315 → _____ 6) 173 → _____
7) 908 → _____ 8) 209 → _____ 9) 167 → _____
10) 245 → _____ 11) 373 → _____ 12) 196 → _____

Round these numbers to the nearest 100

1) 732 → _____ 2) 569 → _____ 3) 306 → _____
4) 817 → _____ 5) 763 → _____ 6) 284 → _____
7) 455 → _____ 8) 1372 → _____ 9) 2408 → _____
10) 1375 → _____ 11) 956 → _____ 12) 4347 → _____

Round these numbers to the nearest 1000

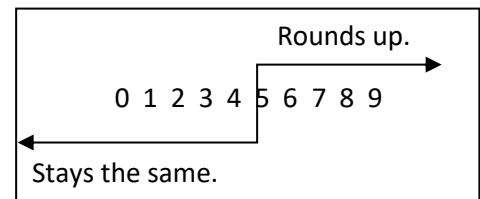
1) 1348 → _____ 2) 5027 → _____ 3) 1608 → _____
4) 827 → _____ 5) 5981 → _____ 6) 4389 → _____
7) 2715 → _____ 8) 1595 → _____ 9) 6375 → _____
10) 3811 → _____ 11) 375 → _____ 12) 7287 → _____

Rounding Decimals:

Sometimes you could be asked to round a number to a certain number of decimal places (or to a whole number). This does not mean that you move the decimal point. You leave the decimal point where it is but get rid of some numbers from the end.

The method is to look at the next number after the one you want to stop at: Put a door up and look who is knocking. Who's that knocking at my door 5 or more raise the score.

If **5 or above** then round the last **number up**.
If **4 or below** the last number **stays the same**.



Examples:

- Round 15.748 to 2 decimal places. *(You want 2 numbers after the decimal point.)*

You want the number to stop here.

15.748

Look at the next number (8). It is 5 or above so round the 4 up.

Answer is 15.75

*(decimal point has **not moved** but now there are only 2 numbers after it.)*

- Round 64.3463 to 3 decimal places.

You want the number to stop here.

Look at the next number (3). It is less than 5 so the 6 stays the same.

ROUNDING UP TO 2 DECIMAL PLACES



SHEET 2

NUMBER	Nearest one	To 1dp	To 2dp
3.748	4	3.7	3.75
4.123		4.1	
5.271			5.27
0.406	0		
2.195			
6.374			
9.621			
8.505			
0.096			
2.915			
7.308			
10.245			
3.66			
9.207			
12.746			
0.954			
2.896			
9.978			
4.015			
13.671			
9.506			
21.445			

Adding Decimals

$$\begin{array}{r} \text{e.g. } 10.01 \\ + 24.13 \\ \hline 34.14 \end{array}$$

$\begin{array}{r} 32.16 \\ + 54.21 \\ \hline 86.37 \end{array}$	$\begin{array}{r} 27.123 \\ + 31.342 \\ \hline 58.465 \end{array}$	$\begin{array}{r} 1.326 \\ + 2.425 \\ \hline 3.751 \end{array}$
---	--	---

Subtracting Decimals

$$\begin{array}{r} \text{e.g. } 24.13 \\ - 10.01 \\ \hline 14.12 \end{array}$$

$\begin{array}{r} 54.21 \\ - 32.16 \\ \hline 22.05 \end{array}$	$\begin{array}{r} 31.342 \\ - 27.123 \\ \hline 04.219 \end{array}$	$\begin{array}{r} 2.425 \\ - 1.326 \\ \hline 1.099 \end{array}$
---	--	---

Now try these

1. $0.2 + 0.33 =$

2. $0.55 + 0.3 =$

3. $0.55 + 0.503 =$

4. $2.2 + 0.313 =$

5. $4.215 + 2.31 =$

6. $5.287 + 4.1 =$

7. $4.342 + 5.3 =$

8. $0.67 + 5.463 =$

9. $0.65 - 0.2 =$

10. $0.75 - 0.5 =$

11. $0.88 - 0.6 =$

12. $6.74 - 5.2 =$

13. $3.71 - 0.4 =$

14. $8.29 - 2.7 =$

15. $12.4 - 8.34 =$

16. $9.784 - 7.2 =$

Converting between Fractions, Decimals and Percentages



HOW DO YOU CONVERT FROM A <u>PERCENTAGE</u> TO A <u>FRACTION</u>? JUST WRITE THE PERCENTAGE DOWN OVER 100 THEN SIMPLIFY $30\% = 30/100 = 3/10$ $45\% = 45/100 = 9/20$	HOW DO YOU CONVERT FROM A <u>PERCENTAGE</u> TO A <u>DECIMAL</u>? DIVIDE BY 100 $75\% / 100 = 0.75$ $33\% / 100 = 0.33$
HOW DO YOU CONVERT FROM A <u>DECIMAL</u> TO A <u>FRACTION</u>? MAKE INTO A PERCENTAGE (MULTIPLY BY 100) Then write over 100 and simplify. $0.60 = 60\% = 60/100 = 6/10 = 3/5$ $0.70 = 70\% = 70/100 = 7/10$	HOW DO YOU CONVERT FROM A <u>DECIMAL</u> TO A <u>PERCENTAGE</u>? MULTIPLY BY 100 $0.75 \times 100 = 75\%$ $0.33 \times 100 = 33\%$
HOW DO YOU CONVERT FROM A <u>FRACTION</u> TO A <u>DECIMAL</u>? TOP NUMBER DIVIDED BY THE BOTTOM $5/6 = 5 \text{ DIVIDE BY } 6 = 0.83$ $2/3 = 2 \text{ DIVIDE BY } 3 = 0.66$	HOW DO YOU CONVERT FROM A <u>FRACTION</u> TO A <u>PERCENTAGE</u>? CHANGE TO A DECIMAL (TOP DIVIDED BY BOTTOM) THEN MULTIPLY THE ANSWER BY 100 $3/5 = 3 \text{ DIVIDE BY } 5 = 0.6 \times 100 = 60\%$

Convert these fractions to decimals:

$$\frac{1}{3} = \quad \frac{2}{5} = \quad \frac{3}{6} = \quad \frac{4}{10} =$$

Now convert these decimals to percentages:

$$0.25 = \quad 0.70 = \quad 0.85 = \quad 0.99 =$$

So...how can you convert from a fraction to a percentage?

$$\frac{1}{3} = \quad \frac{2}{5} = \quad \frac{3}{6} = \quad \frac{4}{10} =$$

And convert these percentages to decimals:

$$50\% = \quad 75\% = \quad 33\% = \quad 25\% =$$

Finally convert these percentages to fractions

$$50\% = \quad 75\% = \quad 30\% = \quad 25\%$$

What is Ratio?



Expressing ratios

A ratio is a way of comparing 2 or more quantities. When writing a ratio you should always make sure they are:

In the same **unit**

In the correct **order as in the question.**

Cancelled down/simplified (always do the same to each side).

Examples:

Write £3 to 50p as a ratio:

Same units (pence): 300p to 50p

As a ratio (in order): 300:50 (both sides will ÷ by 10)

Cancel down/simplify: 30:5 (both sides will ÷ by 5)

Cancel further: 6:1 (final ratio)

Write 20cm to 5m as a ratio:

Same units: 20cm to 500cm

As a ratio: 20:500 (both sides will ÷ by 20)

Cancel down: 1:25

In a box there are 8 blue pens, 12 red and 28 black. What is the ratio of red to black to blue?

R:B:B

Correct order: 12:28:8 (all numbers will ÷ by 4)

Cancel down: 3:7:2

****Remember****

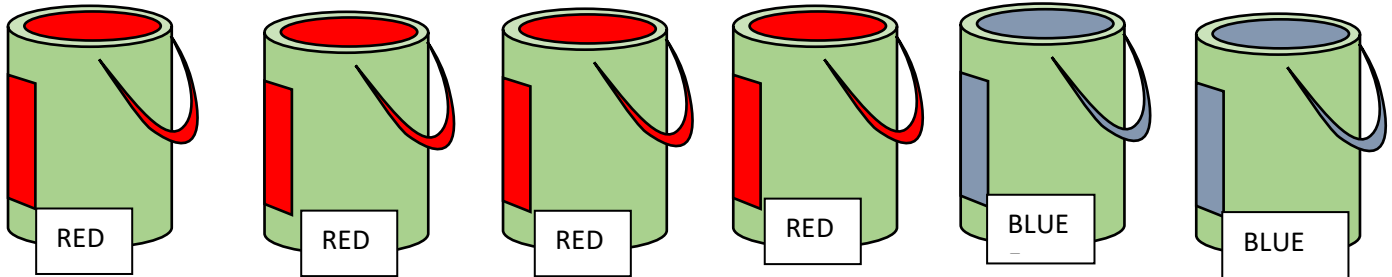
Ratios can be simplified by dividing each part by the highest common factor.

The same as we did with fractions

e.g. 7 : 21

Ben the painter needs 6 litres of dark purple, he uses 4 litres of red paint and 2 litres of blue paint.

Write the ratio of the number of red tins to the number of blue tins in its simplest form.



What is the ratio of milk to white chocolate?



Simplifying Ratio

These questions are not too tricky so try these to get you started.

e.g. $8 : 12 = 2 : 3$ 4) $6 : 9 =$ 8) $6 : 18 =$ 12) $16 : 8 =$

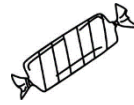
1) $4 : 8 =$ 5) $20 : 30 =$ 9) $10 : 100 =$ 13) $11 : 22 =$

2) $12 : 8 =$ 6) $7 : 14 =$ 10) $9 : 18 =$ 14) $24 : 12 =$

3) $5 : 10 =$ 7) $6 : 12 =$ 11) $4 : 16 =$ 15) $10 : 20 =$

1) There are 32 pupils in a class. 20 of them are girls. What is the ratio of boys to girls in its simplest form?

1) There are 50 sweets in a mixed pack. 25 are jellies, 10 are fizzy cola bottles and the rest are boiled. Write the ratio of each type of sweet in its simplest form.



2) A fruit drink is made by mixing 60ml of orange juice with 180ml of pineapple juice. What is the ratio of orange juice to pineapple juice in its simplest form?

2) Concrete is made by mixing sand, water and concrete mix in the ratio of 6 parts sand, 3 parts water and 3 parts concrete mix. What ratio is this in its simplest form?

Sharing Quantities in a Given Ratio

Sometimes you are asked to share a quantity (e.g. an amount of money) in a given ratio.

To do this:

find the **total** number of parts needed
Divide by the total number of parts to find the size of 1 part
Multiply each number in the ratio by the value of 1 part.

Examples:

This side needs
3 parts.

This side needs
4 parts.

• Split £140 in the ratio 3:4

Total number of parts needed: $3+4 = 7$
Divide the money into 7 equal parts: $140 \div 7 = £20$

Now we know each part is worth **£20**

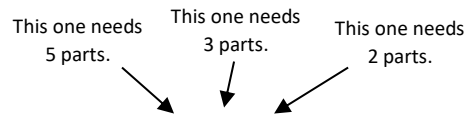
The original ratio is **3:4**

$3 \times 20 = £60$

$4 \times 20 = £80$

The 2 amounts of money are: £60 and £80 (check these add to the original £140)

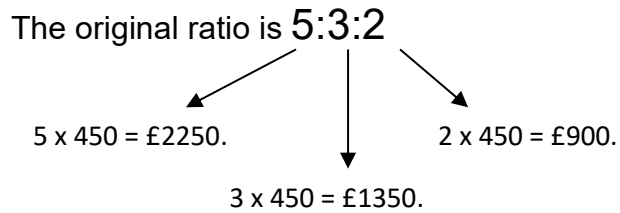




- **Split £4500 in the ratio 5:3:2**

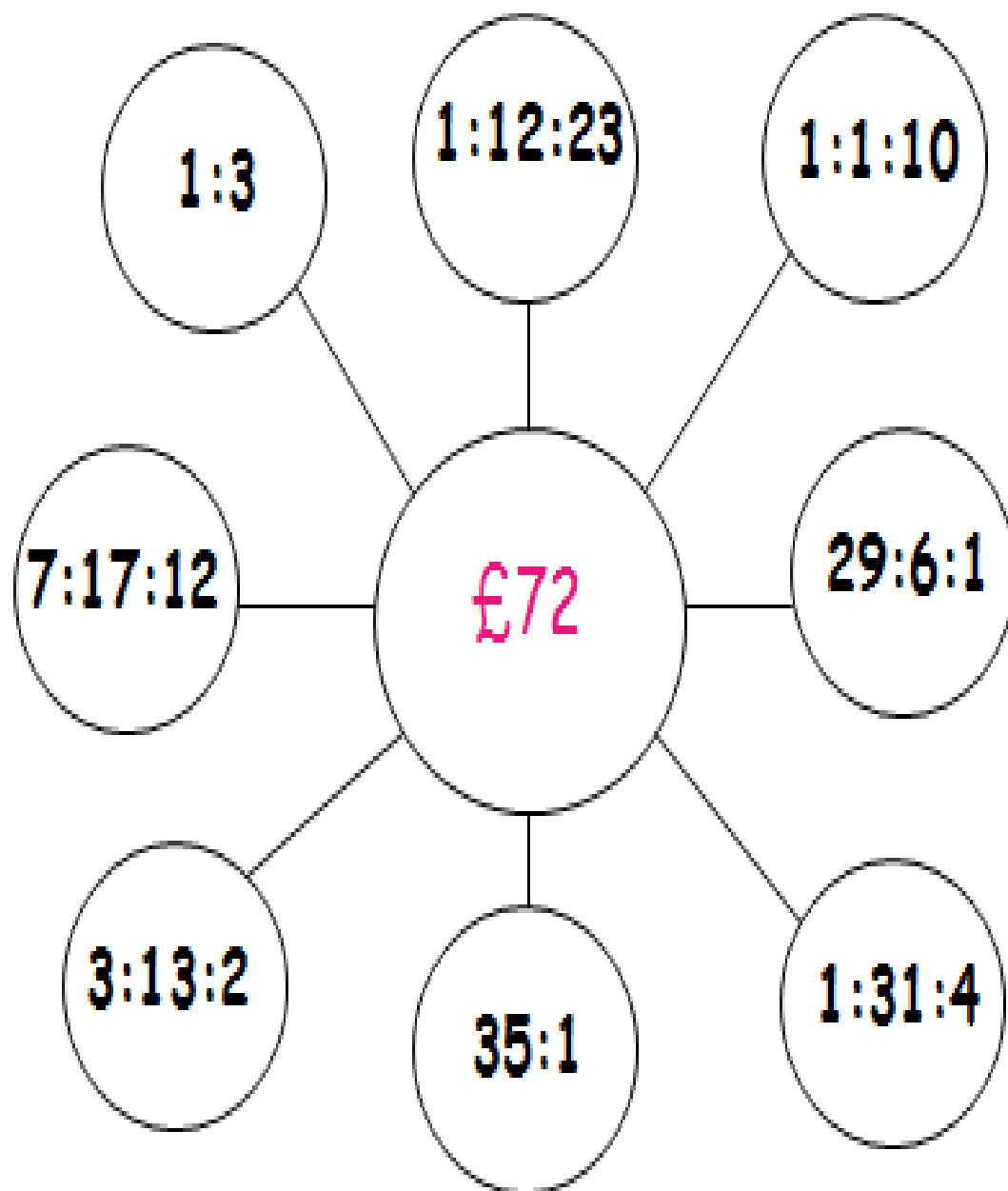
Total number of parts needed: $5+3+2 = 10$
Divide the money into 10 equal parts: $4500 \div 10 = £450$

Now we know each part is worth **£450**



The 3 amounts of money are: £2250, £1350 and £900 (check they add to £4500)

Divide the quantity in the given ratio



Steps to Success

1. Add together the total number of parts of the ratio
2. Divide the given amount by the total number of parts
3. Multiply the answer by each ratio amount
4. Check that your answers add up to the same total given in the question

Green - these questions are not too tricky so try these to get you started.

- 1) Divide £50 into the ratio 1 : 4
- 2) Divide 40 L into the ratio 1:3
- 3) Divide £10 into the ratio 2 : 3
- 4) Divide 500g into the ratio 2 : 3
- 5) Divide 100ml into the ratio 3:7
- 6) Divide 30cm into the ratio 2 : 4

Orange - these questions are a little trickier than the green questions.

- 1) Divide 49p in the ratio 4 : 2 : 1
- 2) Divide £350 in the ratio 4 : 2 : 1
- 3) Divide £250 in the ratio 3:6:1
- 4) Divide 120cm in the ratio 1:2:3
- 5) Divide 51g in the ratio 1 : 2
- 6) Divide 68p in the ratio 1 : 2 : 1



Red - these questions are the trickiest and will require you to interpret worded questions.

- 1) Mr Martin has 120 CDs. The ratio of indie CDs to dance CDs is 5 : 7. How many of each type of CD does he have?
- 2) Mr Martin has 36 calculators in a box. The ratio of ordinary calculators to scientific is 5 : 1. How many of each calculator does he have?

BIDMAS (BODMAS)

Order of Operations		
B	Brackets	$10 \times (4 + 2) = 10 \times 6 = 60$
I	Indices	$5 + 2^2 = 5 + 4 = 9$
D	Division	$10 + 6 \div 2 = 10 + 3 = 13$
M	Multiplication	$10 - 4 \times 2 = 10 - 8 = 2$
A	Addition	$10 \times 4 + 7 = 40 + 7 = 47$
S	Subtraction	$10 \div 2 - 3 = 5 - 3 = 2$

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BIDMAS Rule

This tells us the correct order in which operations (sums) are to be carried out, so we can find the value of an expression

- B – Brackets (these are done first)
- I – indices (powers) (these are done second)
- D – Division (these are done third)
- M – Multiplication (these are done fourth)
- A – Addition (these are done fifth)
- S – Subtraction (this is last)

Have a look at this

$2 + 3 \times 6$

20

Activate Windows
Go to Settings to activate

Work out the answer to the following calculation:

$$5 + 7 \times 3 - 6 \div 2 + 4$$

Did you get one of the following answers? 27, 19, 14, 37, 35

The only correct answer is 27. If you got this well done, you did the correct order. If you got any of the other answers you need some practice.

You can see, from the above example, that there are various different answers depending on which way round you do the calculation. It is important that there is only one answer and so there is a specific way round that you must perform calculations.

<i>Remember:</i>	B rackets	(any brackets should be done 1 st)
	I ndices	(next any powers for us this is just squaring the number)
	D ivision	} (next any $\div$ or $\times$)
	M ultiplication	
	A dd	} (finally just work from Left to Right doing + or -)
	S ubtract	

This is often just referred to as “**BIDMAS**” and is the “order of operation”.

All calculation should be done in the order described above. i.e. deal with any brackets first, then any powers. Multiply and divide should be done next (from left to right) then, once you are left with just add and subtract, work from left to right.

Let's look at the original calculation again:

$$5 + 7 \times 3 - 6 \div 2 + 4$$

There are no brackets or powers, so move onto divide and multiply:

$$5 + 7 \times 3 - 6 \div 2 + 4$$

Now we have:

$$5 + 21 - 3 + 4$$

We have done everything else so now we can just go from left to right performing the add and subtract:

$$5 + 21 - 3 + 4 = \underline{\underline{27}}$$

Work out the following:

1. $7 + 2 \times 4$

2. $9 - 2 \times 3$

3. $(10 - 3) \times 4$

4. $15 + 9 \div 3$

5. $44 - 11 \times 2$

6. $24 - 6 \times 3 + 2$

7. $20 \div 5 - 18 \div 6$

8. $6 + 28 \div 7 - 3$

Add brackets to make the calculation correct

9. $6 + 14 \div 2 = 10$

10. $9 + 15 \div 8 = 3$

11. $8 + 2 \times 6 - 5 = 10$

12. $51 \div 3 + 5 = 22$

13. $11 + 6 \times 4 = 68$

14. $10 - 2 + 2^2 = 4$

15. $3 + 5 \times 9 - 8 = 8$

16. $8 + 15 \div 3 \times 0 = 0$