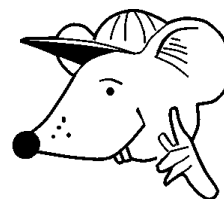




MATHEMATICS



N.S. Yr. 6 P.33

Percentages as fractions of 100. Equivalence of percentages, fractions and decimals.

Equipment

Paper, pencil, ruler

MathSphere

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Concepts

Children should be able to read, write and understand the language associated with percentages: *percentage, percent, %, discount, profit, loss etc.*

Where does the % sign occur? Watch out for it in everyday life.

One whole = 100%,

One half = 50%,

One quarter = 25%,

One tenth = 10%

33% and 66% are roughly $\frac{1}{3}$ and $\frac{2}{3}$ respectively.

Understand **equivalence** between $37\% = 0.37 = \frac{37}{100}$

Children should be able to find percentages of quantities by any valid method. Most difficult is something like 46% because this is not equivalent to an easy fraction. In this case they should find 1% by dividing by 100 and then multiplying by the percentage (46 in this example).

What percentage of one quantity is another quantity? (e.g.: What fraction is 11 of 30?)

These may be tackled by first writing as a fraction : $\frac{11}{30}$

Then divide the numerator by the denominator (using a calculator if necessary):

0. 3666....

Convert this decimal to a percentage:

36.66....%

Finally round to nearest whole percent:

37%

Children should be able to read quantities from a pie chart, estimating where necessary. Estimates should be based on easy fractions. For example, one quarter is 25%, therefore a half of a quarter (one eighth) must be $12\frac{1}{2}\%$.

Lastly, children should know the meaning of the term V.A.T. (Value Added Tax)

When I see **27%**, I know that means **0.27** or $\frac{27}{100}$



1. Do you know what these percentages mean? Write them as a decimal and as a fraction.

a) 87% b) 36% c) 40% d) 12% e) 5% f) 99%

2. What is **33%** as a fraction approximately?

3. What is **66%** as a fraction approximately?

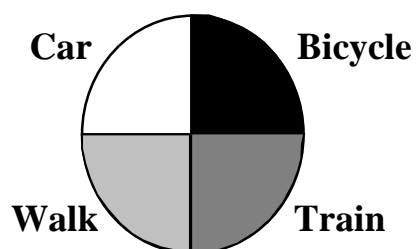
4. Which of these percentages is equal to **0.76** ?

a) 0.76% b) 7.6% c) 76% d) 760%

5. Which of these percentages is the same as **0.08** ?

a) 0.08% b) 0.8% c) 8% d) 80%

6. This pie chart shows how children came to school:

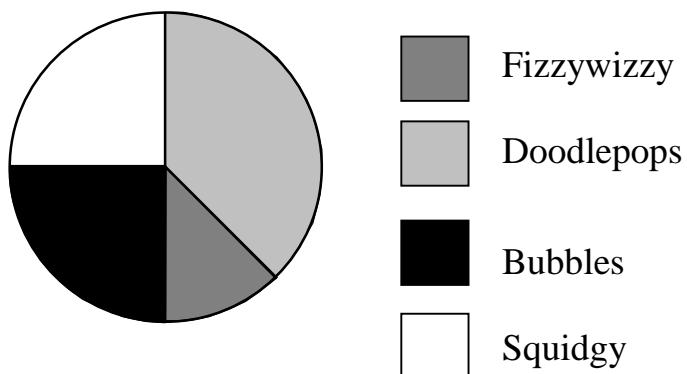


What percentage came by car?

Maths Rats love pies of all kinds - apple pies, raspberry pies, mathematical pies. Pie charts are **my** favourite.

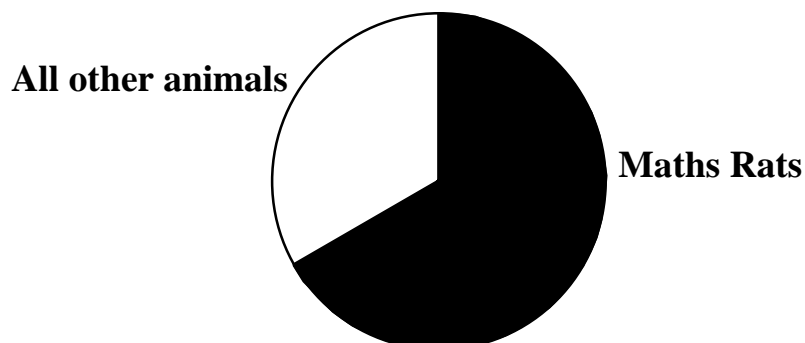


1. This pie chart shows what drinks children liked:



- What percentage does the pie chart represent altogether?
- What percentage liked Squidgy?
- What percentage liked Bubbles?
- What percentage liked Fizzywizzy?
- What percentage liked Doodlepops?
- If 200 children are represented on the pie chart, how many children liked Squidgy?
- How many children liked Fizzywizzy?

1. This pie chart shows how people voted for their favourite animals:



- a) What percentage did **not** vote for Maths Rats?
 - b) What percentage **did** vote for Maths Rats?
-

2. Find **25%** of **60**.

Hint: Remember **25%** is the same
as $\frac{1}{4}$.
Now find **one quarter** of **60**.



- 3. Find **60%** of **£200**
- 4. Find **75%** of **300** metres.
- 5. Find **20%** of **10** Kg.
- 6. Find **30%** of **5** metres.
- 7. Find **5%** of **150** Km
- 8. Find **33%** of **120** (Remember that 33% is approximately one third.)

Here are some problems about percentages. The Maths Rats will give you some advice about solving these problems.

First of all, make sure you read the question carefully.

This is very important!!!!!!



Think in percentages.

Remember that one whole is 100%.

Do not just add or multiply any numbers that come into your head. Think what the question is asking and what you need to do to solve it.



Here is an example. The Maths rats will show you what to do.



On a bus there are **50** people. **20%** are adults. **50%** are boys.
How many are girls?

There are **50** people on the bus. That is everybody,
so that must be **100%**.

20% is $\frac{1}{5}$, so the number of adults is
one fifth of **50**, which is **10**.

50% is $\frac{1}{2}$, so the number of boys is
one half of **50**, which is **25**.

That is **35** people altogether.
So the number of girls must
be **50 – 35**, which is **15**.

Right, here goes. Try these for size!

No, the problems, not my shades!



1. Nazir has **200** books. **25%** are stories. **60%** are about horses. The rest are about dolls houses.

- a) How many books are story books?
- b) How many books are about horses?
- c) How many books are about dolls houses?

2. Twenty people went to a gardening club meeting.
70% arrived by coach. **10%** arrived in cars. The rest walked.

How many people walked to the exhibition?

3. A netball team played **25** games in one season.
They lost **40%** of them. How many games did they win?

4. A computer game costs **£35** today. Tomorrow the price is going up by **20%**.
What will the price be tomorrow?

5. Peter can buy a train set for **£60**, but Subby can get a **20%** discount.
How much would it cost Subby?

OK, how are you doing?
Did you get them all right?



Here are some more to keep you on your toes!

I assume you have toes on your paws too!



1. Jane has **50** dolls. **10%** are from Spain. **40%** are from Wales. The rest are from America.
 - a) How many dolls are from Spain?
 - b) How many dolls are from Wales?
 - c) How many dolls are from America?
2. Forty animals were taken to a children's animal show.
40% were cats. **20%** were hamsters. **10%** were mice. The rest were dogs.

How many animals were dogs?
3. In a class there were **30** pupils. **60%** liked the Whizzywhizzy Pop Group.
How many pupils did not like the Whizzywhizzy Pop Group?
4. In 1997 there were **40** houses in a street. Another **20%** were built in 1998.
How many houses were there at the end of 1998?
5. Addy can do a multiplication table in **240** seconds. Multy can do it **15%** faster. How long does it take Multy to do it??

Easy, aren't they. By the way, how are your toes?



1. Kayleigh has a bag of marbles. She pulls **20** marbles from the bag. These **20** marbles are **20%** of the bag.
How many marbles did she have in the bag altogether?



Do not forget that **100%** is everything.

2. Alvin never plays **15** of his CD's. This is **50%** of his total collection.
How many CD's does he have altogether?
3. John saw 20 red cars pass his house in one half hour. This was 10% of all the cars that passed his house. How many cars passed altogether?

Use a calculator to calculate these problems.

4. Find **23%** of **6 700**.
5. A pair of trainers cost **£45**. They were reduced by **24%**. What was their new price?
6. Calculate **46%** of **£5 687**.
7. What is 6 as a percentage of 23?
8. Matthew does a mathematics test and gets 33 marks out of 45 altogether. What was his percentage of right answers?

You can have a percentage of almost anything. Here's **25%** of me!



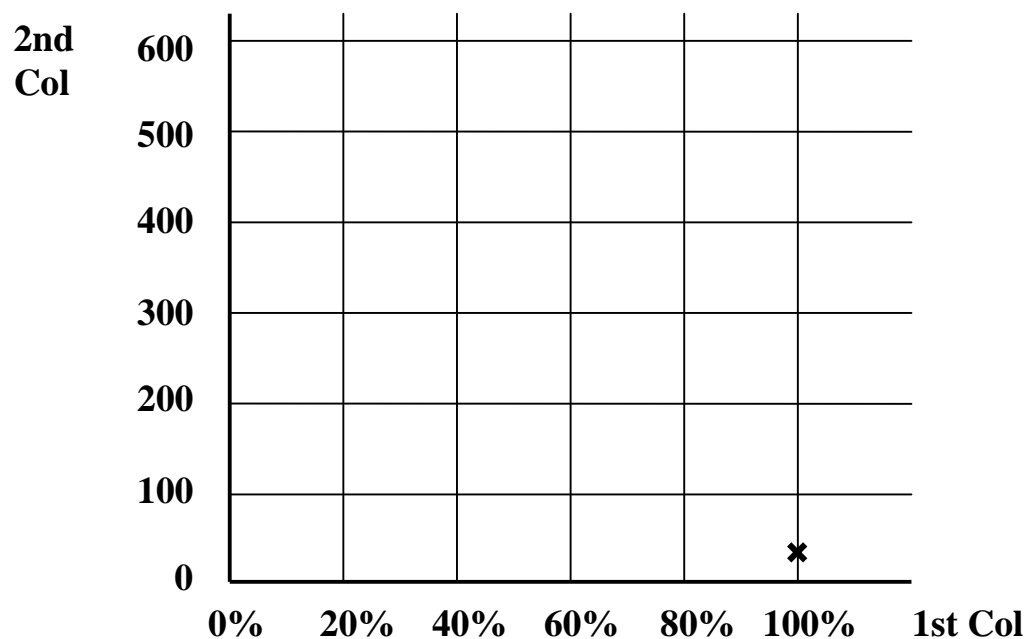
Here is a little investigation to try:

Fill in the **second column** of numbers. One is done for you.

100 % of	30	is 30.
60 % of		is 30.
40 % of		is 30.
20 % of		is 30.
10 % of		is 30.
5 % of		is 30.

Now take each pair of numbers, one in the first column and one in the second column and plot them on this graph. The first one has been done.

Join up the points with a smooth curve.



Sometimes we have to know about V.A.T.
When you buy something in a shop, the price will probably include V.A.T., which is a tax that is paid to the Government.

At the moment V.A.T. is **17.5%**.



This means that when the shopkeepers work out the prices they would like to charge for their goods, they must add **17.5%** to the price.

For example, a computer game costing **£20** will actually cost **£20 + 17.5% of £20**, which is **£23.50** altogether.

The extra **£3.50** goes to the Government.



There is a simple way of adding **17.5%** to an amount of money.

First add **10%**, then add **5%** (which is half of 10%),
lastly add **2.5%** (which is half of 5%).

Eg. Add **17.5%** V. A. T. to a tape player costing **£18.00**

10% of **£18.00** is **£1.80**

5% of **£18.00** is **£0.90**

2.5% of **£18.00** is **£0.45**

TOTAL V.A.T. is **£3.15**

The tape player therefore costs **£18.00 + £3.15**, which is **£21.15** in the shop.

Complete these V.A.T. calculations:

1. A television set costs £300 before V.A.T. is added.

10% of £300 is

5% of £300 is

2.5% of £300 is

TOTAL V.A.T is _____

The television now costs **£300** +

=

-
2. A computer costs £1200 before V.A.T. is added.

10% of £1200 is

5% of £1200 is

2.5% of £1200 is

TOTAL V.A.T is _____

The television now costs **£1200** +

_____ =

Answers**Page 3**

1. a) 0.87 $\frac{87}{100}$ b) 0.36 $\frac{36}{100}$ c) 0.40 $\frac{40}{100}$ d) 0.12 $\frac{12}{100}$
e) 0.05 $\frac{5}{100}$ f) 0.99 $\frac{99}{100}$
2. Approximately $\frac{1}{3}$.
3. Approximately $\frac{2}{3}$.
4. 76% 5. 8% 6. 25%

Page 4

1. a) 100% b) 25% c) 25% d) Approx. 12.5% e) 37.5%
f) 50 g) 25

Page 5

1. a) Approx. 33% b) Approx. 66%
2. 15 3. £120 4. 225 metres 5. 2 Kg 6. 150 cm
7. 7.5 Km 8. 40

Page 8

1. a) 50 b) 120 c) 30 2. 4 3. 15 4. £42 5. £48

Page 9

1. a) 5 b) 20 c) 25 2. 12 3. 12 4. 48 5. 204 seconds.

Page 10

1. 100 2. 30 3. 200 4. 1 541 5. £34.20 6. £2 616.02
7. 26% 8. 73%

Answers

Page 11

100% of **30** is 30
60% of **50** is 30
40% of **75** is 30
20% of **150** is 30
10% of **300** is 30
5% of **600** is 30

Draw curve.

Page 13

- 1.** 10% of £300 is **£30.00**
5% of £300 is **£15.00**
2.5% of £300 is **£ 7.50**

TOTAL V.A.T. is £52.50

Television now costs **£300 + £52.50 = £352.50**

- 2.** 10% of £1200 is **£120.00**
5% of £1200 is **£ 60.00**
2.5% of £1200 is **£ 30.00**

TOTAL V.A.T. is £210.00

Television now costs **£1200 + £210 = £1410**