Percentage Problems

Finding Percentages of Amounts

$10\% = \dfrac{10}{100} = \dfrac{1}{10}$ ...and to find a tenth of something, you just divide by 10.

So to find 10% of something, just divide it by 10.

EXAMPLE: Ron eats 65% of a packet of 400 frogs. How many frogs has he eaten?

1. Find 10% of 400. ⟹ 10% of $400 = 400 \div 10 = \underline{40}$

2. Use that to find 60% and 5% of 400. ⟹
   60% of $400 = 40 \times 6 = \underline{240}$
   5% of $400 = 40 \div 2 = \underline{20}$

3. Then add them: $240 + 20 = \underline{260}$ So 65% of 400 = 260 frogs

Writing a Number as a Percentage of Another

To write one number as a percentage of another number, write it as a fraction and then convert to a percentage.

EXAMPLE: There are 8 witches and 12 wizards in Katie's class. What percentage of the class are wizards?

First write the total amount as the denominator of the fraction. $8 + 12 = 20 \longrightarrow \overline{20}$

Then write the number of wizards as the numerator. Convert the fraction into a percentage (see page 36).

$$\dfrac{12}{20} \,{\overset{\times 5}{\underset{\times 5}{=}}}\, \dfrac{60}{100} = 60\%$$

Use Percentages to Compare Amounts

You can compare amounts by converting them into percentages.

EXAMPLE: A magic wand that normally costs £50 has £15 off in a sale. A spell book that normally costs £25 has £5 off in the sale. Which item has the biggest percentage discount?

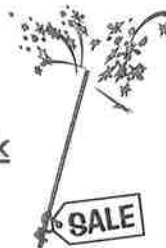You need to find the money off each item as a percentage of the total price.

Put the money off as the numerator.
Put the total price as the denominator.

magic wand $\dfrac{15}{50} \,{\overset{\times 2}{\underset{\times 2}{=}}}\, \dfrac{30}{100} = 30\%$

spell book $\dfrac{5}{25} \,{\overset{\times 4}{\underset{\times 4}{=}}}\, \dfrac{20}{100} = 20\%$

So the magic wand has the biggest percentage discount.

"I can find a percentage of an amount. I can use percentages to compare amounts."

Worked Examples

1 Jasmine's maths test has **40 questions**. Jasmine has answered **35%** of them. How many questions has she answered?

10% of $40 = 40 \div 10 = 4$
30% of $40 = 4 \times 3 = 12$
5% of $40 = 4 \div 2 = 2$
35% of $40 = 12 + 2 = 14$

14 questions

1) Divide by 10 to find 10%.
2) Multiply this by 3 to find 30%.
3) And divide 10% by 2 to find 5%.
4) Add these together to find 35%.

2 Brett bakes a cake, then sells it for **£8**. He spent **£5** on the cake's ingredients. What was his **percentage profit**?

1) His profit is the money he made — so subtract his costs from the selling price.

2) His percentage profit is his profit as a percentage of the amount he spent.

£8 − £5 = £3

$\dfrac{3}{5} = \dfrac{60}{100} = 60\%$

3 Joni has **8 chickens** and **17 ducks** in her flock. Nick has **7 chickens** and **13 ducks** in his flock. Who has the highest percentage of ducks in their flock?

1) You need to find the percentage of ducks in each flock.

2) For each flock, write the total number in the flock as the denominator of the fraction.

3) Then write the number of ducks as the numerator.

4) Convert the fractions into percentages.

5) Then compare the percentages. 68% is higher, so Joni has the highest percentage.

Joni's flock: $8 + 17 = 25$

$\dfrac{17}{25} = \dfrac{68}{100} = 68\%$

Nick's flock: $7 + 13 = 20$

$\dfrac{13}{20} = \dfrac{65}{100} = 65\%$

Joni

100% of this page is really, really interesting...

To find a percentage of a number you divide by 10 to get 10%, then build your answer up from there. Writing one number as a percentage of another is just converting fractions.

Percentage Problems

1 Work out these percentages.

10% of 390 = [ ]

1% of 6800 = [ ]

1 mark

2 Calculate:

5% of 740

[ ]

1 mark

15% of 2180

[ ]

1 mark

3 In Applemouth Primary School there are 560 pupils.
35% of the pupils have blonde hair.

How many of the pupils have blonde hair?

[ ]

1 mark

4 Larry buys a bike for £420 and sells
it for 45% more than he paid for it.

How much money does Larry make when he sells the bike?

£ [ ]

1 mark

Percentage Problems

5 35% of the books sold at a bookshop one week
were comics. The percentages of the other types
of books sold are shown in the table on the right.

Bookshop Sales	
Comics	35%
Novels	45%
Non-fiction	15%
Other	5%

The bookshop sold 860 books that week.
How many comics did the bookshop sell?

[ ]

1 mark

What was the total number of novels and non-fiction books sold?

[ ]

1 mark

6 Calculate 32% of 300.

[ ]

1 mark

7 Farmer Fairbank is selling duck eggs on his market stall.
On Saturday he has 400 duck eggs and sells 45% of them.
On Sunday he has 700 duck eggs and sells 58% of them.

What was the total number of duck eggs sold on Saturday and Sunday?

[ ]

3 marks

SECTION FOUR — RATIO, PROPORTION & ALGEBRA

Percentage Problems

8 Calculate:

11 as a percentage of 25 [___ %]   ☐ 1 mark

7 as a percentage of 20 [___ %]   ☐ 1 mark

9 In a group of 15 friends, 9 of them like cheese.

What percentage of the group like cheese?

[___ %]   ☐ 1 mark

10 In a bag of marbles, 7 are green, 20 are red and 8 are blue.

What percentage of the marbles are green?

[___ %]   ☐ 1 mark

11 Sandeep has a fish tank with 20 fish in it.
He adds another 12 fish to the tank.

By what percentage has he increased the number of fish in the tank?

[___ %]   ☐ 1 mark

Percentage Problems

12 An antique mirror is bought for £2000 and sold for £3500.

What was the percentage profit?

[___ %]   ☐ 2 marks

13 Stuart and Miranda buy and sell old cars.
Stuart bought a car for £800 and sold it for a £160 profit.
Miranda bought a car for £250 and sold it for a £60 profit.

Who made the highest percentage profit? Show your working.

[___]   ☐ 2 marks

14 Two cereal brands are changing the amount of cereal in their boxes.
Nutios are changing from a 600 g box to a 750 g box.
Branpops are changing from a 300 g box to a 360 g box.

Which brand is increasing the amount of cereal by the biggest percentage?
Show your working.

[___]   ☐ 2 marks

"I can find a percentage of an amount.
I can use percentages to compare amounts."