Planner

Fractions and percentages of amounts

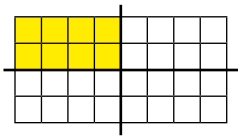
- Calculating a fraction of an amount
- Calculating a percentage of an amount

Keywords

You should know

explanation 1

1 **a** Explain how you know that $\frac{1}{4}$ of this diagram is shaded.



b Explain how the diagram shows that $\frac{1}{4}$ of 32 is 8.

2 **a** Copy the diagrams. Shade them to show the fractions given.

i $\frac{1}{2}$ **ii** $\frac{1}{4}$ **iii** $\frac{1}{8}$

iv $\frac{1}{3}$ **v** $\frac{1}{6}$ **vi** $\frac{1}{12}$

b Use your diagrams from part **a** to find these fractions of 24.

i $\frac{1}{2}$ **ii** $\frac{1}{4}$ **iii** $\frac{1}{8}$ **iv** $\frac{1}{3}$ **v** $\frac{1}{6}$ **vi** $\frac{1}{12}$

3 Explain how you could work out that $\frac{1}{3}$ of 21 = 7 without drawing a diagram.

4 Work these out.

a $\frac{1}{2}$ of 28 **b** $\frac{1}{4}$ of 20 **c** $\frac{1}{3}$ of 36

d $\frac{1}{3}$ of 30 **e** $\frac{1}{4}$ of 32 **f** $\frac{1}{2}$ of 18

g $\frac{1}{10}$ of 70 **h** $\frac{1}{3}$ of 18 **i** $\frac{1}{10}$ of 200

5 What are the missing numbers?

a $\frac{1}{2}$ of $\square = 8$ **b** $\frac{1}{4}$ of $\square = 5$ **c** $\frac{1}{3}$ of $\square = 22$

d $\frac{1}{2}$ of $\square = 11$ **e** $\frac{1}{4}$ of $\square = 6$ **f** $\frac{1}{4}$ of $\square = 20$

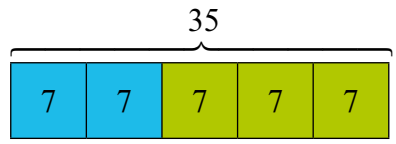
g $\frac{1}{10}$ of $\square = 12$ **h** $\frac{1}{3}$ of $\square = 15$ **i** $\frac{1}{10}$ of $\square = 5$

6 A man spent $\frac{1}{3}$ of each day sleeping.
He lived for 75 years.
How much time did he spend asleep?

explanation 2 online

7 **a** Explain why $\frac{1}{5}$ of 35 is 7.

b Explain why $\frac{3}{5}$ of 35 is 21.



8 Work these out.

a **i** $\frac{1}{4}$ of 28 **ii** $\frac{3}{4}$ of 28

b **i** $\frac{1}{3}$ of 12 **ii** $\frac{2}{3}$ of 12

c **i** $\frac{1}{5}$ of 40 **ii** $\frac{2}{5}$ of 40

d **i** $\frac{1}{10}$ of 60 **ii** $\frac{3}{10}$ of 60

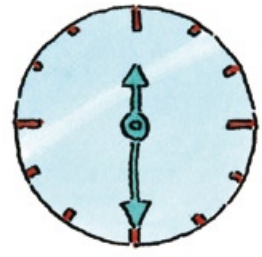
9 Find the number of minutes in these fractions of an hour.

a $\frac{1}{2}$ **b** $\frac{1}{4}$ **c** $\frac{3}{4}$

d $\frac{1}{3}$ **e** $\frac{2}{3}$ **f** $\frac{1}{6}$

g $\frac{5}{6}$ **h** $\frac{1}{10}$ **i** $\frac{3}{10}$

j $\frac{1}{5}$ **k** $\frac{3}{5}$ **l** $\frac{1}{15}$



10 There are 360° in a full turn.

Find the number of degrees in these fractions of a turn.

a $\frac{1}{2}$ **b** $\frac{1}{3}$ **c** $\frac{1}{4}$

d $\frac{3}{4}$ **e** $\frac{2}{3}$ **f** $\frac{3}{10}$

g $\frac{5}{12}$ **h** $\frac{1}{5}$ **i** $\frac{4}{9}$

explanation 3

11 Explain how you can work out that $\frac{8}{3} = 2\frac{2}{3}$.

12 Write these improper fractions as mixed numbers.

a $\frac{7}{4}$ **b** $\frac{11}{3}$ **c** $\frac{18}{5}$ **d** $\frac{15}{7}$

e $\frac{17}{9}$ **f** $\frac{11}{4}$ **g** $\frac{23}{5}$ **h** $\frac{9}{4}$

i $\frac{24}{7}$ **j** $\frac{5}{3}$ **k** $\frac{9}{8}$ **l** $\frac{13}{2}$

13 Work out these calculations. Give your answers as mixed numbers.

a $\frac{1}{4}$ of 15 **b** $\frac{1}{3}$ of 20 **c** $\frac{1}{5}$ of 23

d $\frac{1}{6}$ of 40 **e** $\frac{1}{7}$ of 32 **f** $\frac{1}{8}$ of 36

g $\frac{1}{9}$ of 40 **h** $\frac{1}{2}$ of 43 **i** $\frac{1}{5}$ of 66

explanation 4 online

14 Work these out. Write the percentages as fractions.

a 25% of 60 **b** 50% of 86 **c** 25% of 36

d 25% of 300 **e** 75% of 300 **f** 50% of 98

g 25% of 120 **h** 75% of 120 **i** 50% of 19

j 50% of 125 **k** 25% of 180 **l** 75% of 180

15 Work these out.

a 25% of ☐ = 12 **b** 50% of ☐ = 23 **c** 25% of ☐ = 13

d 50% of ☐ = 38 **e** 25% of ☐ = 45 **f** 50% of ☐ = 6.5

g 25% of ☐ = 8.5 **h** 75% of ☐ = 15 **i** 75% of ☐ = 36

16 A clothes shop is having a sale.

Everything is reduced by 25%.

i For each item find the reduction.

ii What is the sale price of each item?

a Coat £80 **b** Jacket £48

c Jeans £60 **d** Shirt £32

e Boots £42 **f** Jumper £26

explanation 5a explanation 5b online

17 Find 10% of each of these amounts.

a £80 **b** £300 **c** £1700 **d** £25 000

e £92 **f** £7 **g** £234 **h** £67.50

i £9.40 **j** £27.80 **k** £0.70 **l** £1.50

18 **a** **i** Find 10% of 85 kg.

ii Explain why 20% of 85 kg is 17 kg.

iii Explain why 5% of 85 kg is 4.25 kg.

b Use your answers from part **a** to find 35% of 85 kg.

19 **a** Work these out.

i 10% of £640 **ii** 20% of £640 **iii** 5% of £640

b Use your answers from part **a** to find 35% of £640.

20 **a** Work these out.

i 10% of £125 **ii** 20% of £125 **iii** 40% of £125

b Use your answers from part **a** to find 70% of £125.

21 Work these out.

a	**i**	10% of 46 kg	**ii**	20% of 46 kg	**iii**	5% of 46 kg
b	**i**	10% of £24	**ii**	20% of £24	**iii**	40% of £24
c	**i**	10% of 60 m	**ii**	20% of 60 m	**iii**	30% of 60 m

22 **a** Find 10% of 35 m.

b Use Jenna's method to work out 30% of 35 m.

c Use Amir's method to work out 70% of 35 m.

23 **a** Find 10% of £12.50.

b Find 30% of £12.50.

c Find 70% of £12.50.

24 A top sprinter can run at a speed of about 10 m/s.

A little known fact is that some crocodiles can reach up to 40% of this speed.

How fast can these crocodiles run?

25 Work these out.

a	**i**	10% of 120 people	**ii**	5% of 120 people	**iii**	95% of 120 people
b	**i**	20% of £70	**ii**	5% of £70	**iii**	15% of £70
c	**i**	30% of 150 g	**ii**	15% of 150 g	**iii**	45% of 150 g
d	**i**	5% of 28 litres	**ii**	15% of 28 litres	**iii**	85% of 28 litres
e	**i**	40% of 15 m	**ii**	5% of 15 m	**iii**	45% of 15 m

26 Marcus says, 'To find 10% you divide by 10. So is it true that to find 20% you divide by 20?'

a Explain why this is *not* true.

b What percentage would you find if you divided by 20?

c What number could you divide by to find 20%?

27 A train ticket costs £15. Next year the price will go up by 30%.

a How much does the price of a ticket go up by?

b What will be the new price of the ticket?

28 A new bicycle costs £180. In the sale it is reduced by 20%.

a How much does the price of the bike go down by?

b What will be the new price of the bike?

29 A school has 120 pupils this year. Next year the number of pupils will go up by 40%.

a How many more pupils will this be?

b How many pupils will there be next year?