Do now

6 Write down 10% of these amounts.
  a 100 g   **b** 70 km   **c** $450   **d** $8000   **e** $5   **f** 90 c

7 Find:
  a 25% of $400   **b** 75% of 80 m   **c** 50% of $3

  d 10% of $678   **e** 1% of 600 days   **f** $\frac{1}{2}$% of 600 days

8 Complete the following.
  a 1% of 60 = 60 divided by ☐   **b** 10% of 50 = 50 divided by ☐

  c 5% of 100 = 100 divided by ☐   **d** $33\frac{1}{3}$% of 963 = 963 divided by ☐

  e 25% of 88 = 88 divided by ☐

9 Find $33\frac{1}{3}$% of 6300 km.

10 Which is larger: 56% of 78 or 87% of 65?

11 Copy and complete:
  a 1 week = ☐ days   **b** 1 year = ☐ days
  c 1 year = ☐ weeks   **d** 1 year = ☐ months

12 How many hours are there from:
  a 5 a.m. to 7 p.m.?   **b** 9 a.m. to 3 p.m.?   **c** 8:30 a.m. to 9 p.m.?

Applying percentages

WALT find percentage of amounts /quantity and finding original amoun.
SUccess Criteria

Check your answers for Do Now

6 a 10 g   **b** 7 km   **c** $45

     d $800   **e** 50 c   **f** 9 c

7 a $100   **b** 60 m   **c** $1.50

     d $67.80   **e** 6 days   **f** 3 days

8 a 100   **b** 10   **c** 20   **d** 3   **e** 4

9 2100 km

10 87% of 65

11 a 7   **b** 365   **c** 52   **d** 12

12 a 14   **b** 6   **c** 12.5

Something to think about

The media often quotes percentages in news stories and advertisements. For example:
- 90% of dentists prefer this toothbrush.
- There is a 45% chance of rain.
- A swing of 5% towards the Liberals is expected in the next election.

It is important to be able to find a percentage of a quantity or amount.

▶ Let's start: Today's newspaper challenge

In pairs, go through today's newspaper and find articles and advertisements that use percentages. Choose two and explain to the class how percentages are used in the items you choose.

1 Find these percentage amounts mentally.
  a 10% of $40   **b** 5% of $40
  c 25% of 8 kg   **d** 75% of 8 kg
  e 1% of $800   **f** 2% of 140 seconds

2 If 1% of an amount is $4, what is 100% of the amount?

3 True or false? 34% of $568 = 0.34 \times 568$

Example 4 | **Finding a percentage of a quantity**

Find 15% of $35.

Solution

$$15\% \text{ of } \$35 = \frac{\overset{3}{\cancel{15}}}{\underset{20}{\cancel{100}}} \times \$35$$
$$= \$5.25$$

Explanation

Write the percentage as a fraction out of 100 and multiply by $35.
Or:
Write 0.15×35.
Note: 'of' means to 'multiply'.

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4 Find the following amounts.

a 10% of 20	**b** 5% of 200	**c** 20% of 40
d 15% of 50	**e** 8% of 720	**f** 5% of 680
g 15% of 8200	**h** 70% of 60	**i** 90% of 500
j 75% of 44	**k** 99% of 200	**l** 3% of 50

$10\% \text{ of } 20 = \dfrac{10}{100} \times 20$

5 Find:

a 10% of $360	**b** 50% of $420	**c** 75% of 64 kg
d 12.5% of 240 km	**e** 37.5% of 40 apples	**f** 87.5% of 400 m
g $33\frac{1}{3}\%$ of 750 people	**h** $66\frac{2}{3}\%$ of 300 cars	**i** $8\frac{3}{4}\%$ of $560

Example 5 | **Finding the original amount**

Determine the original amount if 5% of the amount is $45.

Solution

5% of the amount = $45
1% of the amount = $9
100% of the amount = $900
So the original amount is $900

Explanation

To use the unitary method, find the value of 1 part or 1% then multiply by 100 to find 100%.

6 Determine the original amount if:
   a 10% of the amount is $12
   b 6% of the amount is $42
   c 3% of the amount is $9
   d 40% of the amount is $2.80
   e 90% of the amount is $0.18
   f 6% of the amount is $27
   g 12% of the amount is $96
   h 15% of the amount is $54

> First find the value of 1%.

7 Determine the value of x in the following if:
   a 10% of x is $54
   b 15% of x is $90
   c 25% of x is $127
   d 18% of x is $225
   e 105% of x is $126
   f 110% of x is $44

> x is the original amount.

Problem-solving and Reasoning

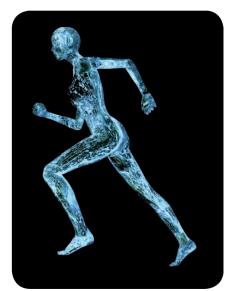**8** Without a calculator, evaluate the following.
   a 10% of $58
   b 5% of $84
   c 1% of $46
   d $2\frac{1}{2}$% of $20
   e $33\frac{1}{3}$% of $132
   f $66\frac{2}{3}$% of $60

> $33\frac{1}{3}\% = \frac{1}{3}$

9 If $\frac{1}{3}$ of 96 = 32, what is $66\frac{2}{3}$% of 96?

10 If 10% of $800 is $80, explain how you can use this result to find:
   a 1% of $800
   b 5% of $800
   c $2\frac{1}{2}$% of $800

11 About 80% of the mass of the human body is water. If Carla weighs 60 kg, how many kilograms of water make up her body weight?

12 In a class of 25 students, 40% have been to England. How many students have not been to England?

13 Explain why 10% of 24 = 24% of 10.

14 10% of 1 day is the same as x hours and y minutes. What is the value of x and y?

15 a Find 120% of 60.
b Determine the value of x if 165% of $x = 1.5$.
c Write 2.80 as a percentage.
d Write 325% as a fraction.
e $2000 in a bank account increases to $5000 over a period of time. By how much has the amount increased as a percentage?

Check your answers

1 a $4 **b** $2 **c** 2 kg **d** 6 kg **e** $8 **f** 2.8 seconds
2 $400
3 T

4 a	2	b	10	c	8	d	7.5
	e	57.6	f	34	g	1230	h	42
	i	450	j	33	k	198	l	1.5

4 a 2 **b** 10 **c** 8 **d** 7.5
 e 57.6 **f** 34 **g** 1230 **h** 42
 i 450 **j** 33 **k** 198 **l** 1.5
5 a $36 **b** $210 **c** 48 kg
 d 30 km **e** 15 apples **f** 350 m
 g 250 people **h** 200 cars **i** $49
6 a $120 **b** $700 **c** $300 **d** $7
 e $0.20 **f** $450 **g** $800 **h** $360
7 a $540 **b** $600 **c** $508
 d $1250 **e** $120 **f** $40
8 a $5.80 **b** $4.20 **c** $0.46
 d $0.50 **e** $44 **f** $40
9 64
10 a divide by 10
 b divide by 2
 c divide by 2 and then 2 again (or just 4)
11 48 kg
12 15 students
13 $\frac{10}{100} \times 24 = \frac{24}{100} \times 10$ as $\frac{24 \times 10}{100}$, can multiply in any order
14 $x = 2, y = 24$
15 a 72 **b** $\frac{10}{11}$ **c** 280% **d** $3\frac{1}{4}$ **e** 150%