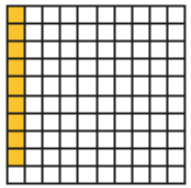
Week 8 – Lesson 1 – Understand Percentages

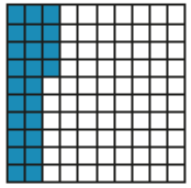
Understand percentages

1 Complete the sentence for each diagram.

a) 

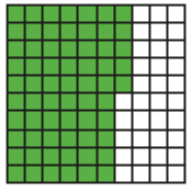
There are ☐ parts out of a hundred shaded.

This is ☐ %.

b) 

There are ☐ parts out of a hundred shaded.

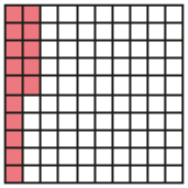
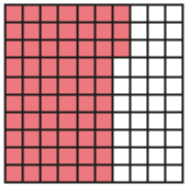
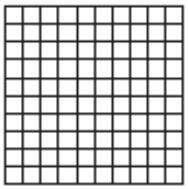
This is ☐ %.

c) 

There are ☐ parts out of a hundred shaded.

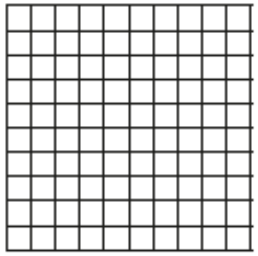
This is ☐ %.

2 Complete the table.

Hundred square	Percentage
	
	
	82%

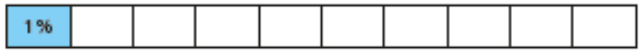
3 Shade 15% of the hundred square red.

Shade 32% of the hundred square blue.



What percentage of the hundred square is not shaded? ☐ %

4 a) Is 1% of this bar model shaded? _____

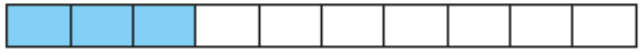


Explain your reasoning.

_____

_____

b) What percentage of each bar model is shaded?



☐ %

☐ %

5 Passengers are boarding a plane.

The plane has 100 seats.

a) 10% of the seats are already full.

How many passengers are already on the plane? ☐

b) 15% of the seats have not been booked.

How many seats have been booked? ☐

c) How many passengers still need to board the plane? ☐

6 Dexter has £1 to spend.

He buys some stickers.

What percentage of his money did Dexter spend?

☐ %

7 Aisha and Brett have been selling tickets for the school play.

There are 100 seats available.

- On Monday they sold 34% of the tickets.
- On Tuesday they sold 42 tickets.
- By the end of Wednesday, 95% of the tickets had been sold.

How many tickets did they sell on Wednesday?

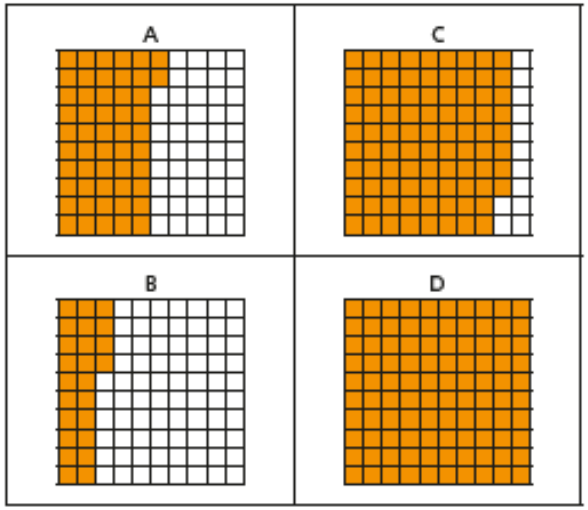
On Wednesday they sold ☐ tickets.

8 Shade 85% of this bar model.

Compare answers with a partner.

Percentages as fractions and decimals

1 Here are four hundred squares.

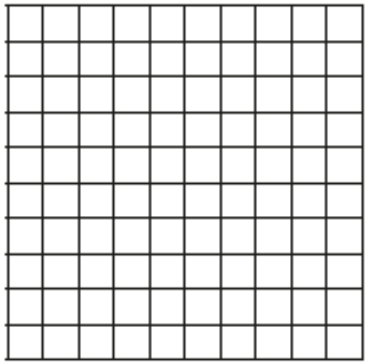


Complete the table.

Hundred square	Percentage	Fraction	Decimal
A		$\frac{52}{100}$	
B			
C			
D			

2 Prove that 0.2 is equal to 20%.

You may use the hundred square to help you.



Why do you think some people think that 0.2 is equal to 2%?

3 Complete the fraction, decimal and percentage equivalents.

a) 32% = $\frac{\square}{100}$ = $\square$

35% = $\frac{\square}{100}$ = $\square$

48% = $\frac{\square}{100}$ = $\square$

b) $\frac{17}{100}$ = $\square$ % = $\square$

$\frac{9}{100}$ = $\square$ % = $\square$

$\frac{90}{100}$ = $\square$ % = $\square$

c) 0.29 = $\square$ % = $\frac{\square}{100}$

0.71 = $\square$ % = $\frac{\square}{100}$

0.03 = $\square$ % = $\frac{\square}{100}$

4 Write <, > or = to complete the statements.

a) 50% ◯ $\frac{5}{100}$

b) 25% ◯ $\frac{50}{100}$

c) 14% ◯ $\frac{41}{100}$

d) $\frac{40}{100}$ ◯ 40%

e) $\frac{70}{100}$ ◯ 7%

f) 82% ◯ $\frac{82}{100}$

5 Write the values in order from smallest to greatest.

a) 33% $\frac{30}{100}$ 3% $\frac{13}{100}$

_____

b) 299% $\frac{91}{100}$ 9% $\frac{9}{10}$

_____

c) 2.5 $\frac{25}{100}$ 250 25% of 100 $\frac{25}{1000}$

_____

6 Convert the fractions to hundredths.

Complete the decimal and percentage equivalents.

a) $\frac{150}{300} = \frac{\square}{100} = \square = \square$ %

b) $\frac{25}{500} = \frac{\square}{100} = \square = \square$ %

c) $\frac{48}{300} = \frac{\square}{100} = \square = \square$ %

d) $\frac{18}{50} = \frac{\square}{100} = \square = \square$ %

e) $\frac{13}{25} = \frac{\square}{100} = \square = \square$ %

7 Circle all the fractions that are greater than or equal to 50%.

$\frac{10}{50}$	$\frac{4}{5}$	$\frac{50}{100}$
$\frac{30}{80}$	$\frac{1}{50}$	$\frac{70}{140}$

8 Jack and Dora go shopping with the same amount of money.

Jack spends $\frac{1}{3}$ of his money.

Dora spends 30% of her money.

a) Who spends more money? _____

Use fraction and percentage equivalence to explain your answer.

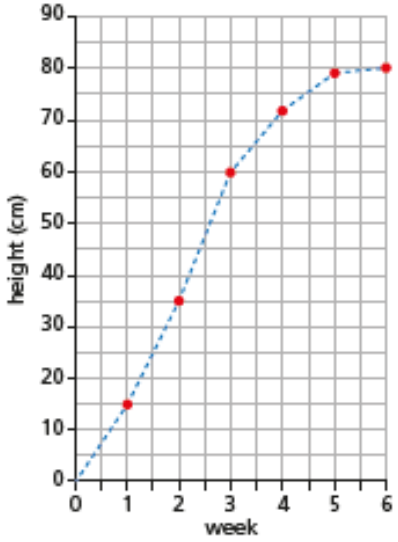
b) Jack and Dora each started with £300

How much money do they each have left?

Jack ☐ Dora ☐

Read and interpret line graphs

1 The graph shows the height of a sunflower on the first day of each week for 6 weeks.



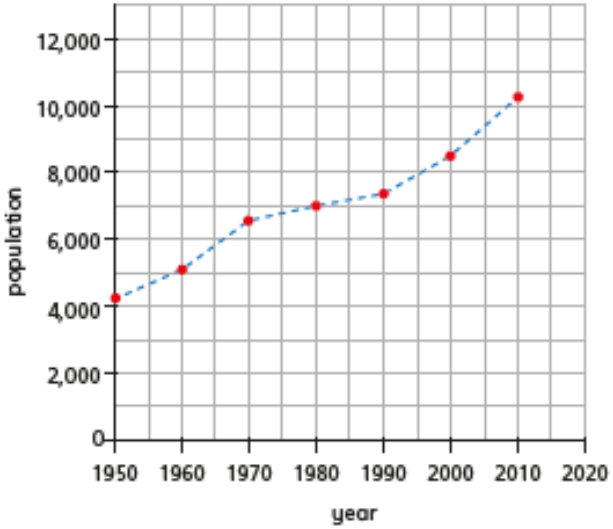
a) What is the height of the sunflower at the start of week 3?

b) What is the height of the sunflower at the start of week 2?

c) Eva thinks the height of the sunflower at the start of week 4 is 75 cm. Explain why Eva is wrong.

d) By how much does the sunflower grow from the start of week 3 to the start of week 6?

2 The graph shows the population of a town at the end of each decade from 1950 to 2000



a) What was the population at the end of 1980?

b) What was the population at the end of 2000?

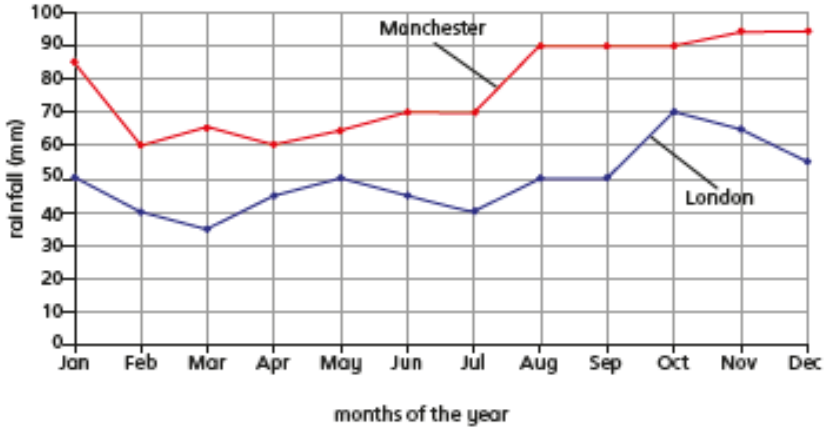
c) Can you accurately tell the population in 1991? Why?

d) Which decade had the least population increase?

e) Predict the population at the end of 2020

Compare answers with a partner.

3 This graph shows the average rainfall in London and Manchester to the nearest 5 mm.



a) How many millimetres of rain falls in London in May? ☐

b) Which months are the driest in Manchester?

_____

c) Which is the wettest month in London? _____

d) In January, how much more rainfall is there in Manchester than London? ☐

e) How many months does it rain more than 50 mm in London and Manchester? ☐

f) How much more rainfall is there in Manchester than London in December? ☐

4 Energy is measured in kWh (kilowatt hours).

This graph shows the amount of energy being used at different times of the year in one household.

Describe three things that you know from looking at the graph.

_____

_____

_____

Describe three things that you could find out from the graph.

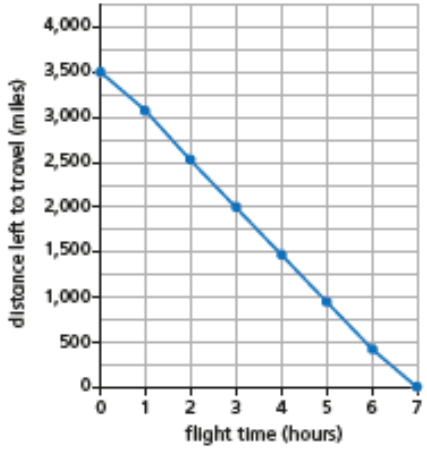
_____

_____

_____

Use line graphs to solve problems

1 This graph shows how many miles an aeroplane has left to travel each hour on its journey from London to New York.



a) How many hours is the flight?

b) How many miles is the journey from London to New York?

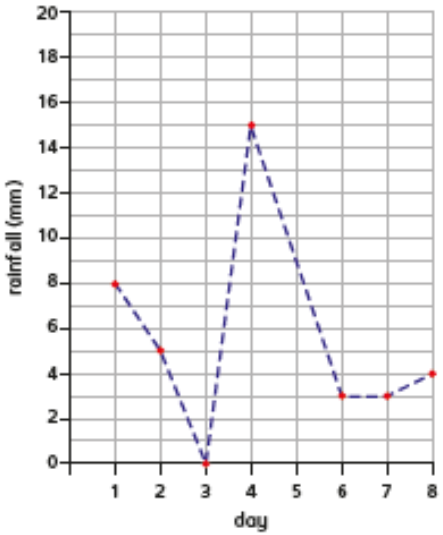
c) After 4 hours, how many more miles are left to travel?

d) How long does it take to fly the final 1,000 miles?

e) How many miles does the plane travel between 2 hours and 4 hours into the flight?

f) Estimate how far the plane has travelled after 3 hours and 30 minutes.

2 The graph shows the rainfall in the first 8 days in October.



a) How many millimetres of rain fell on the 7th October?

b) It rained every day in the first 8 days in October.

Is this statement correct? _____

Explain your answer.

_____

_____

c) The record amount of rainfall for October is 2.5 cm

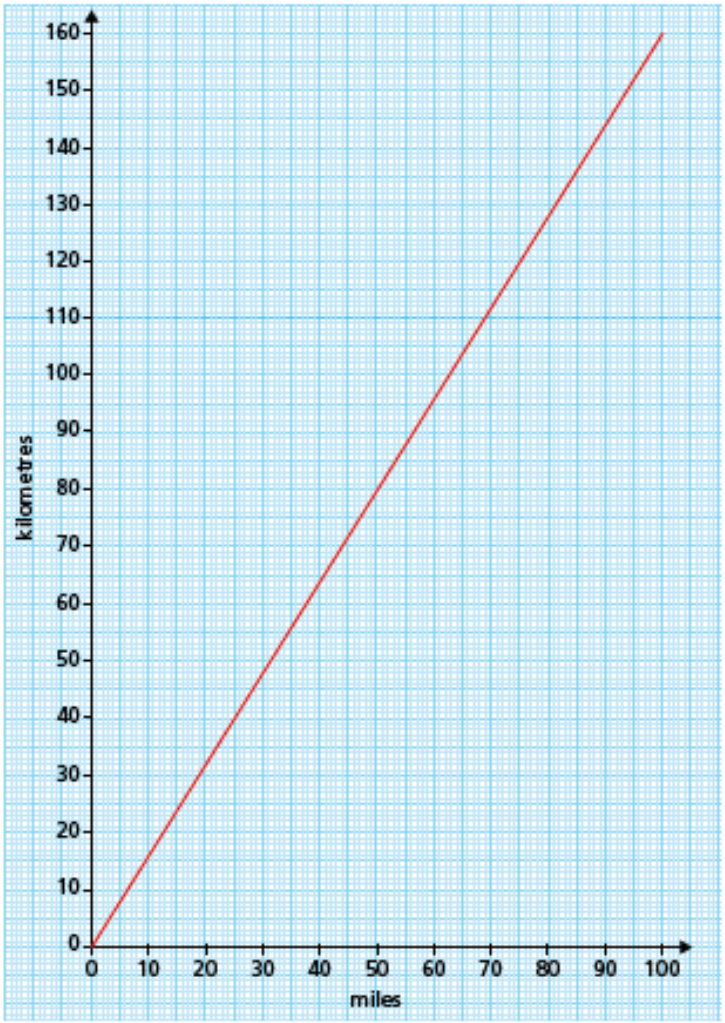
Has a new record been set? _____

Explain your answer.

_____

_____

3 This graph shows the conversion between miles and kilometres.



a) How many kilometres are there in 50 miles?

b) How many miles are there in 130 km?

c) Explain to a partner how you worked out the answers to part a) and b).

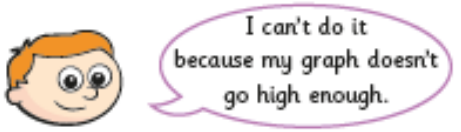
d) Eva cycles 60 miles.

Dexter cycles 80 km.

Who cycles the furthest? _____

How much further does the person cycle?

e) Ron wants to convert 800 km into miles.



Ron is incorrect. Explain why.

_____

_____

Complete the conversion.

Show your working.

800 km = ☐ miles

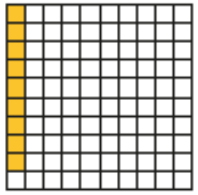
f) A high-speed train can travel up to 400 km in an hour.

How many miles can it travel in an hour?

Week 8 – Lesson 1 - ANSWERS

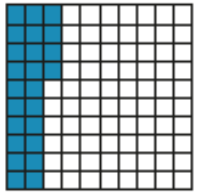
Understand percentages

1 Complete the sentence for each diagram.

a) 

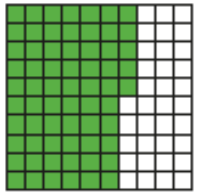
There are [9] parts out of a hundred shaded.

This is [9] %.

b) 

There are [24] parts out of a hundred shaded.

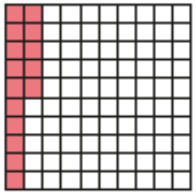
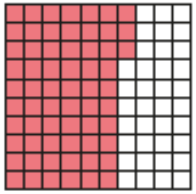
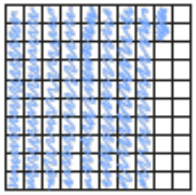
This is [24] %.

c) 

There are [65] parts out of a hundred shaded.

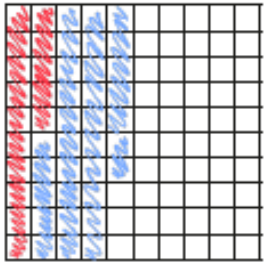
This is [65] %.

2 Complete the table.

Hundred square	Percentage
	15%
	63%
	82%

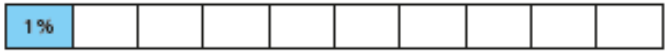
3 Shade 15% of the hundred square red.

Shade 32% of the hundred square blue.



What percentage of the hundred square is not shaded? [53] %

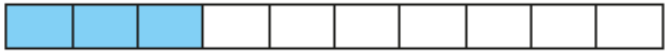
4 a) Is 1% of this bar model shaded? No



Explain your reasoning.

It's split into 10 parts so each part is 10%

b) What percentage of each bar model is shaded?



30 %

70 %

5 Passengers are boarding a plane.

The plane has 100 seats.

a) 10% of the seats are already full.

How many passengers are already on the plane? 10

b) 15% of the seats have not been booked.

How many seats have been booked? 85

c) How many passengers still need to board the plane? 75

6 Dexter has £1 to spend.

He buys some stickers.

What percentage of his money did Dexter spend?

£1 - 35p = 65p ← spent

65p / 100p

65 %

7 Aisha and Brett have been selling tickets for the school play.

There are 100 seats available.

- On Monday they sold 34% of the tickets. (34)
- On Tuesday they sold 42 tickets.
- By the end of Wednesday, 95% of the tickets had been sold. (95)

How many tickets did they sell on Wednesday?

34+42=76

95-76=19

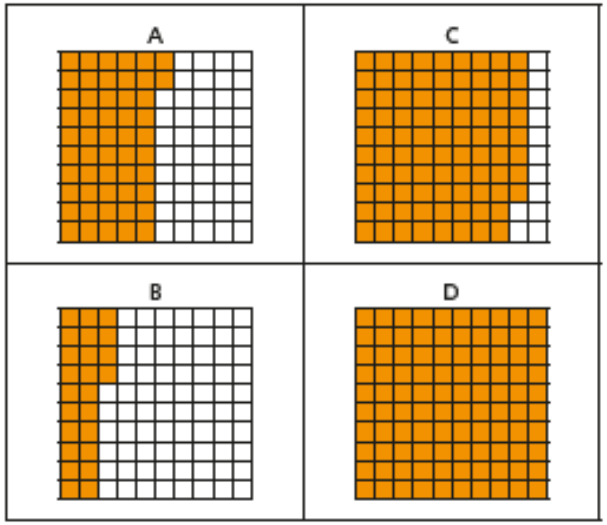
On Wednesday they sold 19 tickets.

8 Shade 85% of this bar model.

Compare answers with a partner.

Percentages as fractions and decimals

1 Here are four hundred squares.

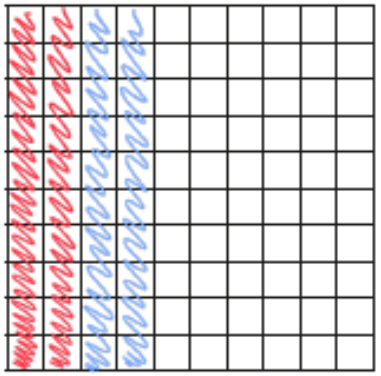


Complete the table.

Hundred square	Percentage	Fraction	Decimal
A	52 %	$\frac{52}{100}$	0·52
B	24 %	$\frac{24}{100}$	0·24
C	88 %	$\frac{88}{100}$	0·88
D	100 %	$\frac{100}{100}$	1

2 Prove that 0.2 is equal to 20%.

You may use the hundred square to help you.



0·2 = 2 tenths = $\frac{2}{10} = \frac{20}{100}$

20% = $\frac{20}{100}$

Why do you think some people think that 0.2 is equal to 2%?

3 Complete the fraction, decimal and percentage equivalents.

a) 32% = $\frac{32}{100}$ = 0·32

35% = $\frac{35}{100}$ = 0·35

48% = $\frac{48}{100}$ = 0·48

b) $\frac{17}{100}$ = 17 % = 0·17

$\frac{9}{100}$ = 9 % = 0·09

$\frac{90}{100}$ = 90 % = 0·9

c) 0.29 = 29 % = $\frac{29}{100}$

0.71 = 71 % = $\frac{71}{100}$

0.03 = 3 % = $\frac{3}{100}$

4 Write <, > or = to complete the statements.

a) 50% (>) $\frac{5}{100}$

b) 25% (<) $\frac{50}{100}$

c) 14% (<) $\frac{41}{100}$

d) $\frac{40}{100}$ (=) 40%

e) $\frac{70}{100}$ (>) 7%

f) 82% (=) $\frac{82}{100}$

5 Write the values in order from smallest to greatest.

a) 33% $\frac{30}{100}$ 3% $\frac{13}{100}$

3%, $\frac{13}{100}$, $\frac{30}{100}$, 33%

b) 299% $\frac{91}{100}$ 9% $\frac{9}{10}$

9%, $\frac{9}{10}$, $\frac{91}{100}$, 299%

c) 2.5 $\frac{25}{100}$ 250 25% of 100 $\frac{25}{1000}$

$\frac{25}{1000}$, $\frac{25}{100}$, 2·5, 25% of 100, 250

6 Convert the fractions to hundredths.

Complete the decimal and percentage equivalents.

a) $\frac{150}{300} = \frac{50}{100} =$ 0·5 = 50 %

b) $\frac{25}{500} = \frac{5}{100} =$ 0·05 = 5 %

c) $\frac{48}{300} = \frac{16}{100} =$ 0·16 = 16 %

d) $\frac{18}{50} = \frac{36}{100} =$ 0·36 = 36 %

e) $\frac{13}{25} = \frac{52}{100} =$ 0·52 = 52 %

7 Circle all the fractions that are greater than or equal to 50%.

$\frac{10}{50}$ $\frac{4}{5}$ $\frac{50}{100}$

$\frac{30}{80}$ $\frac{1}{50}$ $\frac{70}{140}$

8 Jack and Dora go shopping with the same amount of money.

Jack spends $\frac{1}{3}$ of his money.

Dora spends 30% of her money.

a) Who spends more money? Jack

Use fraction and percentage equivalence to explain your answer.

$\frac{1}{3} = \frac{10}{30}$

$30\% = \frac{3}{10} = \frac{9}{30}$

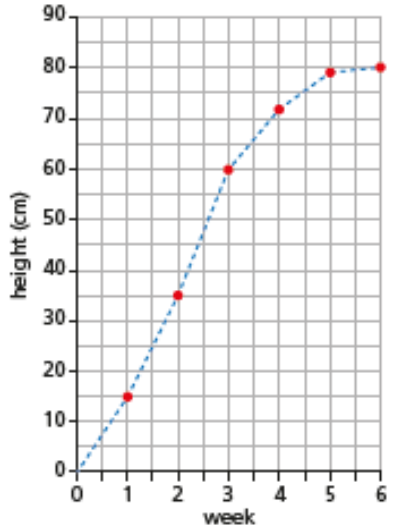
b) Jack and Dora each started with £300

How much money do they each have left?

Jack £200 Dora £210

Read and interpret line graphs

1 The graph shows the height of a sunflower on the first day of each week for 6 weeks.



a) What is the height of the sunflower at the start of week 3? 60cm

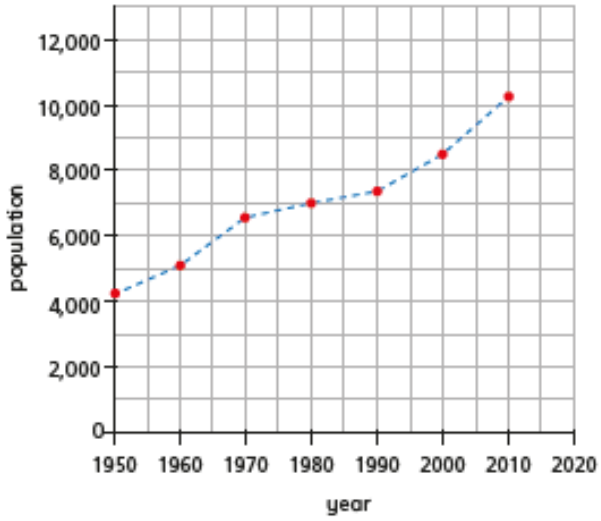
b) What is the height of the sunflower at the start of week 2? 35cm

c) Eva thinks the height of the sunflower at the start of week 4 is 75 cm. Explain why Eva is wrong.

She has read the graph wrong, it's between 70cm and 75cm.

d) By how much does the sunflower grow from the start of week 3 to the start of week 6? 20cm

2 The graph shows the population of a town at the end of each decade from 1950 to 2000



a) What was the population at the end of 1980? 7,000

b) What was the population at the end of 2000? 8,500

c) Can you accurately tell the population in 1991? Why?

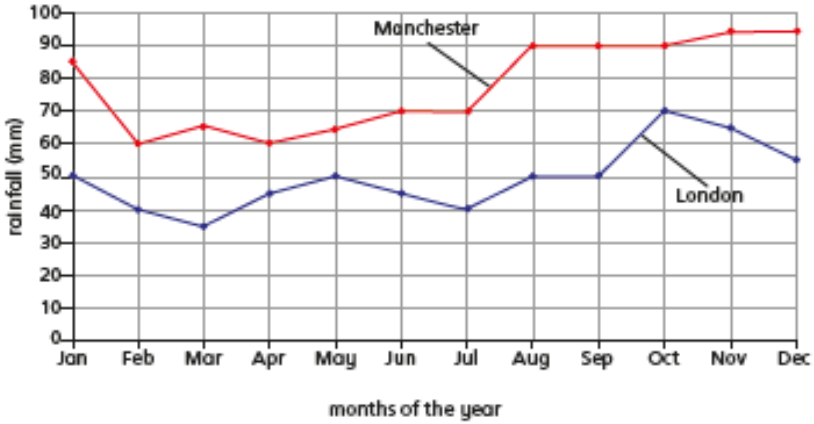
No. Various reasons acceptable e.g. it's only a bit into a square, it wasn't measured in that year.

d) Which decade had the least population increase? 1980

e) Predict the population at the end of 2020

Compare answers with a partner.

3 This graph shows the average rainfall in London and Manchester to the nearest 5 mm.



a) How many millimetres of rain falls in London in May? 50mm

b) Which months are the driest in Manchester?

February and April

c) Which is the wettest month in London? October

d) In January, how much more rainfall is there in Manchester than London? 35mm

e) How many months does it rain more than 50 mm in London and Manchester? 3

f) How much more rainfall is there in Manchester than London in December? 40mm

4 Energy is measured in kWh (kilowatt hours).

This graph shows the amount of energy being used at different times of the year in one household.

Describe three things that you know from looking at the graph.

e.g. Less energy is used in the middle of the year.

The least energy is used in August.

The most energy is used in December.

Describe three things that you could find out from the graph.

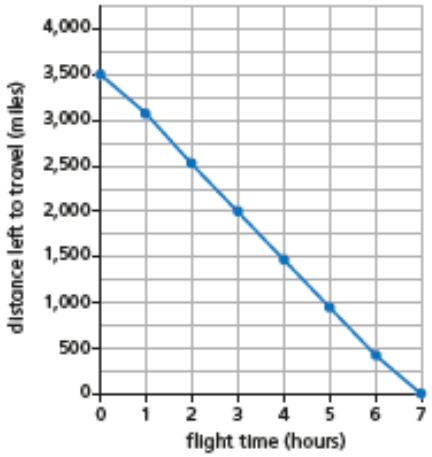
e.g. The difference in the amount of energy used.

The total amount of energy used.

The month with the largest change.

Use line graphs to solve problems

1 This graph shows how many miles an aeroplane has left to travel each hour on its journey from London to New York.



a) How many hours is the flight? 7

b) How many miles is the journey from London to New York? 3,500

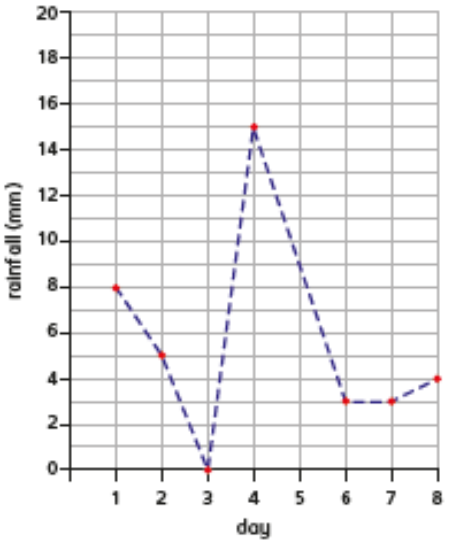
c) After 4 hours, how many more miles are left to travel? 1,500

d) How long does it take to fly the final 1,000 miles? 2 hours

e) How many miles does the plane travel between 2 hours and 4 hours into the flight? 1,000

f) Estimate how far the plane has travelled after 3 hours and 30 minutes. 1,750miles

2 The graph shows the rainfall in the first 8 days in October.



a) How many millimetres of rain fell on the 7th October? 3

b) It rained every day in the first 8 days in October.

Is this statement correct? No

Explain your answer.

It didn't rain on the 3rd

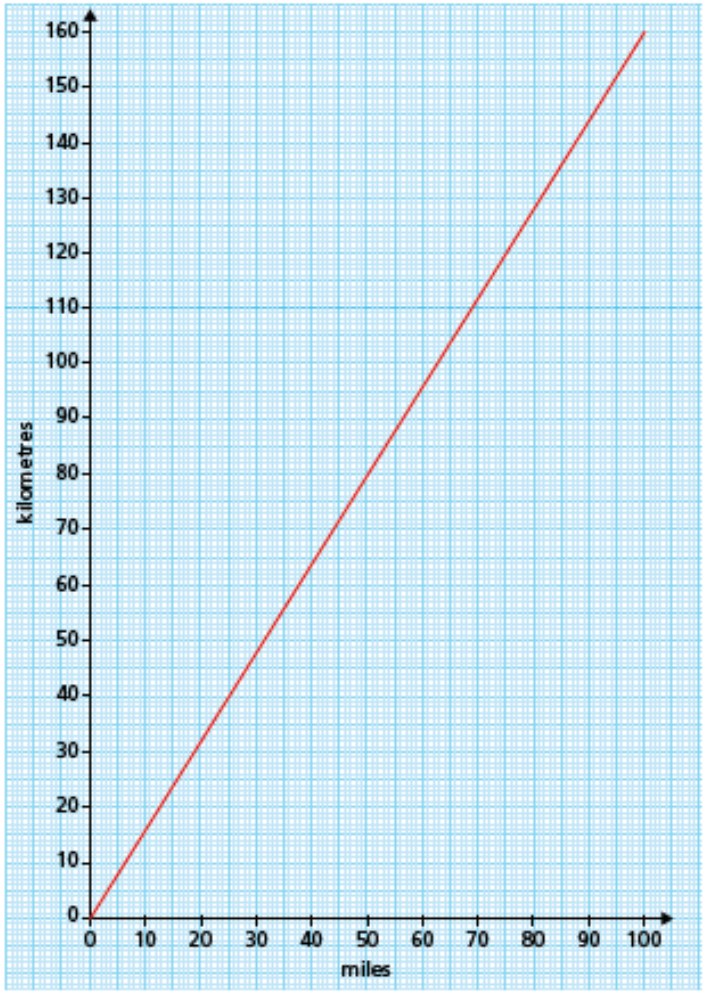
c) The record amount of rainfall for October is 2.5 cm

Has a new record been set? Yes

Explain your answer.

2·5cm = 25mm and 38mm fell in the first 8 days.

3 This graph shows the conversion between miles and kilometres.



a) How many kilometres are there in 50 miles? 80

b) How many miles are there in 130 km? 81

c) Explain to a partner how you worked out the answers to part a) and b).

d) Eva cycles 60 miles.

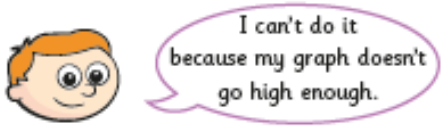
Dexter cycles 80 km.

Who cycles the furthest? Eva

How much further does the person cycle?

10 miles

e) Ron wants to convert 800 km into miles.



Ron is incorrect. Explain why.

You can convert 80km then multiply by 10

Complete the conversion.

Show your working.

800 km = 500 miles

f) A high-speed train can travel up to 400 km in an hour.

How many miles can it travel in an hour?

250