

Year 7

Percentages

Within this fortnight's unit, students will learn to:

- understand percentage as a fractional operator with denominator of 100
- express a part of a whole as a percentage
- convert between fractions, decimals and percentages
- find fractions and percentages of given quantities
- find the whole given a percentage
- increase and decrease by a percentage

Resources available for this unit:

[Ideas for reps \(multiplication\)](#)

[Ideas for depth](#)

[Coaching](#)

[Workbook](#)

[Departmental Workshop](#)

Question prompts (L1-5)

L1

What is percentage?

What manipulatives or representations are best for showing percentages? Why?

Why are equivalent fractions important?

What is one eighth as a percentage?

How does knowing one quarter as a percentage help to find one eighth as a percentage?

L2

How can a hundred square represent a percentage?

What does it mean if a percentage is greater than 100?

How does this compare to what you already know about fractions?

How can we compare fractions, decimals and percentages?

L3

What is an other way of saying 50% / 25% / etc of an amount?

If you can find 50% and 10% of an amount, what other percentages can you find?

What percentages do you need to know to find (e.g.) 26% of a quantity?

How many ways can you find 45% of an amount?

Which method do you prefer? Why?

L4

What is one third as a percentage? How can you prove this?

What mistakes might people make writing one third as a percentage?

If you know 10% / 20% / 25% / etc, how can you find the whole? How can you convince me with a bar model?

If you know 40%, what different strategies can you use to find the whole?

How many strategies can you think of for finding the whole given 17%?

L5

Why might it be useful to convert fractions into percentages?

Which of these test scores is higher? How do you know? How could you compare them?

How could we write this as a percentage? Which numbers would be the numerator and denominator? Why?

How can equivalent fractions help us?

How do you know what the total is?

Question prompts (L6-10)

L6

What does it mean if we increase / decrease by a percentage?

How can finding percentages of a quantity be useful?

What is the whole? What is the starting value?

How could we represent the original value / quantity?

Why is it important to know what value represents 100%?

What percentage did we increase / decrease by if we end up with 125% / 80% / etc?

L7

How can finding percentages of a quantity be useful?

If we increase then decrease by the same percentage, what happens? Why? Is this always true?

Why is it important to know what value represents 100%?

L8

What possible values can you have if increasing or decreasing these numbers by%?

How could you be systematic to find the matching values?

Which of the dimensions have been increased?

What would you expect the new values to be if this conjecture was correct? How could you prove it? What calculations would help you?

Why might people think that conjecture is true? What mistake have they made?

L9

Why might percentages be useful / misleading on cereal packets?

Do you think the red / amber / green system constraints will always remain the same?

Why is it important for the details to be clear?

L10

What different offers do you see in shops?

What does '50% extra free' mean?

Why might some of these offers be misleading / unhelpful?

Are supermarket offers always better value?

How can a bar model help?

Thursday, 04 June 2020

Lesson 1

Representing fractions, decimals and percentages (1)

Key learning

Find equivalent fraction with denominator 100

Convert between fractions decimals and percentage

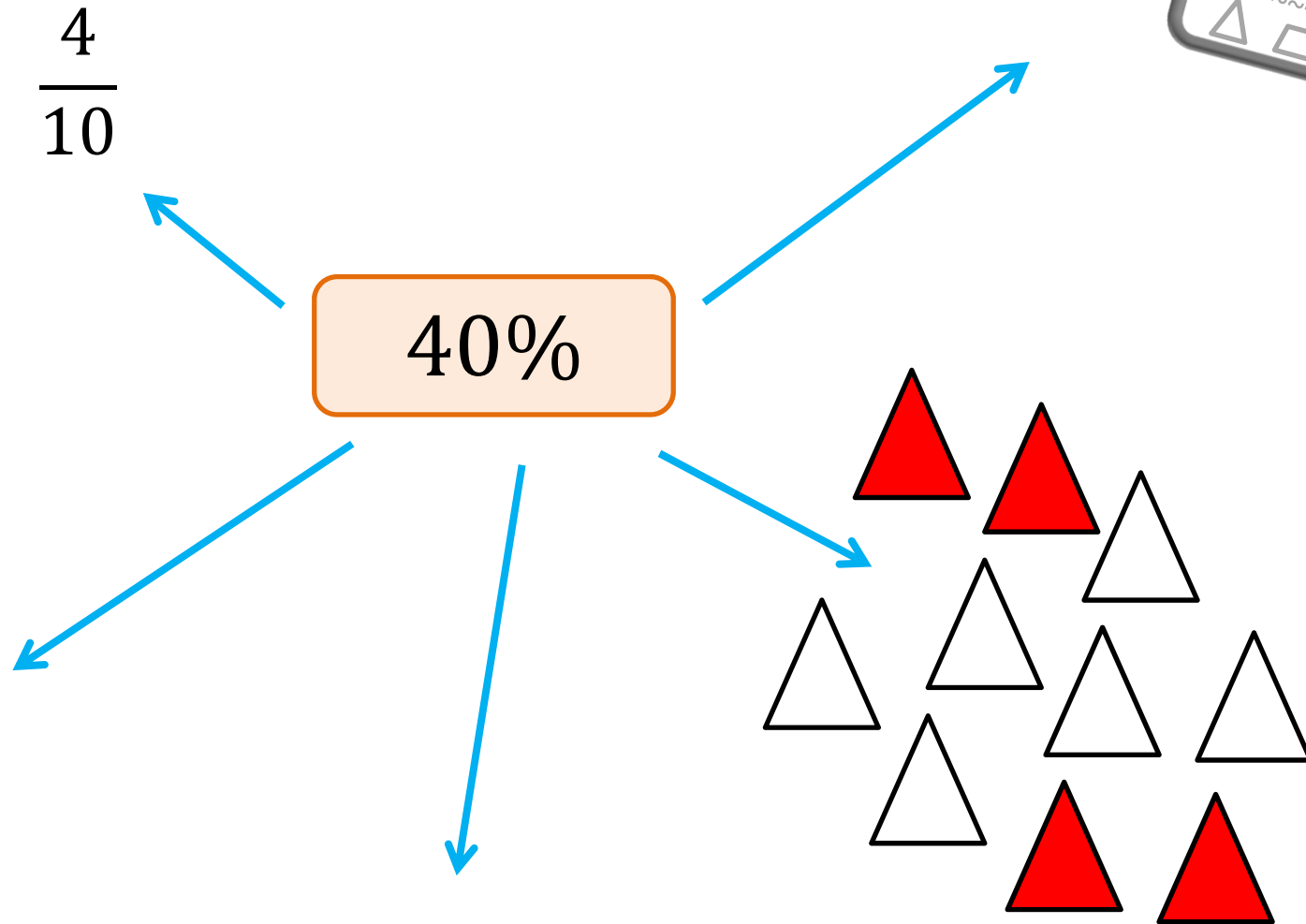
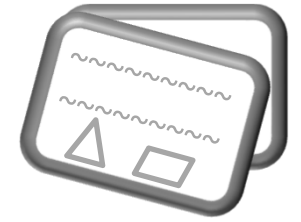
Compare fractions decimals and percentage



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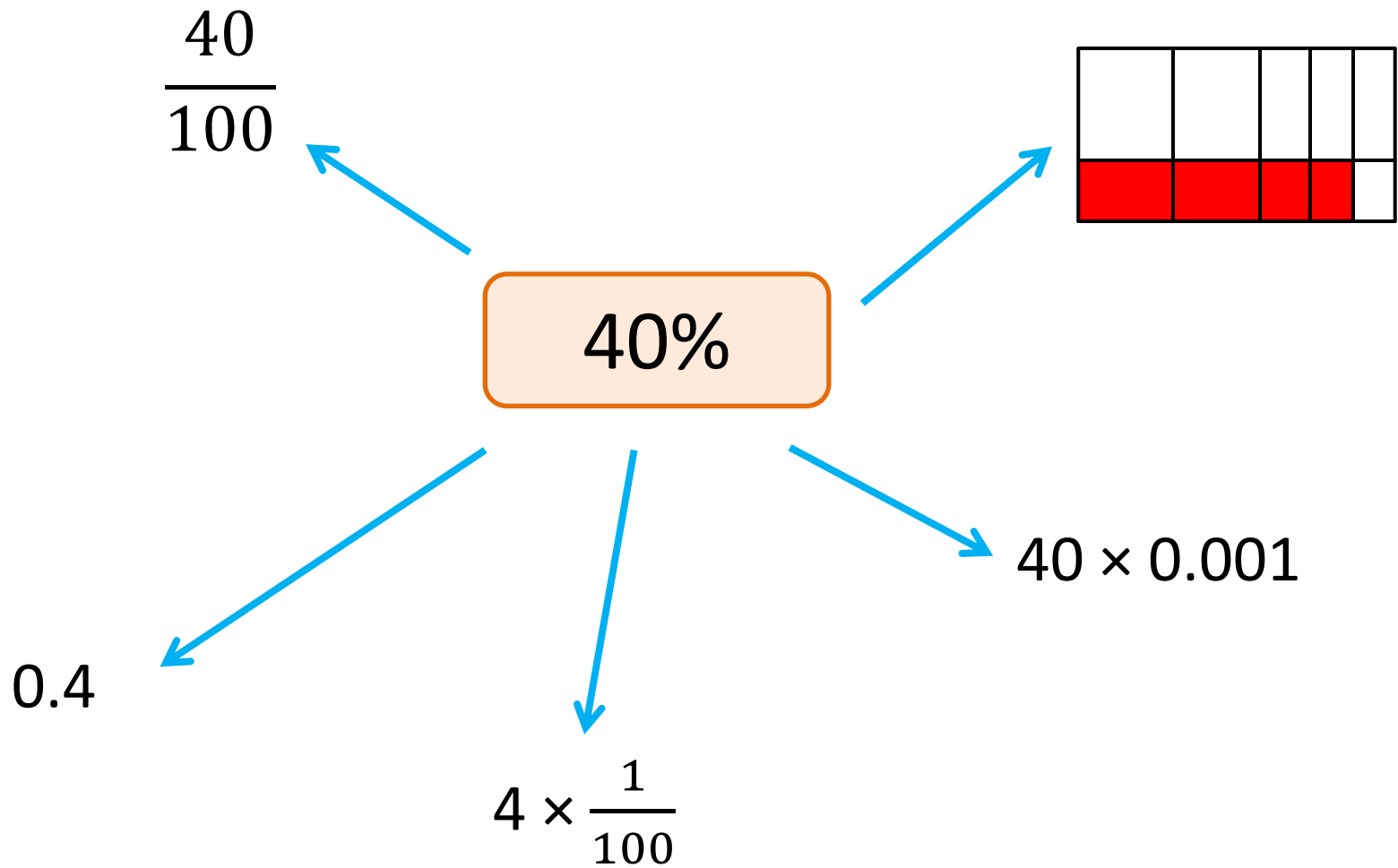
Y7U20

Do Now



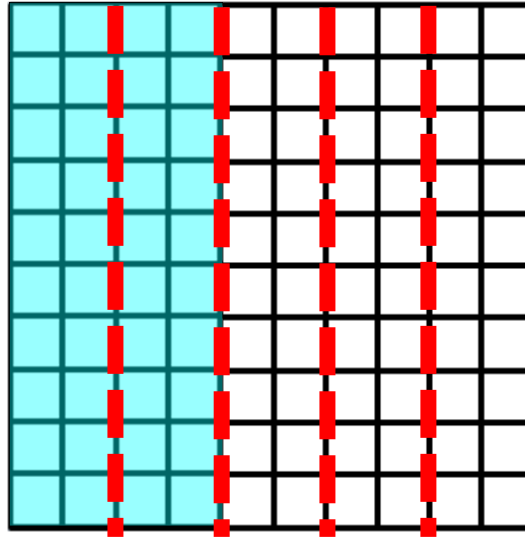
What different representations for this number can you think of?

Do you agree?



Do you agree with all of these representations?

Representing 40%

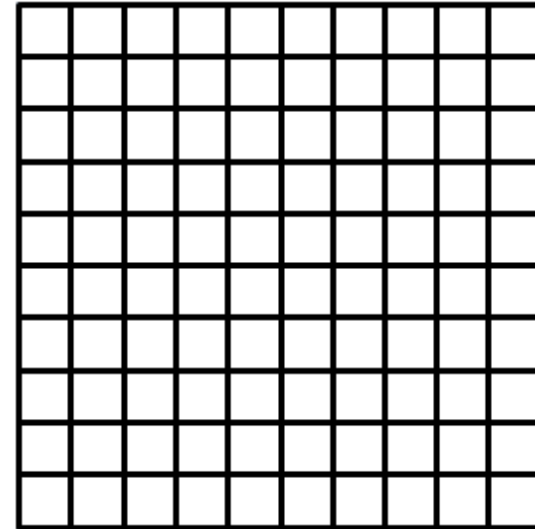


40% is the same as two-fifths

How do you know that?

Percentages

How could you show these percentages?



75 %

40 %

31 %

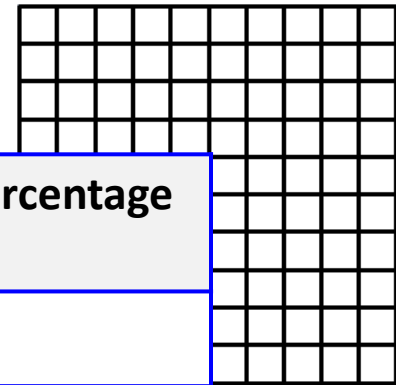
How many different fractions or decimals can you write each percentage as?

Bead string maths

Let the whole bead string or hundred square represent one whole.



Complete the table below.



Number of beads / squares	Fraction	Decimal	Percentage
10			
	$\frac{3}{10}$		
			64%
		0.07	
86			
	$\frac{24}{30} = \frac{4}{5}$		

What if the whole bead string / square represented **one half**?
How would this change the values you entered in the table?

Making groups

What's the same and what's different about these numbers?

0.1

30%

$\frac{1}{4}$

10%

$\frac{1}{2}$

$\frac{3}{4}$

$\frac{1}{10}$

$\frac{1}{25}$

0.3

75%

Group them in as many different ways as you can.

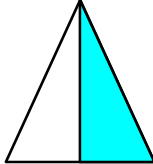
For each group, add another number that is greater than the others in the group.

Odd one out

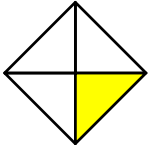
For each triplet of values, find the odd one out.

You must be able to explain your reasons.


20% $\frac{1}{5}$ 0.02

0.5  $\frac{4}{2}$

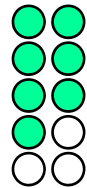
$\frac{3}{4}$ 7.5% 0.75

25% $100 \div 25$ 

$\frac{7}{20}$ 0.72 35%

0.3  $\frac{3}{10}$

70% $10 \div 7$



$\frac{1}{8}$ $25 \div 2$ 12.5%

$\frac{12}{36}$ 0.3 $33\frac{1}{3}\%$

Replace the odd one out in each group to match the other numbers.



Eighths as %

$$\frac{1}{8}$$

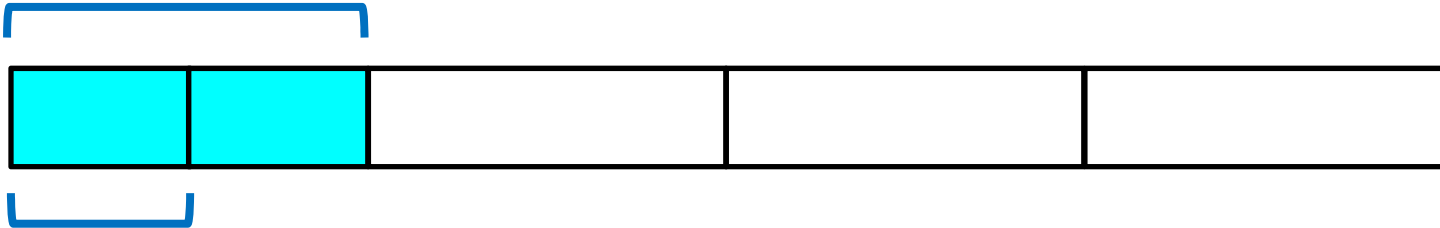
$$25 \div 2$$

$$12.5\%$$

$$\frac{1}{2} = 50\%$$

$$\frac{1}{4} = 25\%$$

$$\frac{1}{8} = ?\%$$



One eighth

$$\frac{1}{8}$$

I know $\frac{1}{8}$ is half of $\frac{1}{4}$.

If $\frac{1}{4}$ is 25%, that means

$\frac{1}{8}$ is 12.5%.

I know $\frac{1}{8}$ means $1 \div 8$.

$$\begin{array}{r} 0.125 \\ 8 \overline{) 1.000} \end{array}$$

and 0.125 is 12.5%

Conversions

Convert each of the following to a decimal and a percentage.


$$\frac{3}{8}$$

$$\frac{5}{8}$$

$$\frac{7}{8}$$

$$\frac{3}{40}$$

$$\frac{3}{16}$$


$$\frac{1}{3}$$


$$\frac{2}{3}$$

I know $\frac{1}{8}$ is 12.5% so ...

I can use division to convert to a decimal first...



Show me two ways

Choosing one of the fractions below. Explain how you can convert it into a percentage.


$$\frac{1}{2}$$

$$\frac{3}{4}$$

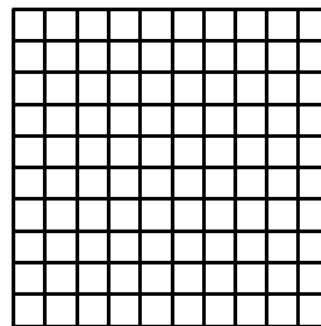
$$\frac{2}{5}$$

$$\frac{11}{20}$$

$$\frac{3}{8}$$


$$\frac{5}{24}$$

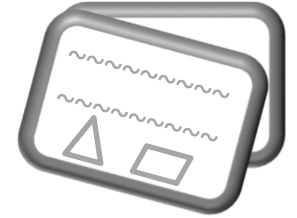
How many different ways can you explain how to convert a fraction into a percentage? Use manipulatives or diagrams to help.



Conversion strategies

How could you use this fact to help convert $\frac{3}{40}$ into a percentage?

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



$$\frac{3}{40} = \underline{\quad} \%$$

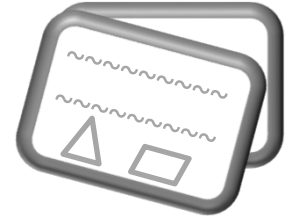
X

Hint

Conversion strategies

How could you use this fact to help convert $\frac{3}{16}$ into a percentage?

$$\frac{3}{4} = 75\%$$



$$\frac{3}{16} = \underline{\quad} \%$$

X

Hint

Thursday, 04 June 2020

Lesson 2

Representing fractions, decimals and percentages (2)

Key learning

Representing percentages greater than 100.

Converting between fractions, decimals and percentages

Comparing fractions, decimals and percentage

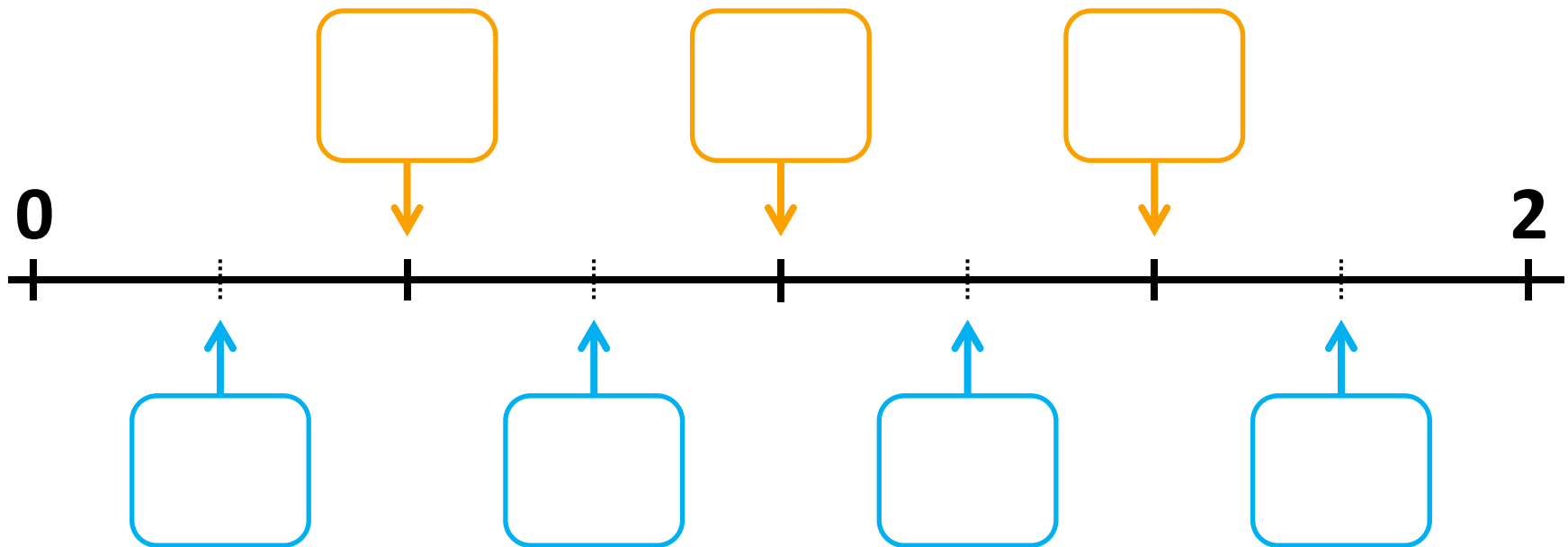


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Do Now

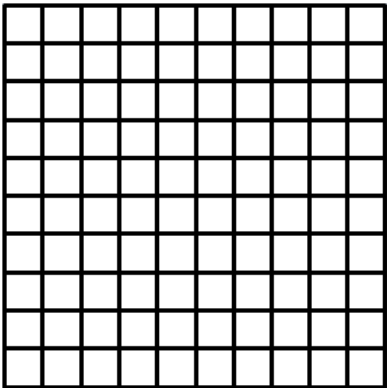
How many different ways can you fill in the spaces on this number line?



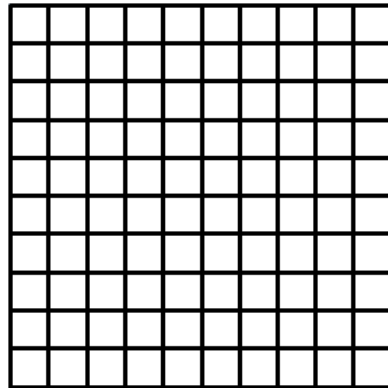
Where would the answer to $\frac{3}{8} \div 0.6 \times 1\frac{3}{5}$ go on the number line?

Percentage comparison

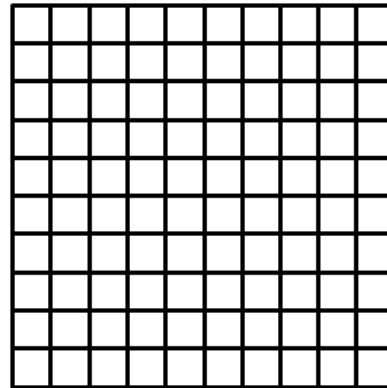
Which of these percentages is closest to $\frac{7}{20}$?



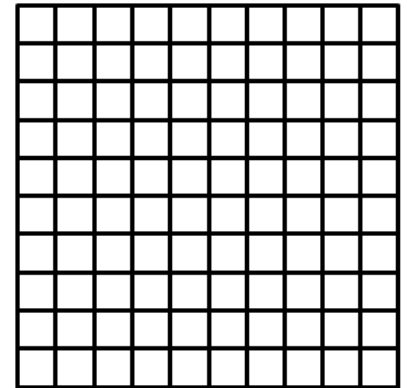
25%



30%



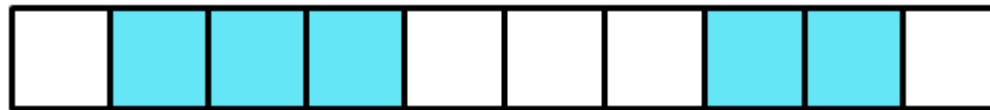
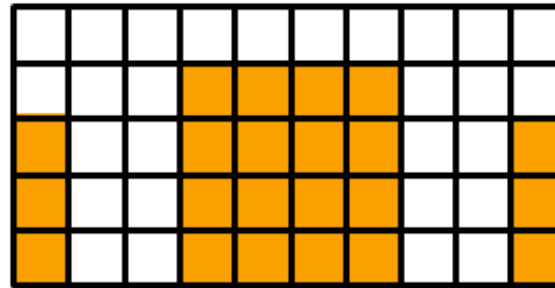
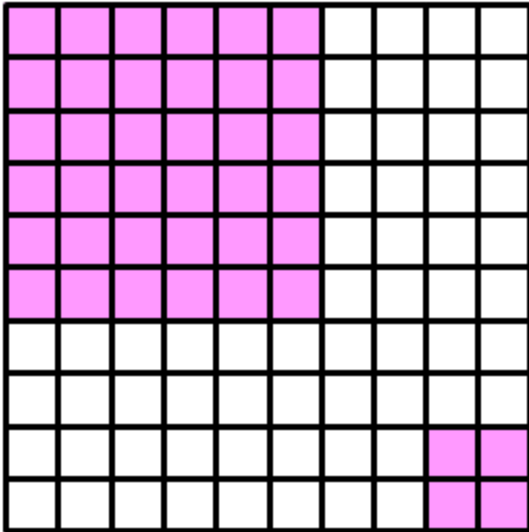
33%



36%

Percentage grids

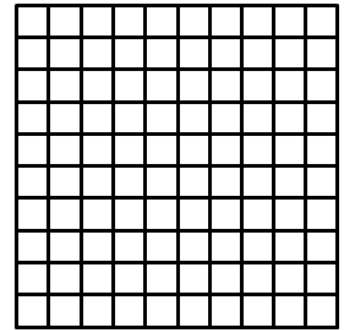
Which of these grids has the smallest percentage shaded?



Draw different sized grids to the ones above. Shade them in so the percentages shaded lie between the values above.

True or false?

Shade in the percentages and fractions on 100 grids to decide if these statements are true or false.



$$50\% > \frac{3}{5}$$

$$25\% > \frac{3}{10}$$

$$\frac{7}{25} < 25\%$$

$$\frac{3}{20} < 20\%$$

$$\frac{1}{5} < 12.5\% < \frac{1}{10}$$

$$10\% < \frac{1}{8} < \frac{3}{25}$$

$$\frac{1}{4} > 23\% > \frac{1}{5}$$

$$66\% > \frac{2}{3} > 65\%$$

Write your own double comparisons for the following percentages:

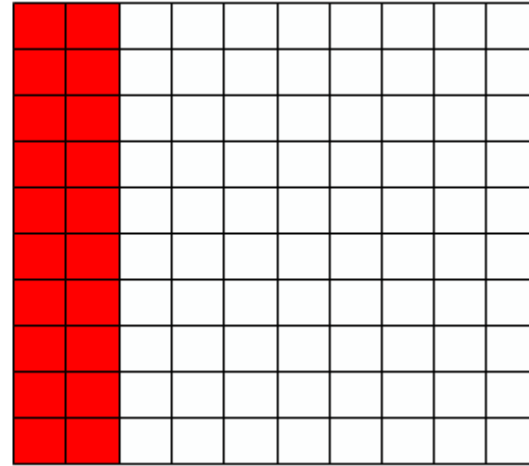
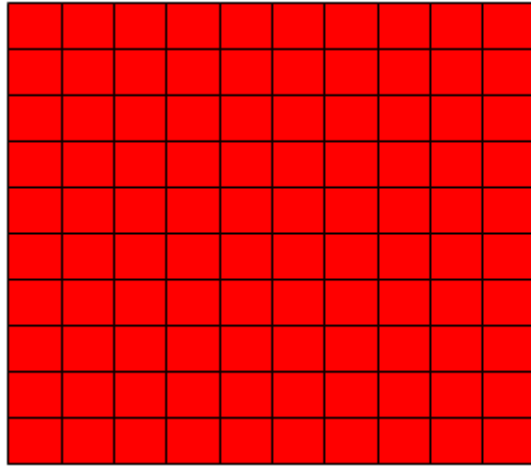
62.5%

1.25%

134%

0.75%

120%?

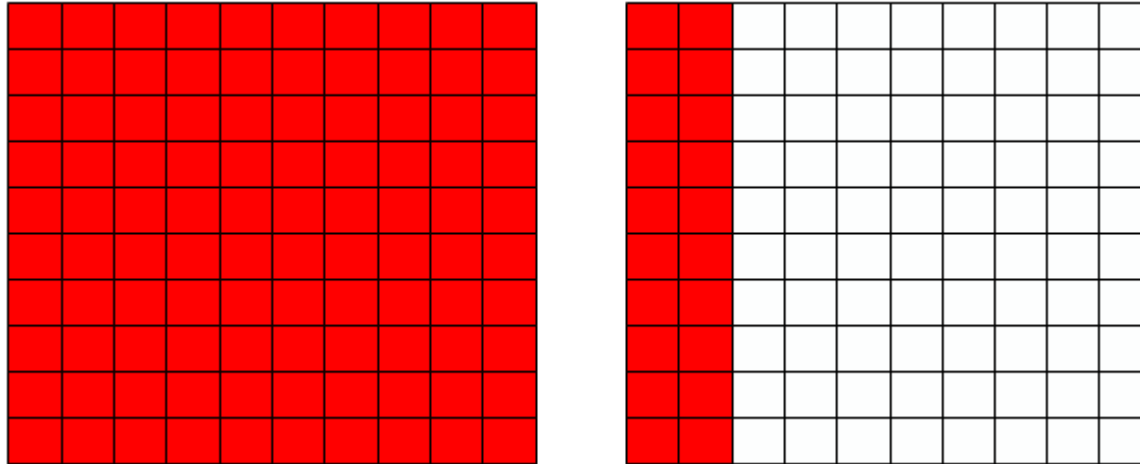


120% is an improper percentage.

No, you get improper fractions, not percentages.

Do you agree with either statement? Why?

120%?



120% means 100% and 20%, so that's 1 whole and

Write 120% as a fraction and a decimal.

Common denominator

Write these numbers as a fraction with denominator 100.

$$\frac{1}{10}$$

$$\frac{21}{20}$$

0.4

$$\frac{1}{4}$$

0.01

100

0.85

$$\frac{19}{25}$$

2.05

0.76

$$2\frac{4}{5}$$

1.7



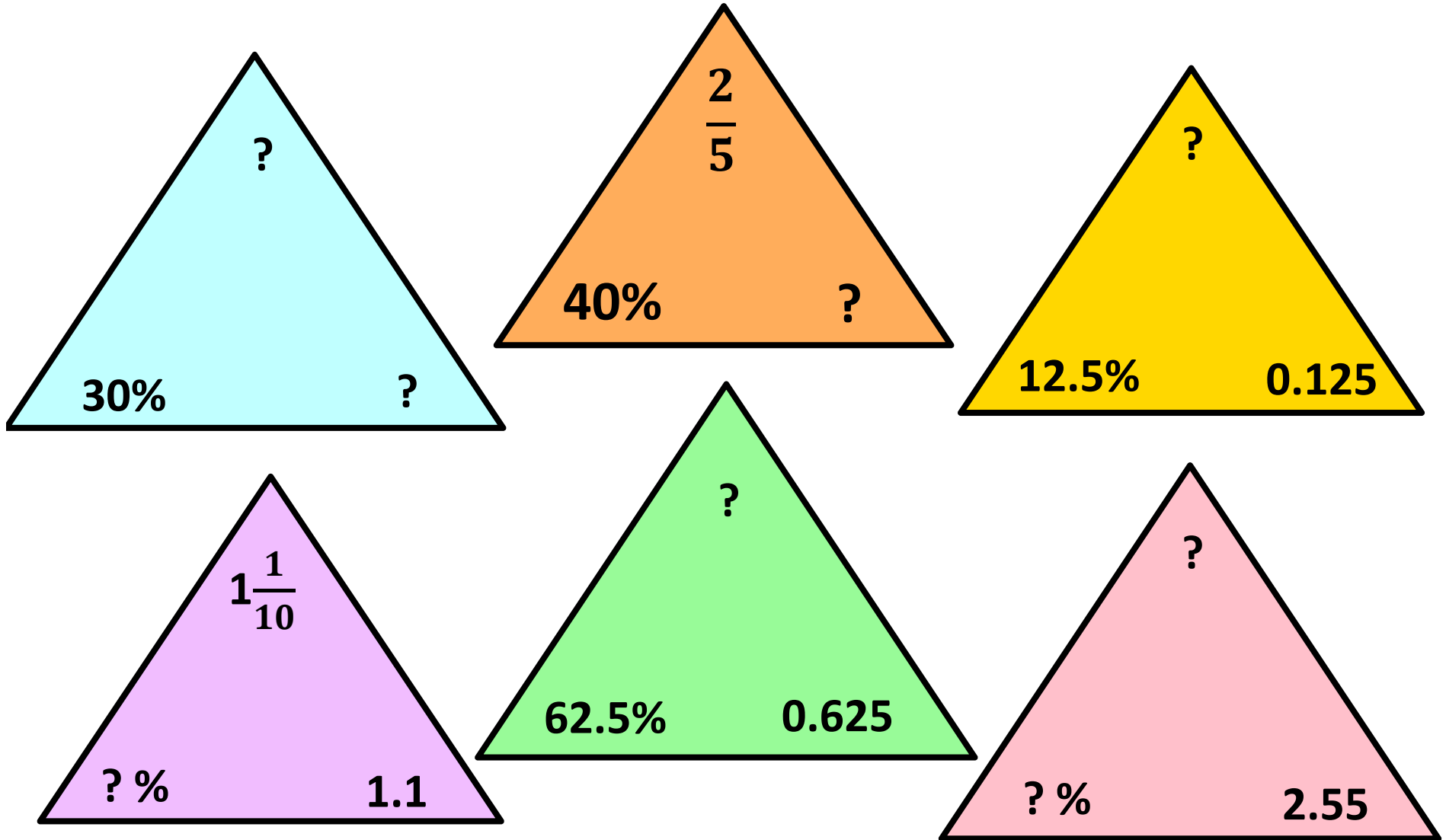
Thirty-two tenths



Ninety thousandths

Fraction, decimal, percentage

Complete the triangles so each has an equivalent fraction, decimal and percentage.



Greater than or equal to?

Fill each space with $>$, $<$ or $=$ to make the statements true.

$$140\% \quad \square \quad \frac{10}{14}$$



$$1.35 \quad \square \quad 1\frac{3}{4}$$

$$1.1 \quad \square \quad \frac{11}{10}$$

$$\frac{9}{5} \quad \square \quad 180\%$$

$$2.4 \quad \square \quad 124\%$$

$$17.5\% \quad \square \quad \frac{3}{16}$$

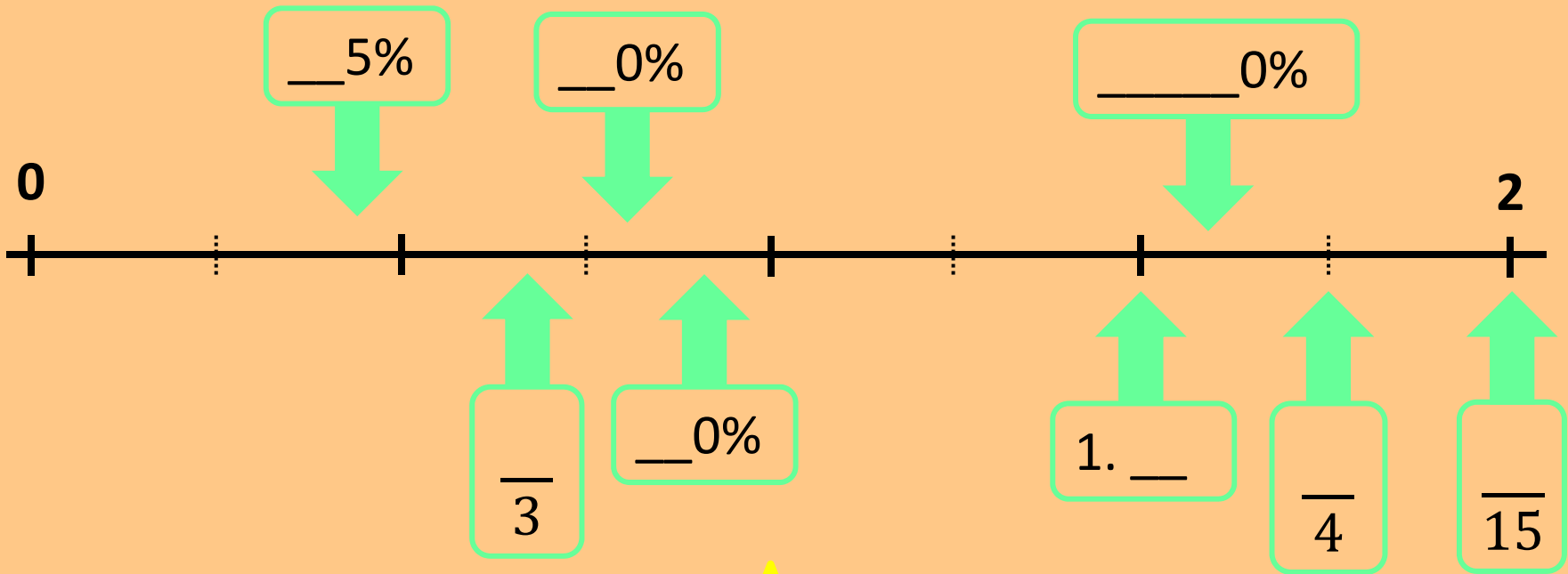

$$0.2 \div \frac{8}{3} \quad \square \quad 25\% \times 0.3$$

Challenge Extra

On the number line

Fill in the blanks on the number line using the digits 0-9 only once each.

0 1 2 3 4 5 6 7 8 9



Create your own 0-9 fraction, decimal and percentage number line.

Thursday, 04 June 2020

Lesson 3

Percentages of amounts (1)

Key learning

Calculating fractions of quantities

Solve problems involving fractions of quantities



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Do Now

Put the following in ascending order.

2.5%

0.3

$\frac{1}{5}$

1.01

35%

$\frac{1}{4}$

$\frac{3}{8}$

$\frac{1}{10}$

0.9

$\frac{9}{5}$

100%

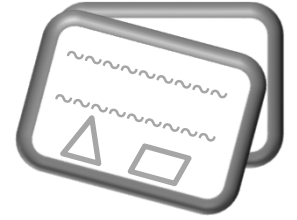
$\frac{2}{3}$

75%

$\frac{1}{50}$

150%

Percentage facts



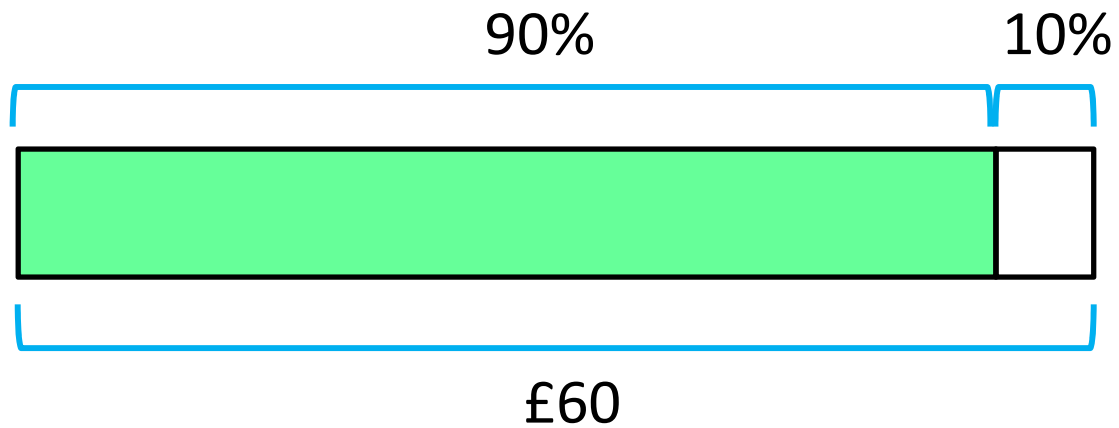
100% of an amount is £60

If 100% is equal to £60, what other facts can you find? Use concrete and pictorial representations to help.

Can you write facts involving fractions and decimals too?

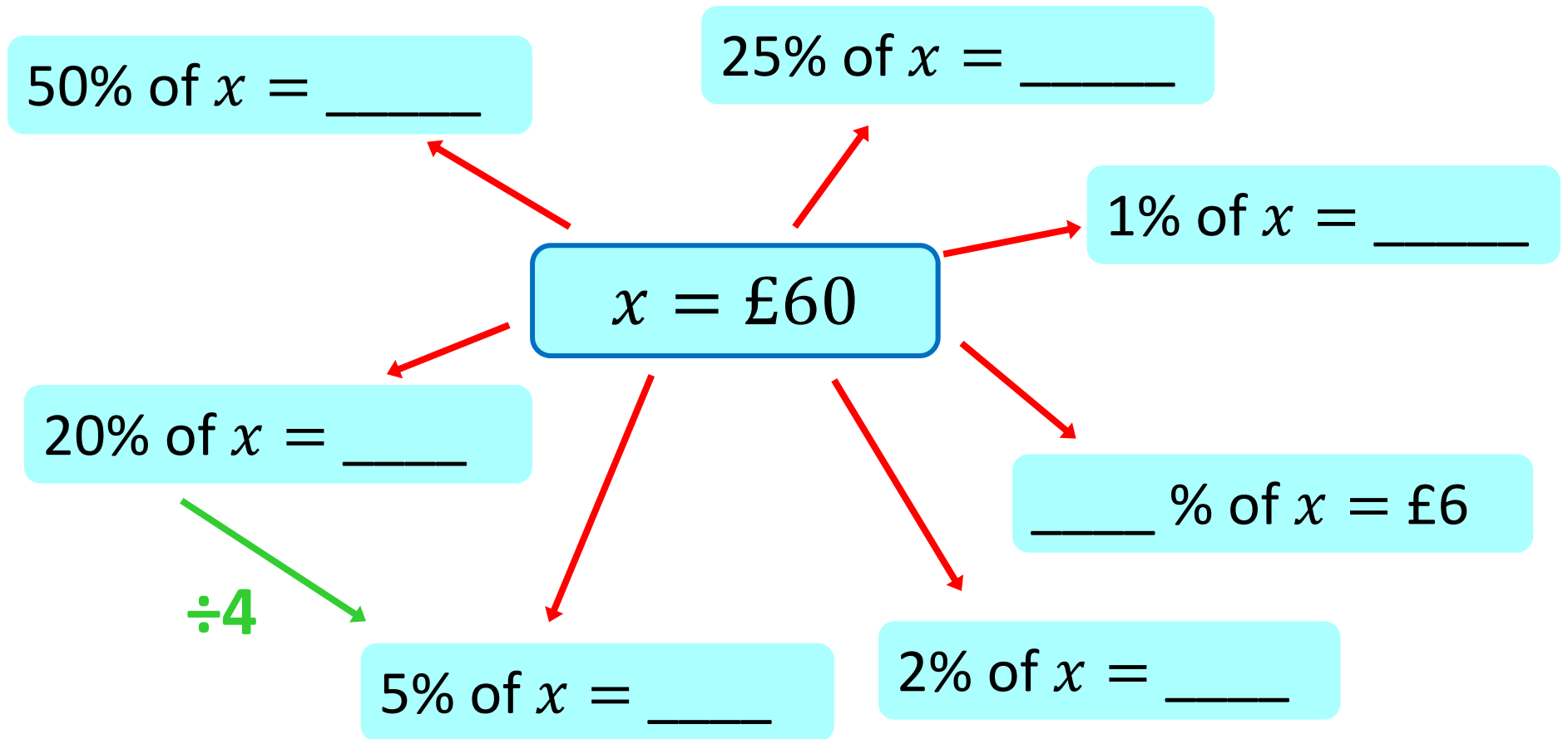
10 less...

If 100% is £60, 90% is £50.



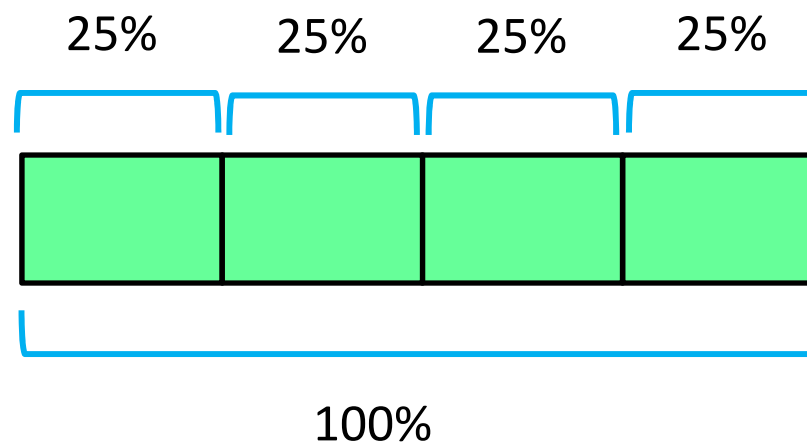
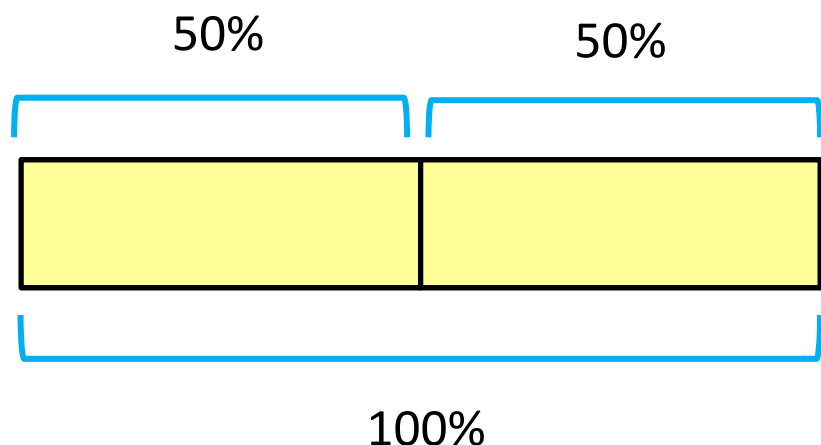
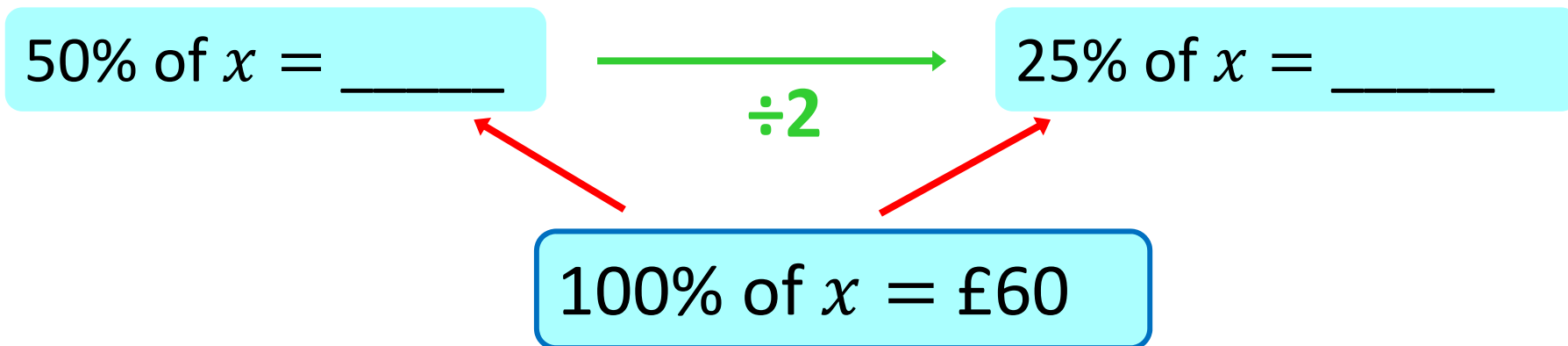
Do you agree?
Why?

Percentage facts



What other connections can you see between the facts?

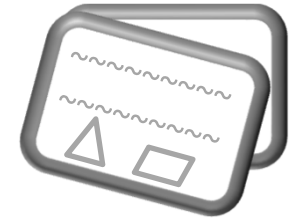
Percentage facts



How can fractions and division help us find percentages of quantities?

To find out what 25% is I can divide by.....

Percentage facts



45% of £60

Use the percentage facts from earlier to help you find 45% of £60.

Can you do this in more than one way?

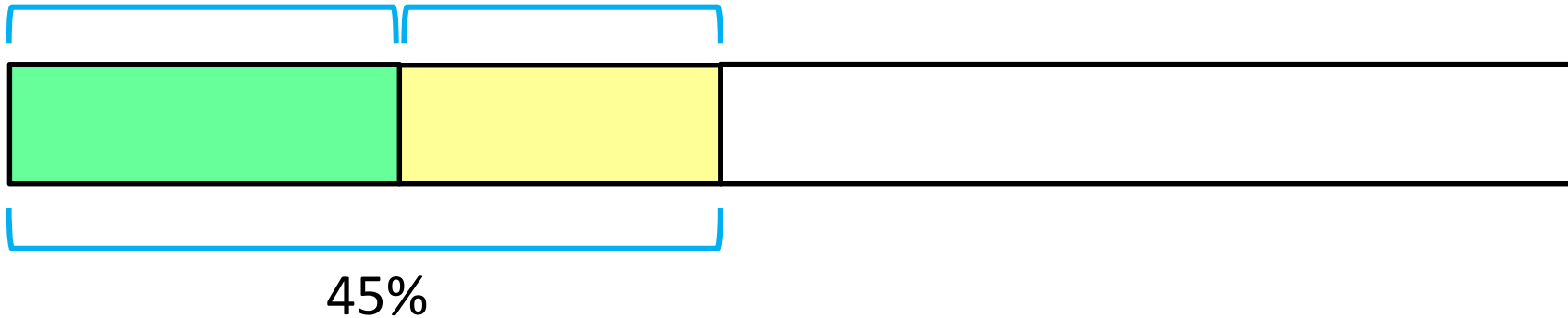
How many ways...
Which do you prefer? Why?

Percentage facts

45% of £60

25% of £60
is £15

20% of
£60 is £12



How many ways...
Which do you prefer? Why?

Percentage facts

17% of £60

Use the percentage facts from earlier to help you find 17% of £60.

Can you do this in more than one way?

How many ways...
Which do you prefer? Why?

Percentage comparisons

In each pair, determine which is the larger amount.

40% of £30

60% of £25

16% of 30 cm

20% of 20 cm

40% of 50 m

50% of 40 m

70% of 50p

5% of £7

7% of 80 cm

3% of 2m

Natalia's marbles



Natalia has a bag with 60 marbles.
Aarti takes 30% of the marbles.
How many are left?

Jake takes 12 of the remaining marbles.
What percentage of the original amount is now left?

Draw a bar model to help you solve this problem.

Natalia's marbles

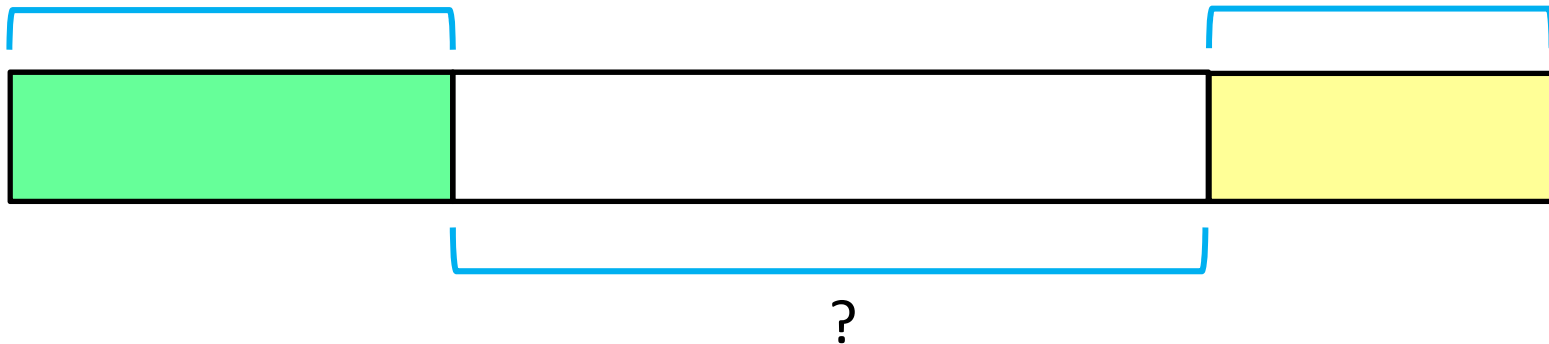
Natalia has a bag with 60 marbles.
Aarti takes 30% of the marbles.
How many are left?



Jake takes 12 of the remaining marbles.
What percentage of the original amount are now left?

30% = ___ marbles

___% = 12 marbles



Favourite subject

Tilly asks 50 students to pick their favourite subject from maths, English and science.

She asks a total of 50 students.

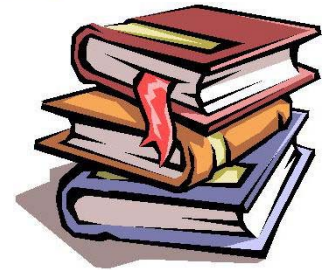
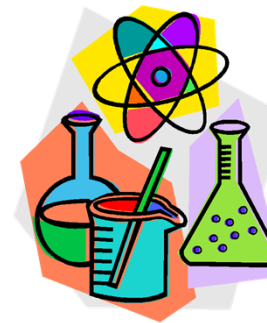
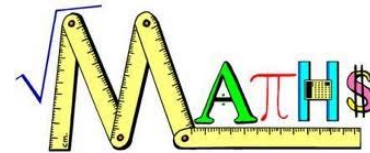
50% of the students are girls.

20% of the girls liked English best.

76% of the boys like science best.

14% of all students like maths.

4 girls like maths.



Use the information above to determine how many students like science best.

Work out...

40% of 90

34% of 840

10% of 360

26% of 120

12% of 60

5% of 144

20% of 1470

$33\frac{1}{3}$ % of 90

____ % of 40 = 80% of 20

____ % of 150 = ____ % of 100

Thursday, 04 June 2020

Lesson 4

Percentages of amounts (2)

Key learning

Calculating fractions of quantities

Calculating the whole given a percentage



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Do Now

$$100\% = 700 \text{ g}$$

Find:

1%

10%

25%

30%

2%

50%

5%

What other facts can you find?

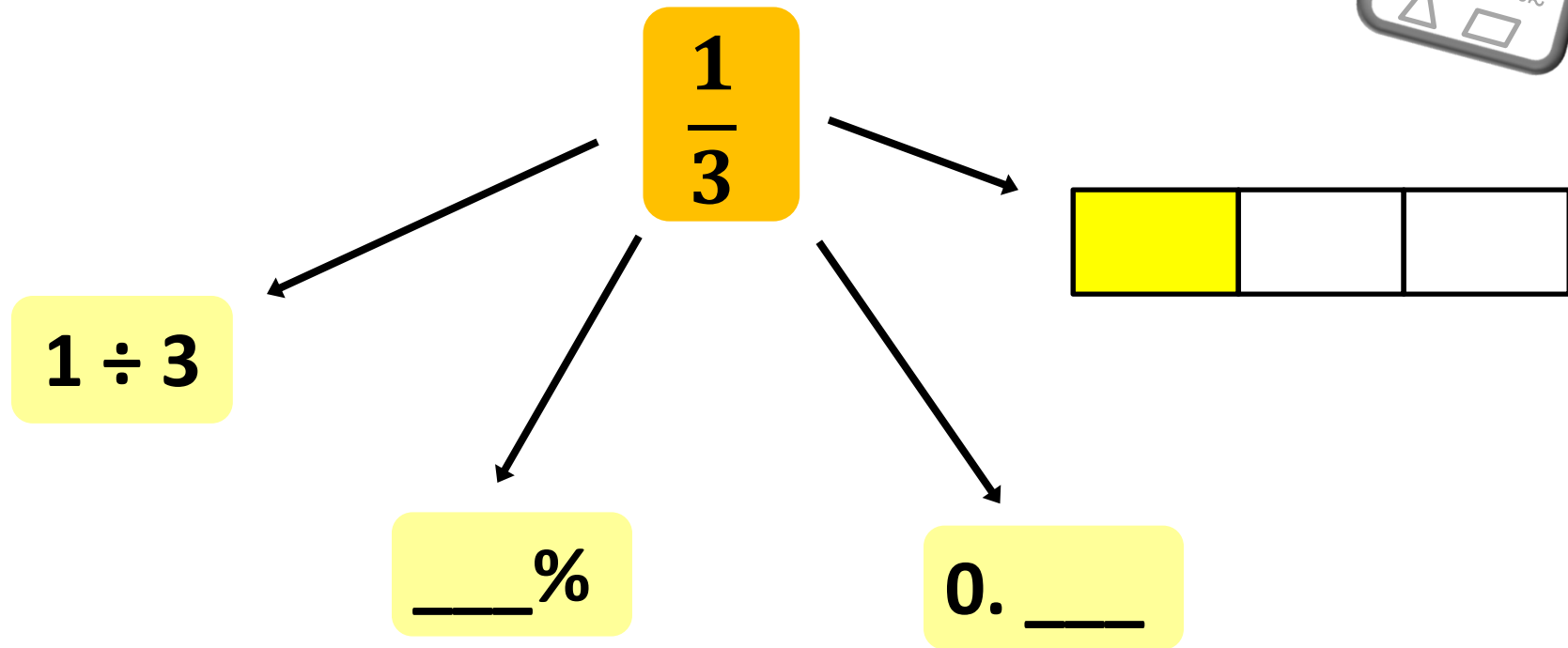
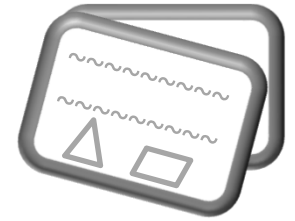
41% of 70 g

32% of 7 kg

16% of 7 litres

109% of 0.7 m

How many ways?



How could you represent $\frac{1}{3}$ as a percentage or a decimal?

$\frac{1}{3}$ as a percentage

$\frac{1}{3}$ means $1 \div 3$

$$3 \overline{) 1.00000000}$$

What happens when you do the division above?

What is $\frac{1}{3}$ as a decimal and as a percentage?

What is $\frac{5}{6}$ as a decimal and as a percentage?



$\frac{1}{3}$ as a percentage

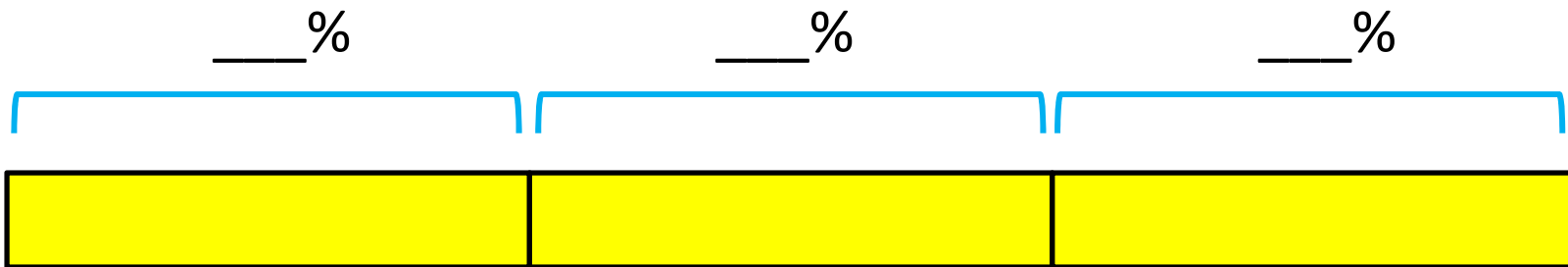
$$\frac{1}{3} = 33\frac{1}{3}\%$$

That's the same as 33.3%

I don't think 33.3% can be equal to $\frac{1}{3}$.



What's the error here?
How could you help them understand?



$$33.3\% + 33.3\% + 33.3\% = \underline{\quad\quad} \%$$

Finding the whole

Danny sold his bike.

Danny gave Ciara 20% of the money he received for helping him.

Ciara received £12.

How much did Danny sell his bike for?



Draw a bar model to help you solve this problem.

Finding the whole

Danny sold his bike.

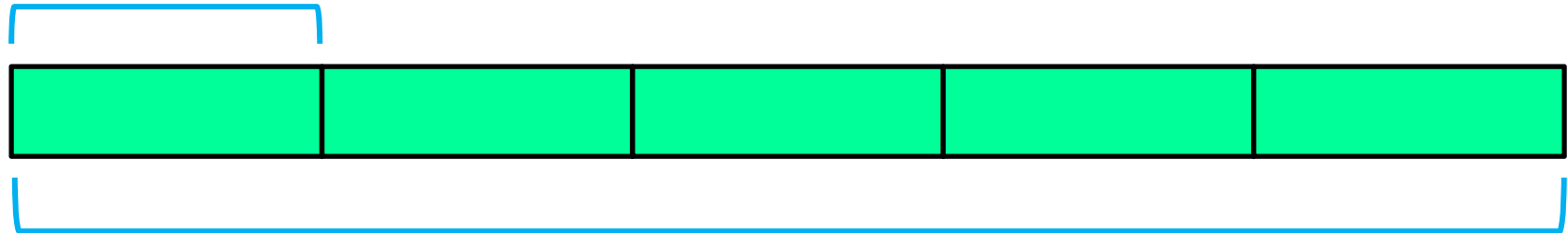
Danny gave Ciara 20% of the money he received for helping him.

Ciara received £12.

How much did Danny sell his bike for?



$$20\% = \text{£}12$$



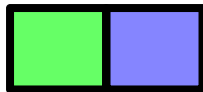
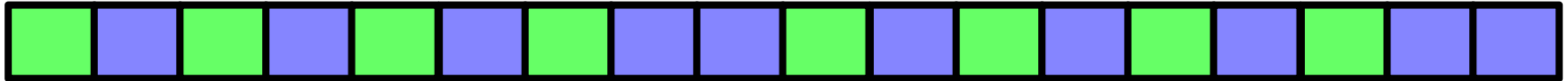
$$100\% = \text{£} \underline{\hspace{2cm}}$$

Danny decided to give $66\frac{2}{3}\%$ of the money he received to charity.

How much did Danny have left?

40%

Which of the following could show 40%?



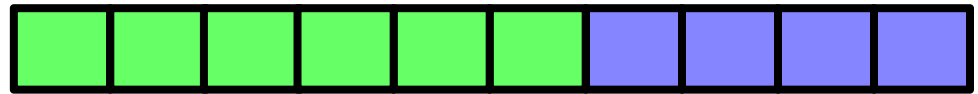
Could you think of another model?

40%

If 40% of the total is 56, what is the whole?



£56



£56

What does each equal part represent in the different bar models?

Finding the whole

24% of an amount is 60

What other facts can you find?

Can you use bar models to represent these facts?

Can you explain why each fact is true using concrete manipulatives?



How many ways can you find of finding the whole given that 24% is 60?

What's your representation?

Use bar models or manipulatives to match pairs which represent the same amount.

5% of the total is £2.90

$33\frac{1}{3}\%$ of the total is £20

80% of the total is £48

10% of the total is £2.90

12.5% of the total is £12

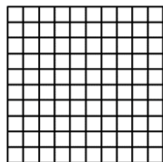
75% of the total is £72

40% of the total is £34

16% of the total is £4.64

90% of the total is £76.50

50% of the total is £29



What the value of 5% would be if:

4% of the total is 12

150% of the total is 72

Challenge Extra

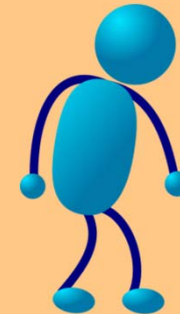
Mystery bank statements

Who has the most savings?

45% of my total savings is £675



10% of my total savings is £210



28% of my total savings is £560



Thursday, 04 June 2020

Lesson 5

One number as a percentage of another

Key learning

Work out one number as a percentage of another

Write fractions of different denominators as percentages



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Do Now

$$50\% \text{ of } x = 180 \text{ kg}$$

$$10\% \text{ of } x = \text{___ kg}$$

$$5\% \text{ of } x = \text{___ kg}$$

$$x = 360 \text{ kg}$$

$$25\% \text{ of } x = \text{___ kg}$$

$$20\% \text{ of } x = 72 \text{ kg}$$

Complete the information above to find the quantities in the blue boxes below.

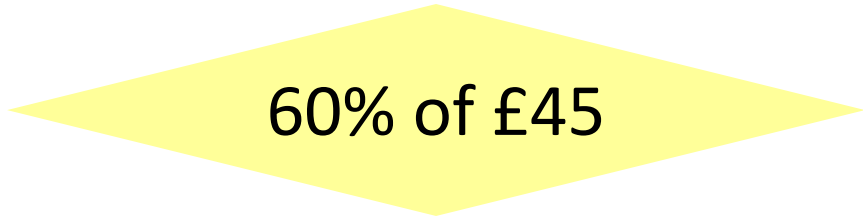
15% of 3.6 kg

75% of 6 hrs

35% of a full turn

Number talks

Using a mental method, find:

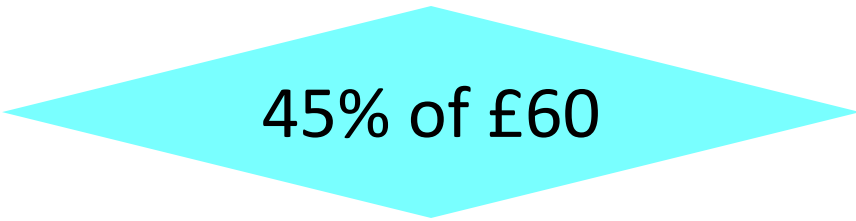


60% of £45

Compare your method to someone else's.
How many different ways can you calculate this?

Number talks

Using a mental method, find:



45% of £60

Compare your method to someone else's.
How many different ways can you calculate this?

Same or different?

What do you notice about the answers to these?
How can you explain this?

60% of £45

45% of £60

Hint

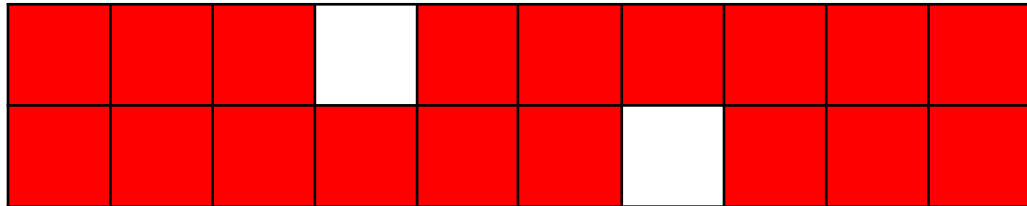
X

One as a % of another

Dharma scored 18 out of 20 on a spelling test.

How can we find this as a percentage?

$$\frac{18}{20}$$



Test score matching

Match each test result with its percentage equivalent.

24 out of 40

17 out of 50

49 out of ___

23 out of 25

___ out of 40

70%

75%

60%

34%

___ %

Comparing results

Maia scored 54 out of 60 in a test and Josh scored 46 out of 50.

I think Maia did best because she got more questions right!



I think Josh did best. He got fewer questions wrong.



Who is right? How do you know?

Challenge Extra

Analysing data

The table below shows data on the sources of electricity in different countries in one year. The data shows the number of terawatt hours used.



Country	Renewable sources			Fossil fuel power stations		Nuclear
	Wind	Solar	Biomass	Gas-fire	Coal-fire	Fission
UK	384	216	120	768	432	480
Germany	512	256	32	320	1440	640

Which country used a higher percentage of renewable energy?

Which country used a higher percentage of nuclear energy?

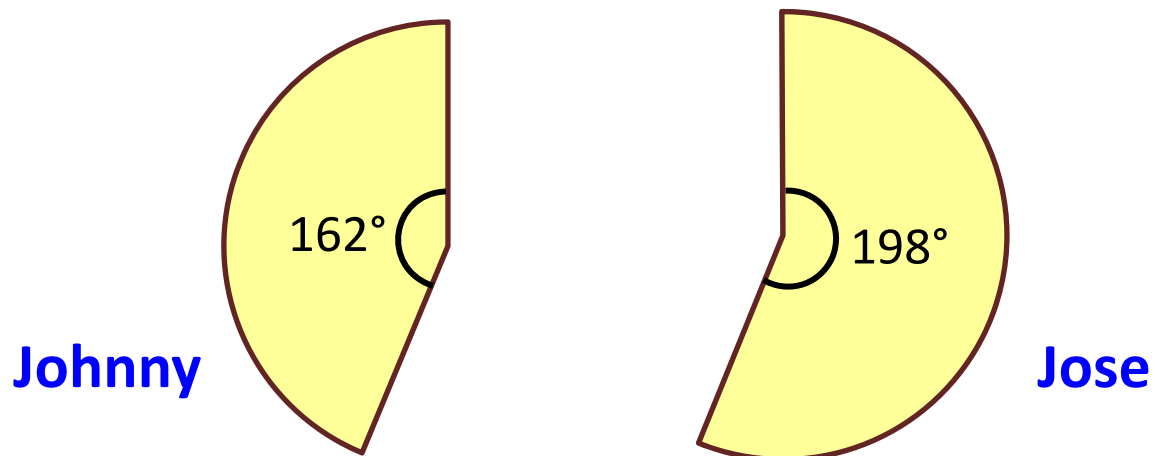
What other comparisons can you make?

Pizza percentages



Johnny and Jose are sharing a pizza.

They cut it into two pieces, but Johnny took a smaller slice than Jose.



What percentage of the pizza did each of them get?

Thursday, 04 June 2020

Lesson 6

Increase and decrease by a percentage (1)

Key learning

Find a percentage of a quantity

Increase by a percentage

Decrease by a percentage

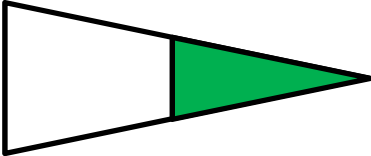


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Do Now

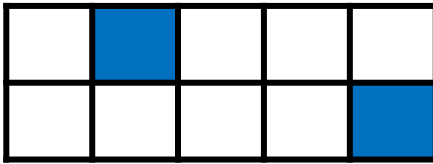
Find the odd one out in each group.



50%

0.5

18 out of 36



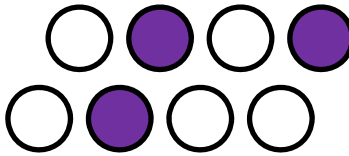
20%

Two hundredths

$2 \div 10$

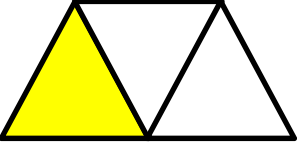
3 out of 8

37.5%



8 ÷ 3

$\frac{100}{3}$



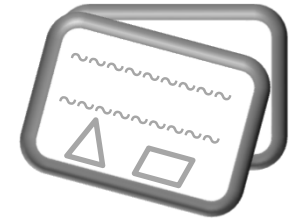
$33\frac{1}{3}\%$

0.3

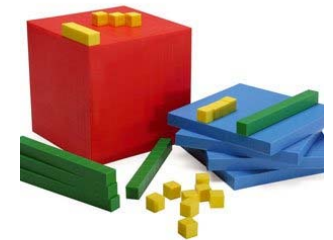
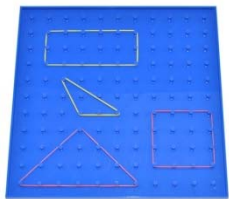
Add another representation that fits in each group.



Increasing and decreasing



Use manipulatives to represent the number 40.



Use your manipulatives to show how you could increase 40 by 10%.

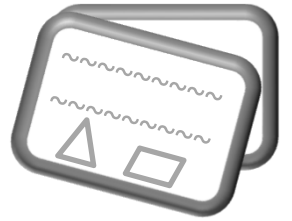
Use your manipulatives to show how you could decrease 40 by 25%.

Charlie wants to show increasing 40 by 37.5%.

He uses 20 multilink cubes to represent 40.

Explain why this is not the best representation to choose.

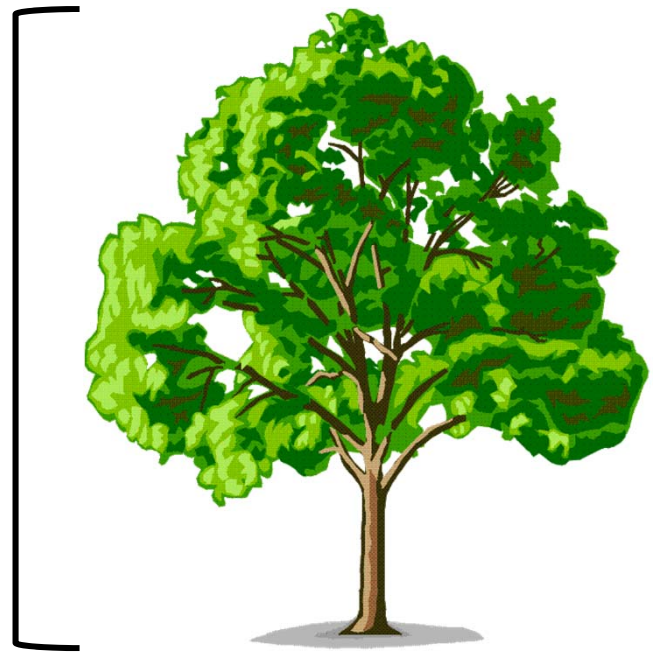
Tree tops



Gethin planted a tree in his garden.
It was 3 m tall when he planted it.

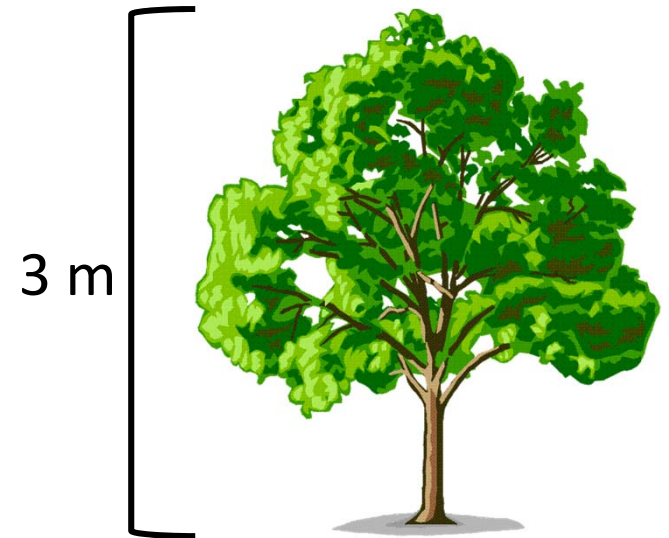
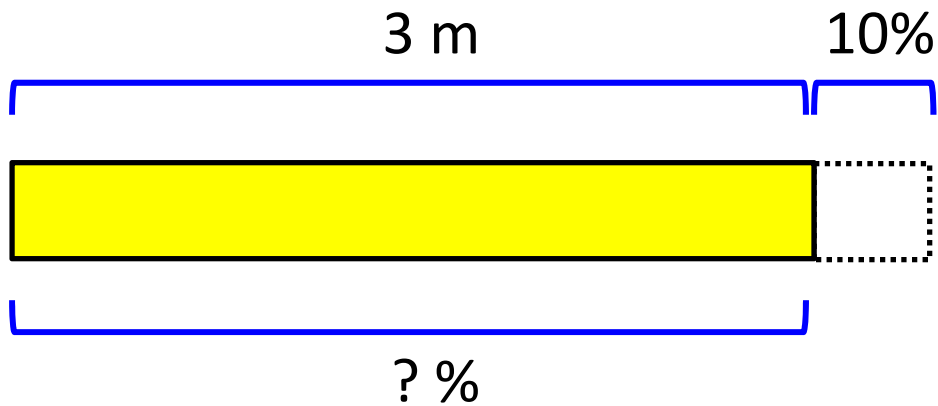
It grew 10% taller in one year.
How tall was it at the end of the year?

3 m



Tree tops

The tree grew 10% taller in one year.
How tall was it at the end of the year?



What percentage does the **yellow bar** represent? Why?

What percentage does **the whole** bar represent? Why?

Bike race

On the first day of a bike race, the course was 150 km.
On the second day the course was 24% longer than the first.

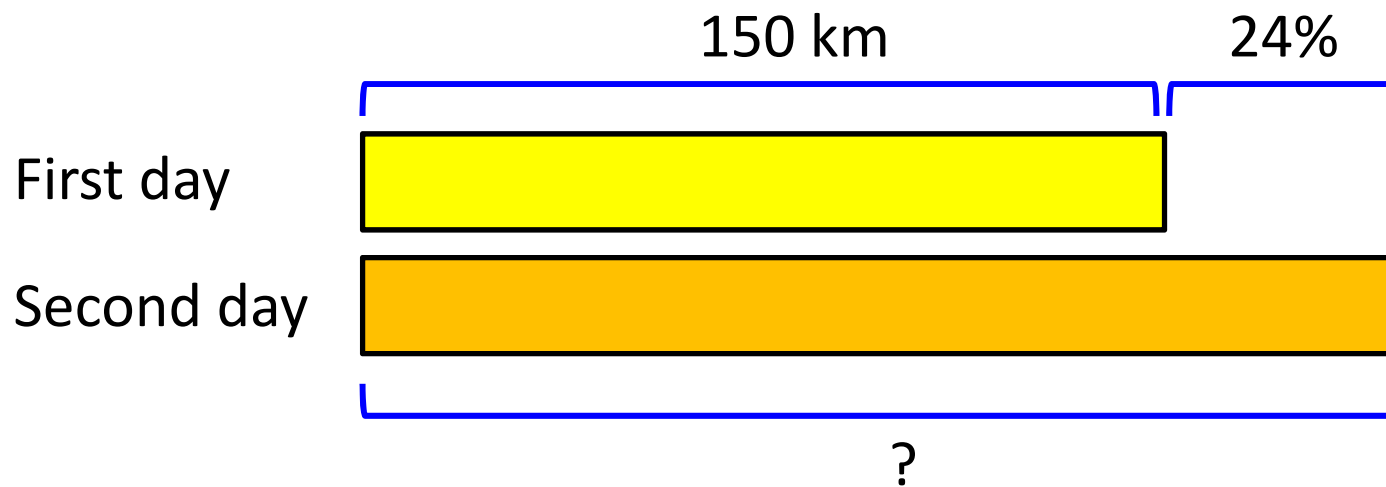


How far did the cyclists race on the second day?

Bike race



On the first day of a bike race, the course was 150 km.
On the second day the course was 24% longer than the first.



How far did the cyclists race on the second day?

What percentage of the **first day's distance** is the **whole race**?

Cake sale

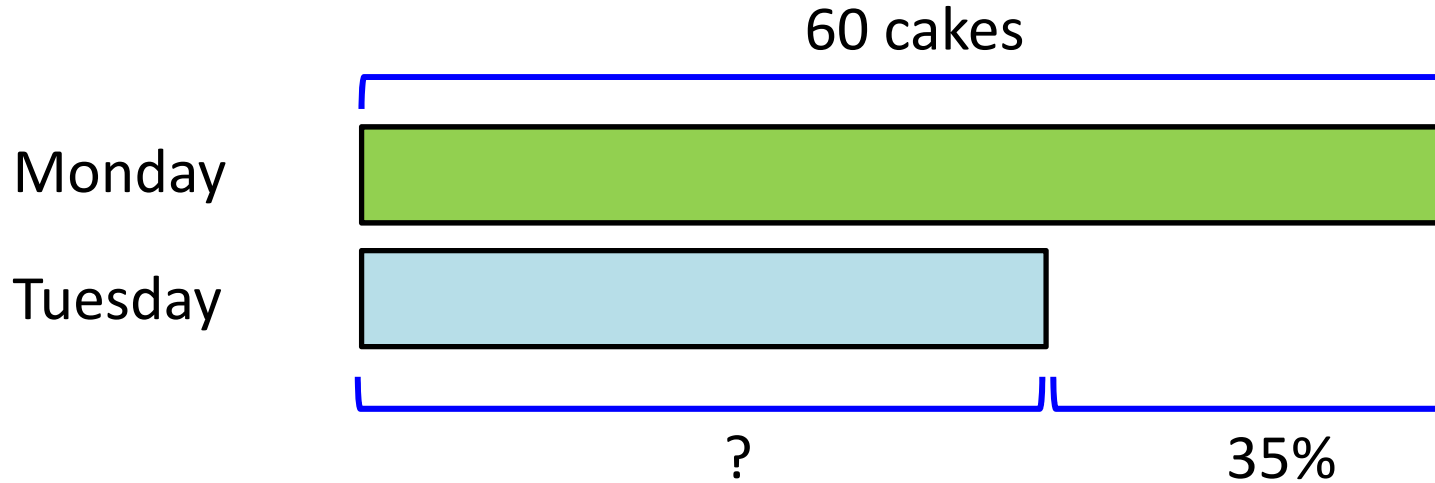
Laura sold 60 cupcakes on Monday.
On Tuesday, she sold 35% fewer cupcakes.



How many cakes did Laura sell on Tuesday?

Cake sale

Laura sold 60 cupcakes on Monday.
On Tuesday, she sold 35% fewer cupcakes.



How many cakes did Laura sell on Tuesday?

Match them up

80 increased by 50%

91

45 increased by 60%

147

210 decreased by 30%

131.25

140 decreased by 35%

—

___ decreased by $33\frac{1}{3}\%$

68.9

53 increased by 30%

72

500 decreased by 92%

80

75 increased by 75%

120

Different strategies

500 decreased by 92%

92% of 500 is 460
 $500 - 460 = 40$

1% of 500 is 5
So 8% is 40



Which method do you prefer? Why?

Draw **one** bar model that can be used to explain **both** methods.



$$80 \leftrightarrow 100$$

80 increased by 25%

100

100 decreased by 20%

80



That must be wrong.
If 80 increased by 25% is 100,
then surely I should decrease
100 by 25% to get back to 80?



How could you help Ewan understand?

Percentages problems

Barry is laying bricks to build his new house.

Over **three days** he lays 1260 bricks.

On the second day he lays 28% more than the first day.

On the third day he lays 13% fewer than the first day.

How many bricks did he lay on the first day?



Percentages problems

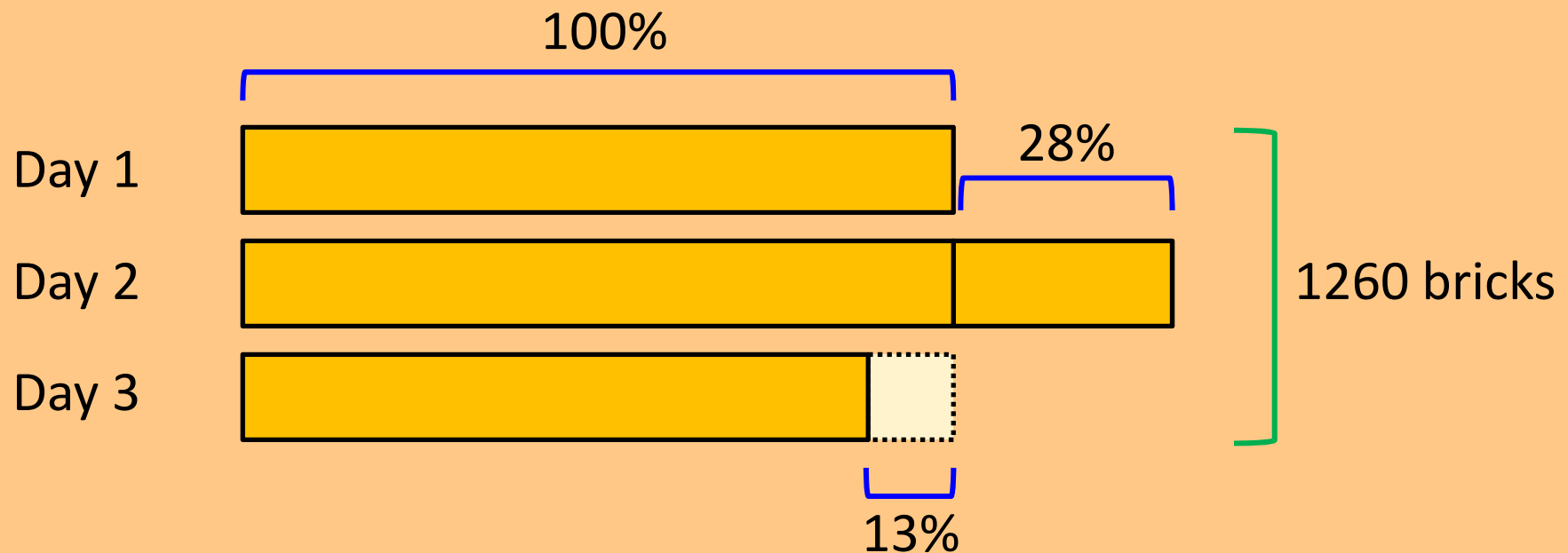


Over **three days** he lays 1260 bricks.

On the second day he lays 28% more than the first day.

On the third day he lays 13% fewer than the first day.

How many bricks did he lay on the first day?



Hint

x

Percentages problems

Sally, Gareth and Sami are collecting cans for recycling.

Gareth collected 60% more than Sally's total.
Sami collected 50% less than Gareth's total.
Altogether they collected 136 cans.



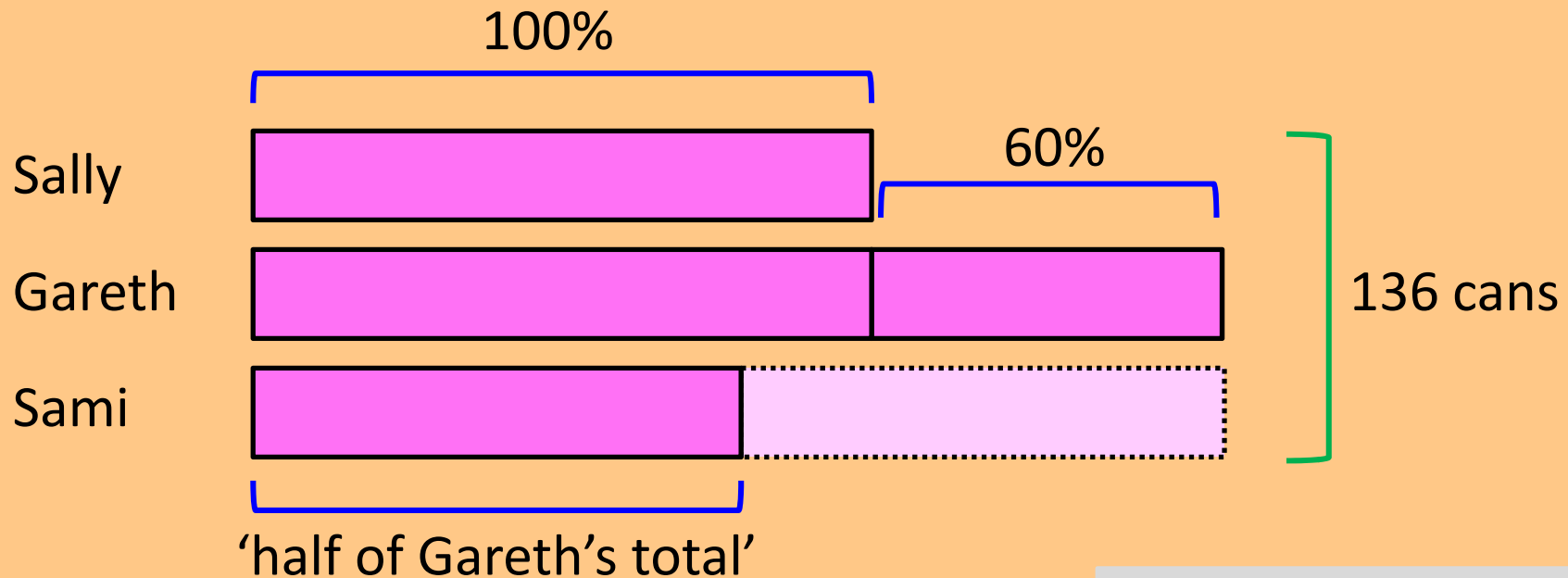
How many more cans did Sally collect than Sami?

Percentages problems

Gareth collected 60% more than Sally's total.
Sami collected 50% less than Gareth's total.
Altogether they collected 136 cans.



How many more cans did Sally collect than Sami?



Hint

x

Thursday, 04 June 2020

Lesson 7

Increase and decrease by a % (2)

Key learning

Find a percentage of a quantity

Increase by a percentage

Decrease by a percentage



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Do Now

Put these amounts in ascending order.

£30 increased by 50%

£200 decreased by 25%

45 increased by $33\frac{1}{3}\%$

£150 decreased by 40%

£50 increased by 100%

75% of £180

$\frac{3}{5}$ of £175

£80 increased by 60%

62.5% of £200

★ £160 decreased by 30%, increased by 15% ★

Useful fractions

Match up the percentages to the fractions.

10%

____%

50%

25%

____%

$66\frac{2}{3}\%$

75%

12.5%

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

$\frac{1}{20}$

$\frac{2}{1}$

$\frac{1}{2}$

$\frac{1}{4}$

$\frac{1}{4}$

$\frac{1}{5}$

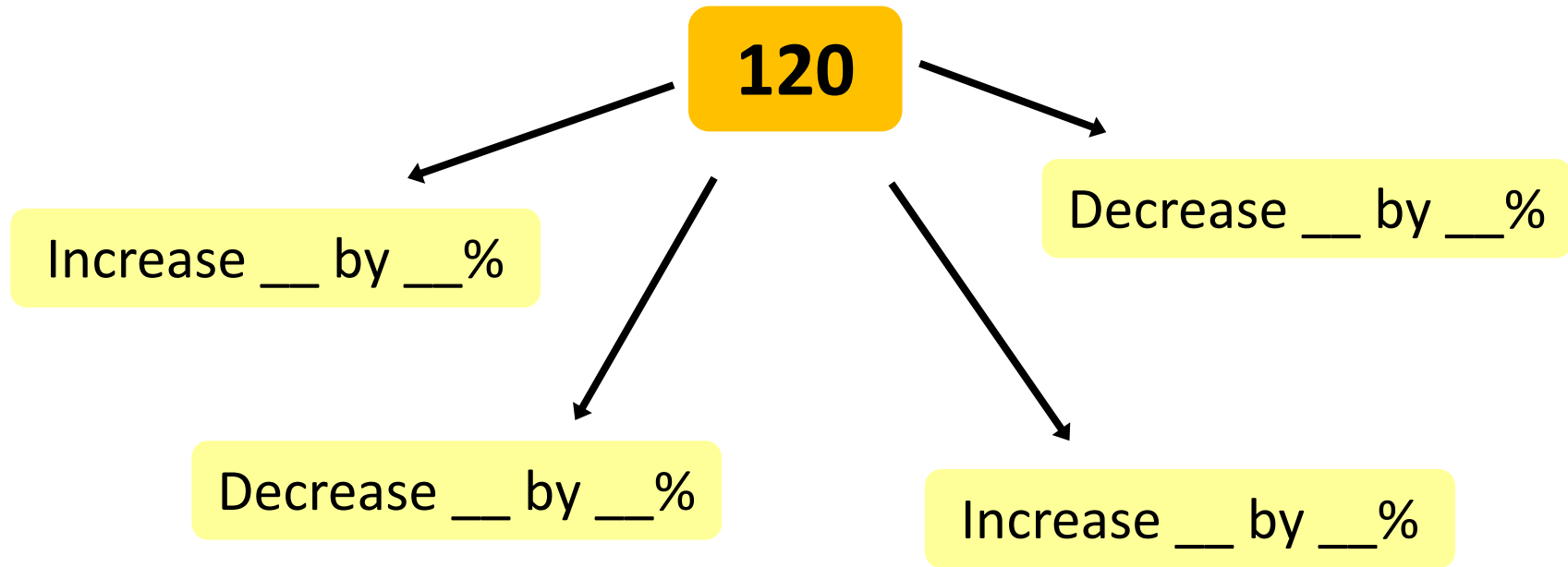
$\frac{1}{8}$

$\frac{1}{10}$

$\frac{1}{3}$

Why might it be useful to know these pairs when calculating with percentages?

How many ways?



How many ways could you make $3\frac{3}{5}$ through percentage increase and decrease?

Number talks

Use a mental method to work out the quantities below.

Increase 50 kg by 20%

£160 increased by 95%

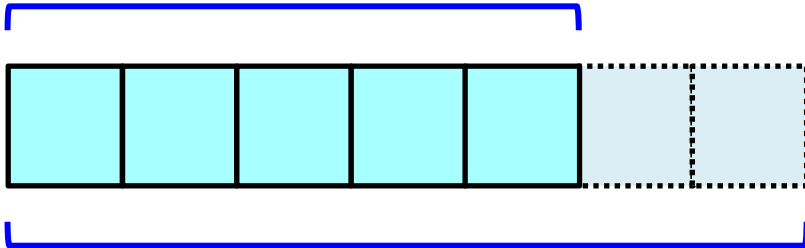
£30 increased by 50%

Decrease 240 ml by 87.5%

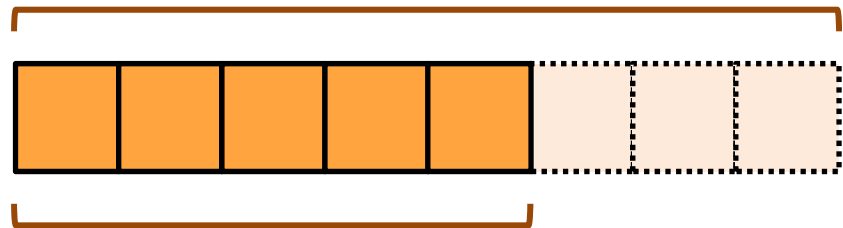
Compare your mental method to someone else's.

Bar models

Use the bar models below to create your own percentage **increase** and **decrease** problems.



?





?

Time percentages

Michael runs 100 m in 12 seconds. He reduces his time by 15%.
How long does it take him now?

A test lasts 1 hour. A teacher removes 20% of the questions,
so reduces the time allowed by the same percentage.
How long is the new test?

A concert runs for 2 hrs 30 mins.
An interval is added that means it lasts 25% longer.
How long is the concert now?



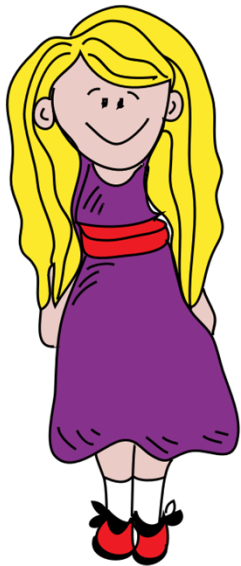
A space station take 2 days to orbit the earth. It moves closer to
the earth and the orbit is reduced by 40%. How long does the new
orbit take. Give your answer in days, hours and minutes.

Back and forth

Daniella has £200 in the bank.

She saves up to increase this amount by 20%.

She then says:



I increased my savings by 20%.
That means I can spend 20% of what
I have now, and be left with £200.

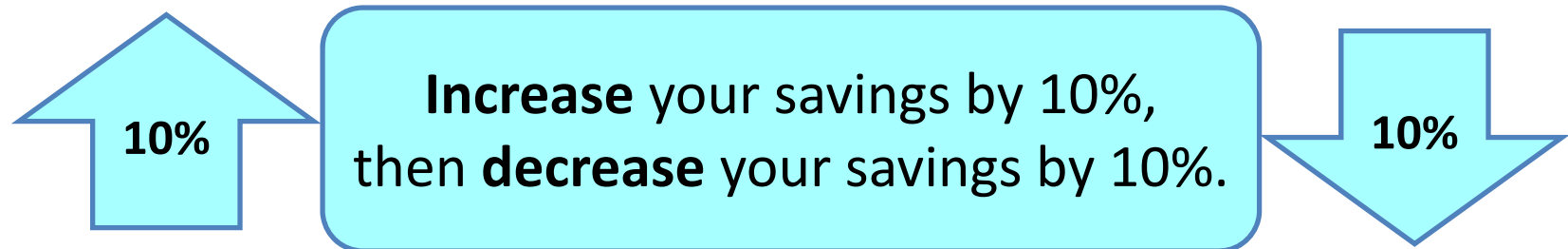


Why is Daniella wrong?

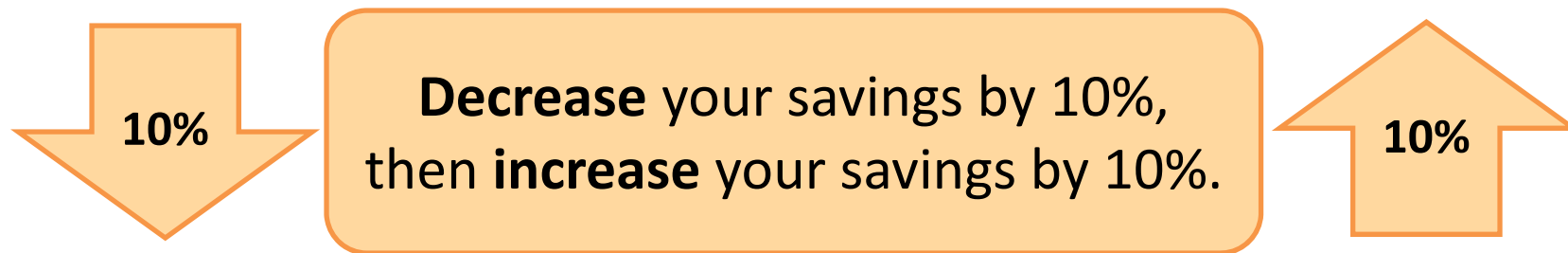
What percentage could Daniella
spend to make the **statement** correct?

Back and forth

Which would you rather do?



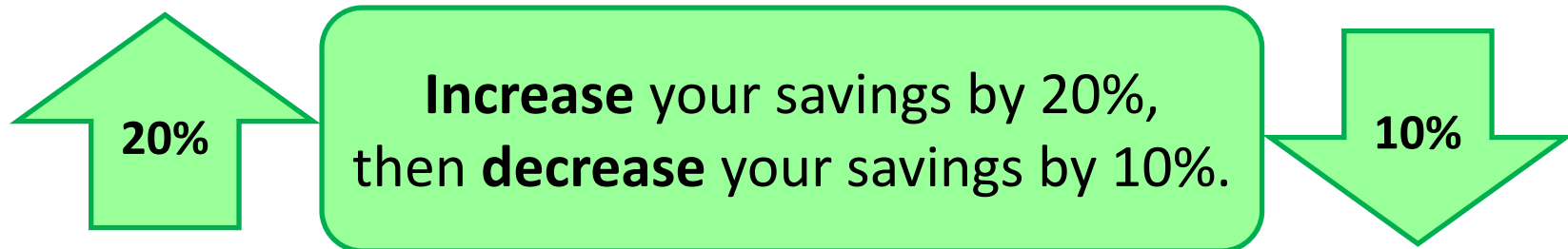
or



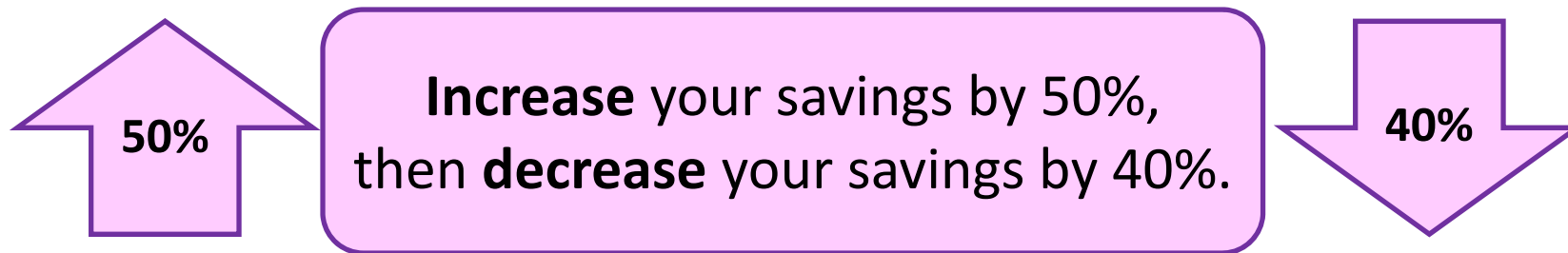
Why? Use an example to explain.

Back and forth

Which would you rather do?



or

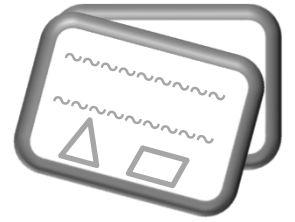


Why? Use an example to explain.

Where did we start?

Shahid's salary was increased by 10%.
His new salary was £22 000.
What was his original salary.

Use a bar model to work out your answer.



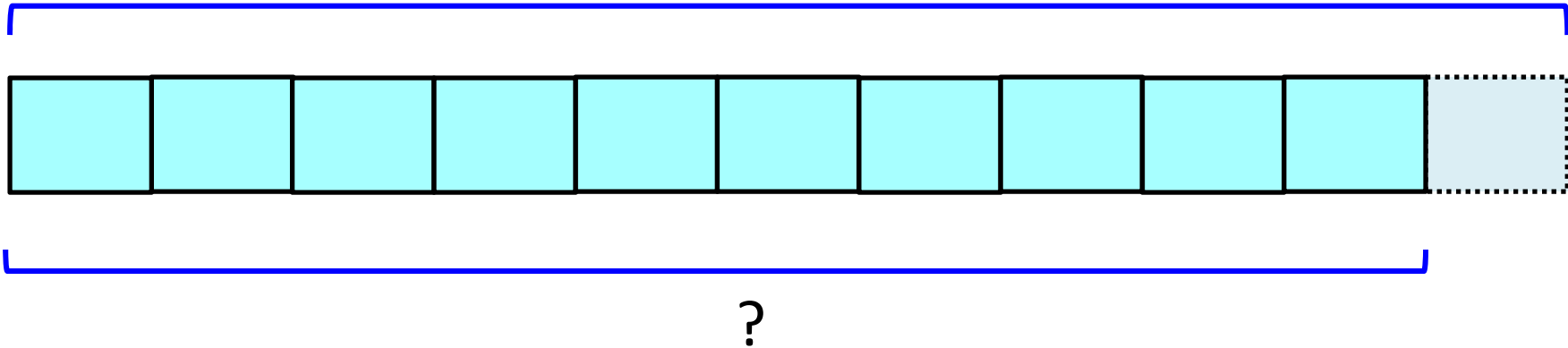
Where did we start?

Shahid's salary was increased by 10%.
His new salary was £22 000.
What was his original salary.

Use a bar model to work out your answer.



£22 000



Where did we start?

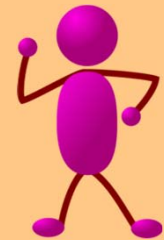
Joe's salary was £15 000.

His salary was increased by 20%.

Harriet's salary was increased by $33\frac{1}{3}\%$.

They now have equal salaries.

What was Harriet's original salary?



Where did we start?

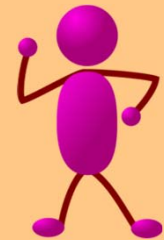
Joe's salary was £15 000.

His salary was increased by 20%.

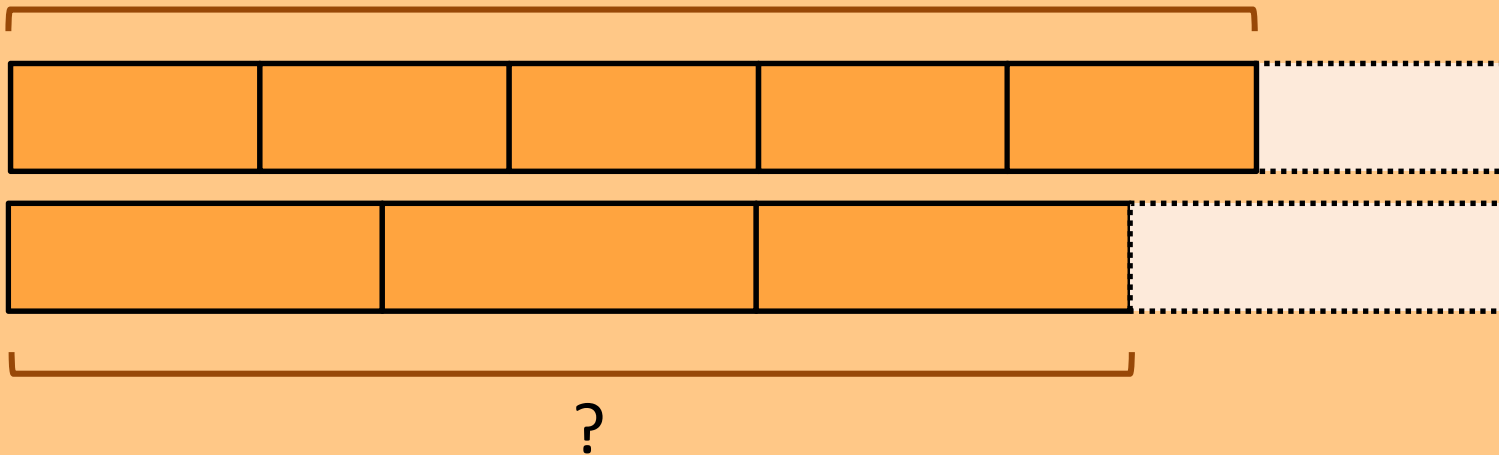
Harriet's salary was increased by $33\frac{1}{3}\%$.

They now have equal salaries.

What was Harriet's original salary?



£15 000



Thursday, 04 June 2020

Lesson 8

Percentage problems

Key learning

Find a percentage of a quantity

Increase and decrease by a percentage

Solve problems involving increasing and decreasing by a percentage



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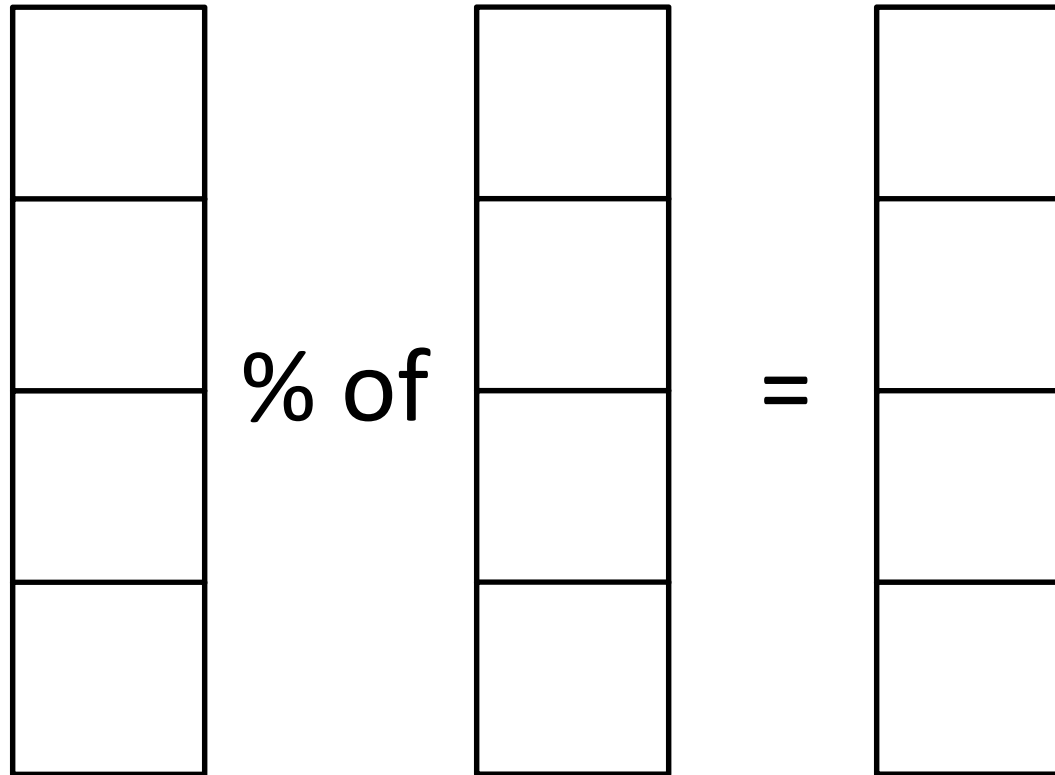
Do Now

Fill in the box trail with the operations, percentages and fractions.

Operation	$\div 2$		$\times 2$	$\div 4$			$\times 4$
Percentage	100%		10%			1%	8%
Fraction	1	$\frac{1}{2}$			$\frac{1}{20}$		

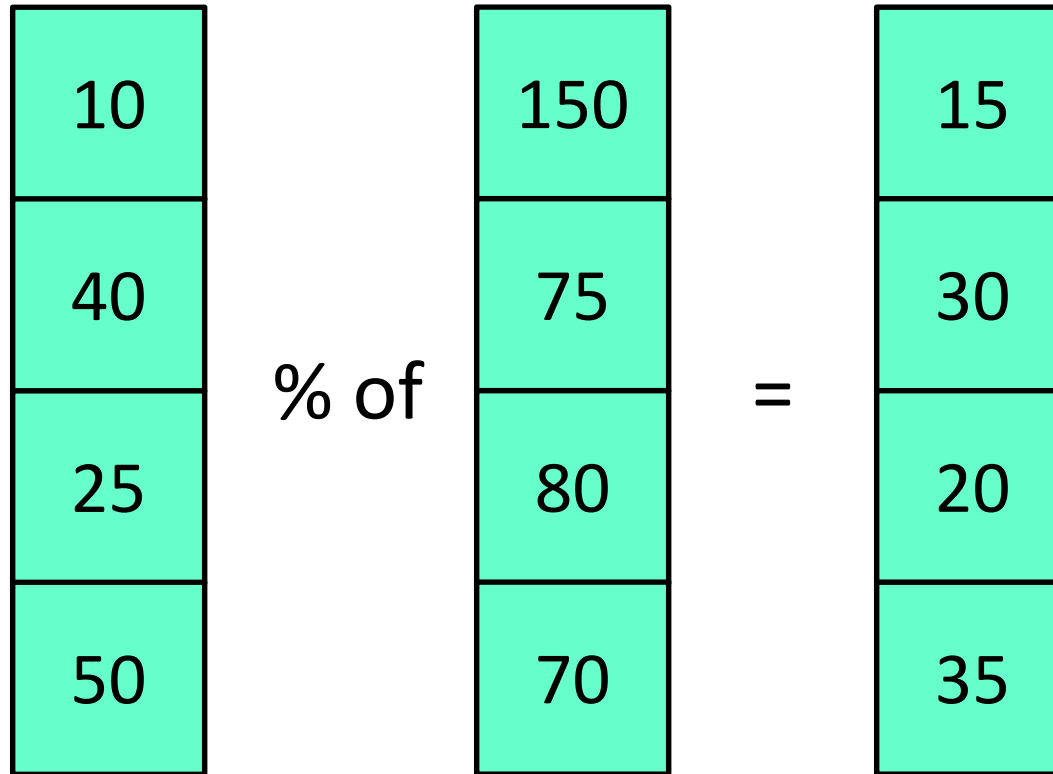
Write your own box trail that includes $33\frac{1}{3}\%$, $\frac{1}{6}$, and 12.5%.

Percentages card sort



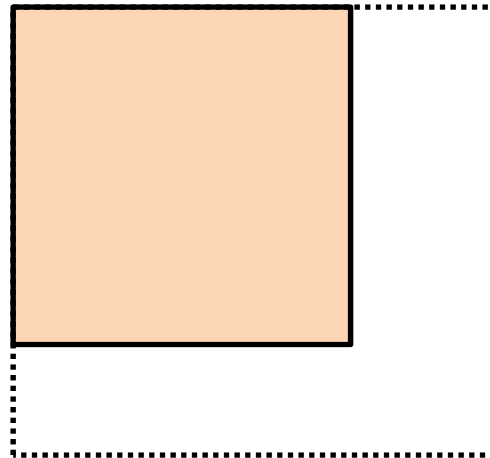
10	15	20	25	30	35
45	50	70	75	80	150

Percentages card sort



Shape increase

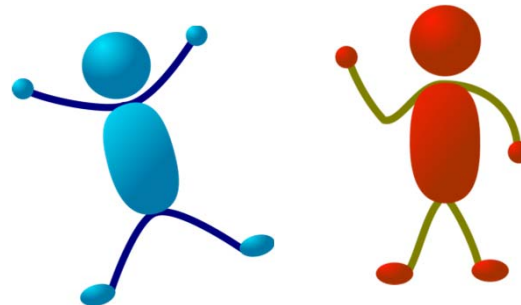
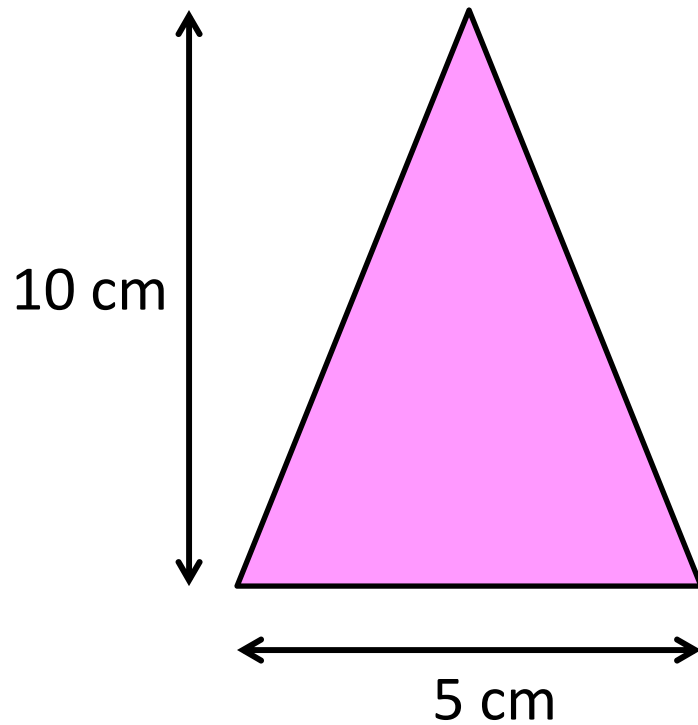
My square has an **area** of 64 cm^2 .
I increased the **perimeter** by 37.5%.
What is the new area of my square?



Shape increase

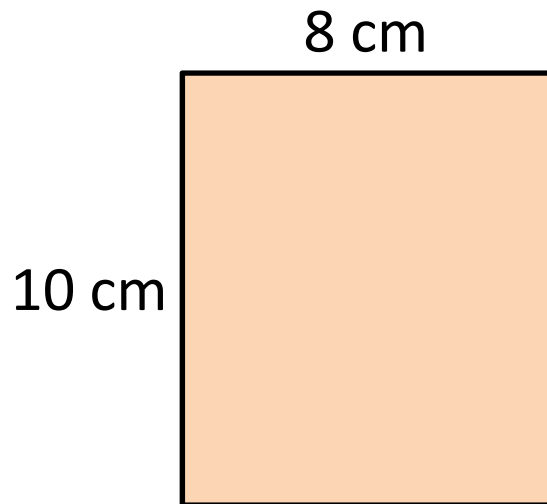
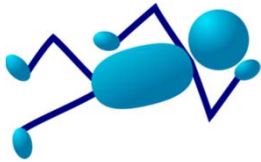
If I increase the base **and** height by 20%, then the area will increased by 20%.

No! You should only increase the base **or** the height by 20% for the area to increase by 20%.

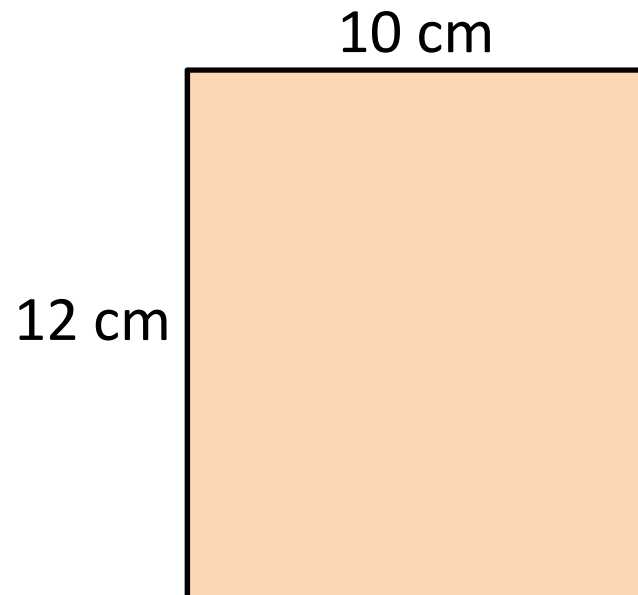


Increase or decrease?

Both the length **and** width have been increased by 20%.

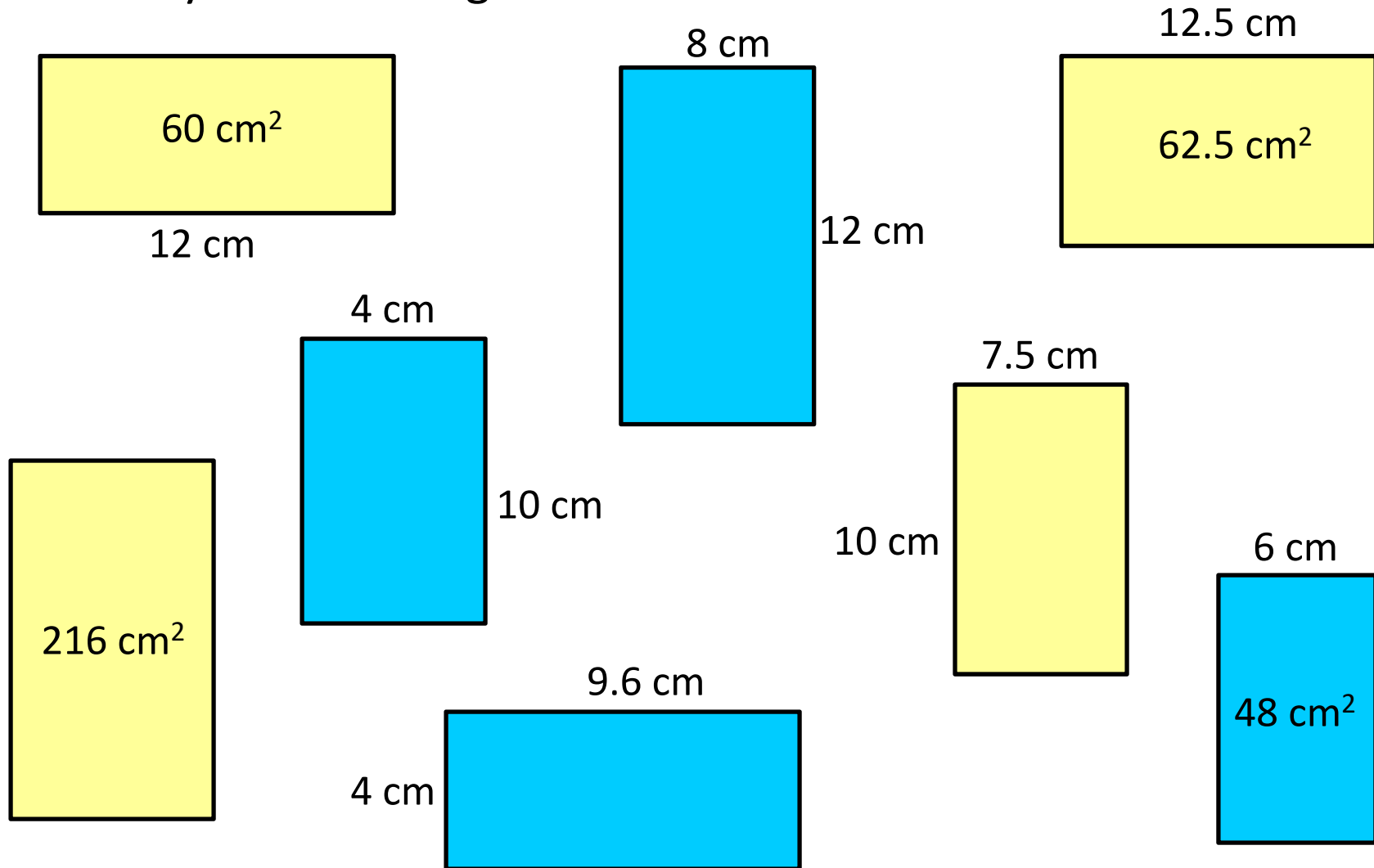


No! The width has been increased by 50% and the length is unchanged.



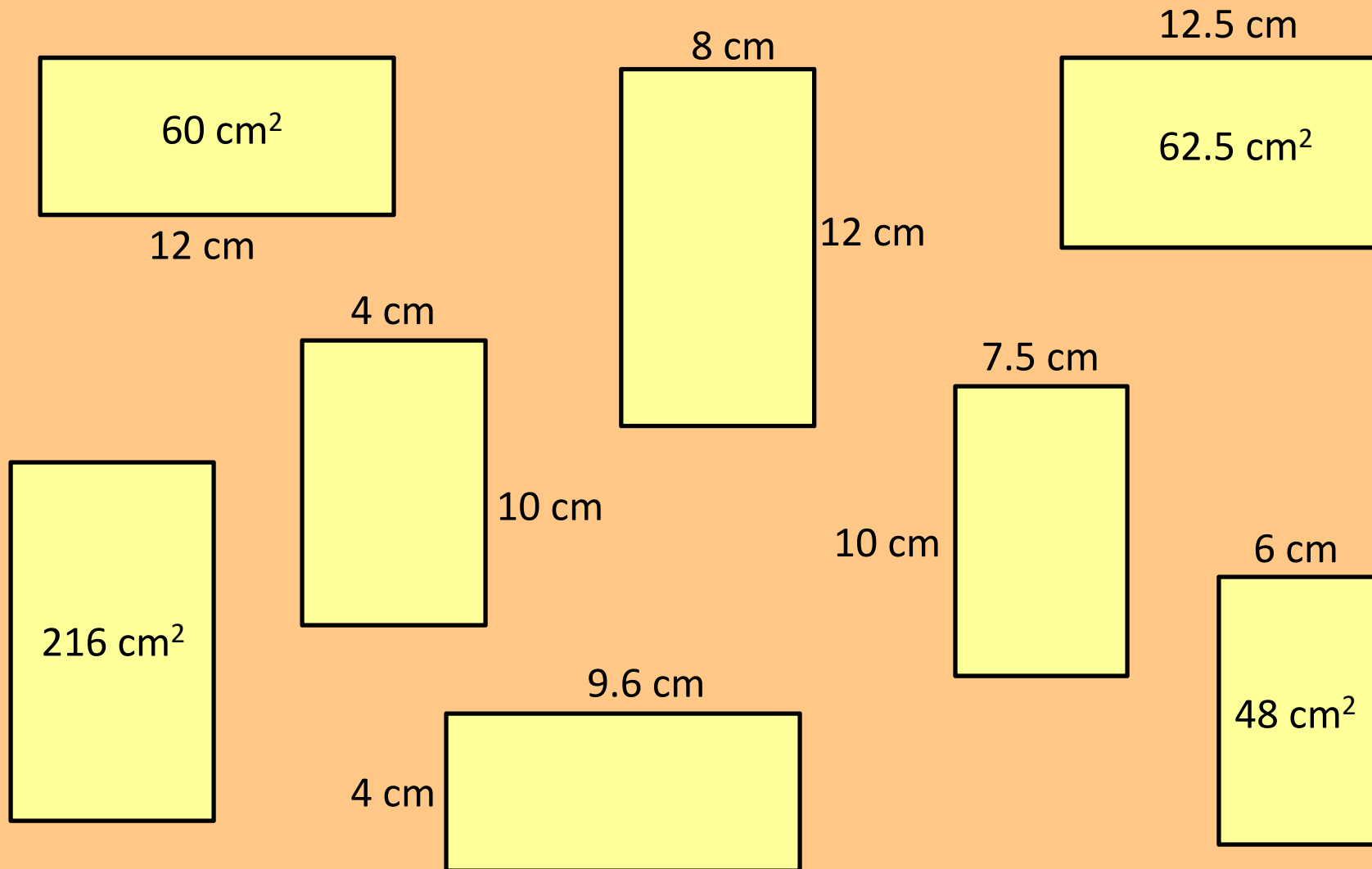
Rectangle match (1)

The blue rectangles were drawn first. Their lengths and widths were increased by 25% to draw the new yellow rectangles. Find the pairs of blue and yellow rectangles.

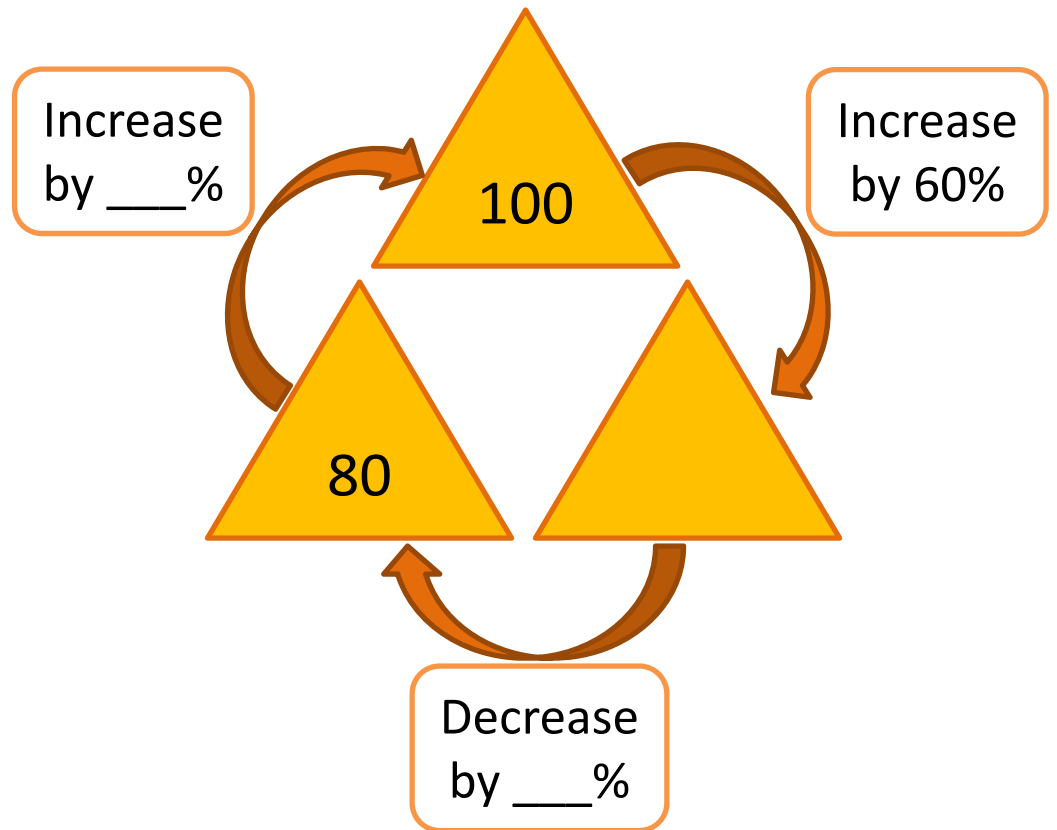
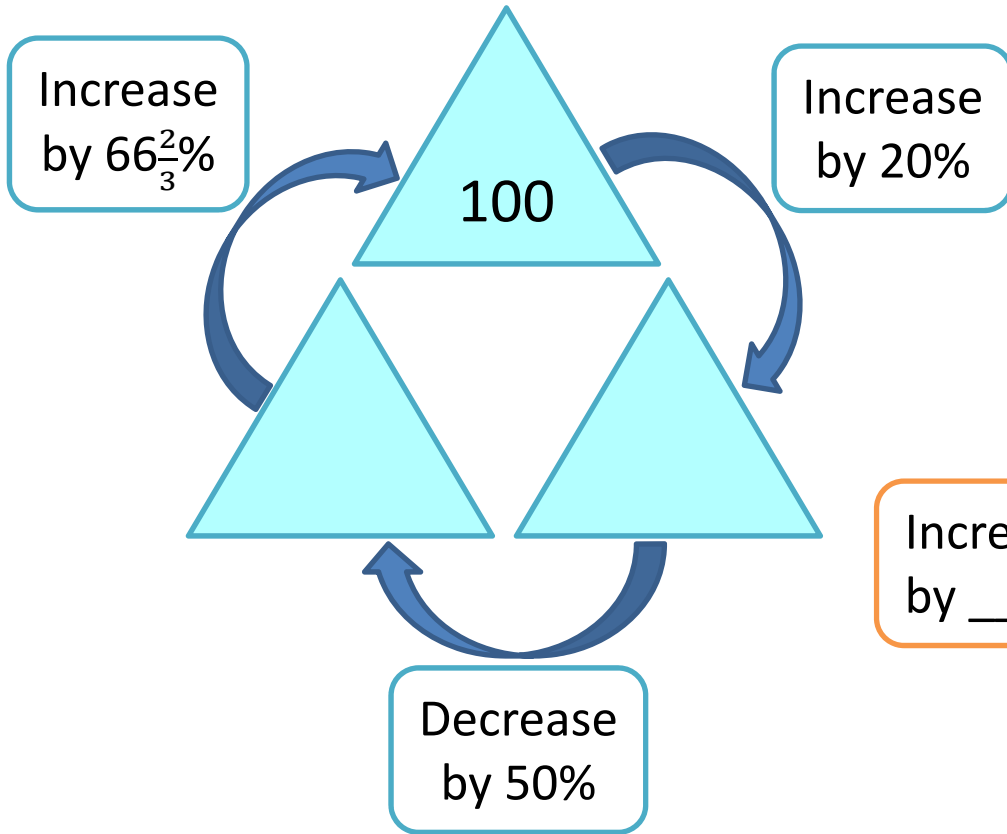


Challenge Extra

Teacher note: This is the same as the previous task without indicating which are the starting rectangles to increase challenge.



Three changes



Write your own 'three changes' triangle.

Thursday, 04 June 2020

Lesson 9

Cereal investigation

Key learning

Understand percentages in context

Understand how percentages are used as a guide for nutritional values



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You will need...

To do this investigation you will need to have the nutritional information from at least 5 cereal boxes.



Quick poll

How many days per week do you eat breakfast?

What do you think the mean number of days in the class is?

Approximately what percentage of the class ate breakfast today?

I usually skip
breakfast!



Scientists say:
Skipping can actually **increase** the
chances of becoming **obese** or
developing **diabetes**.

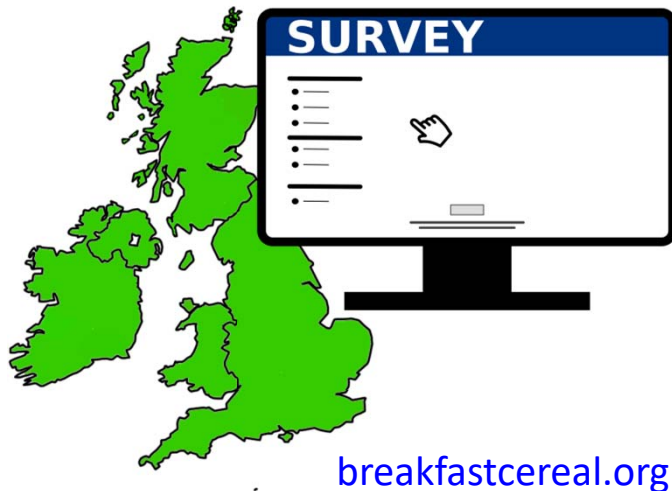
Eating a good breakfast is an
important way of staying healthy.

National statistics?

Cereals are the most popular breakfast in the UK.
Over 95% of households buy breakfast cereals.

On average, each household has approximately 5
opened or unopened cereal packets in the cupboard.

Approximately 20% of children skip breakfast
and go to school with an empty stomach.



Do you think these statistics
sound accurate?

Calculate how these statistics
compare to your class.

Comparing cereals

Do you think all cereals have the same nutritional value?

What might some cereals have too much or too little of?



Nutritional value

What's in a breakfast cereal?

Nutrition		
Typical Composition	A 50g (1 ³ / ₄ oz) serving provides	100g (3 ¹ / ₂ oz) provide
Energy	757kJ 179kcal	1514kJ 358kcal
Protein	5.5g	11.0g
Carbohydrate	30.2g	60.4g
of which sugars	0.8g	1.5g
Fat	4.1g	8.1g
of which saturates	0.8g	1.6g
mono-unsaturates	1.9g	3.8g
polyunsaturates	1.4g	2.7g
Fibre	4.3g	8.5g
Sodium	trace	trace

What do these titles mean?

Why do you think they say how much is in 100 g?

This cereal has 11.0 g of protein per 100 g.
How else could you say this?

Nutritional value

How do we know what is too much or too little of the different parts of the cereal?



Nutrition		
Typical Composition	A 50g (1 ³ / ₄ oz) serving provides	100g (3 ¹ / ₂ oz) provide
Energy	757kJ 179kcal	1514kJ 358kcal
Protein	5.5g	11.0g
Carbohydrate	30.2g	60.4g
of which sugars	0.8g	1.5g
Fat	4.1g	8.1g
of which saturates	0.8g	1.6g
mono-unsaturates	1.9g	3.8g
polyunsaturates	1.4g	2.7g
Fibre	4.3g	8.5g
Sodium	trace	trace

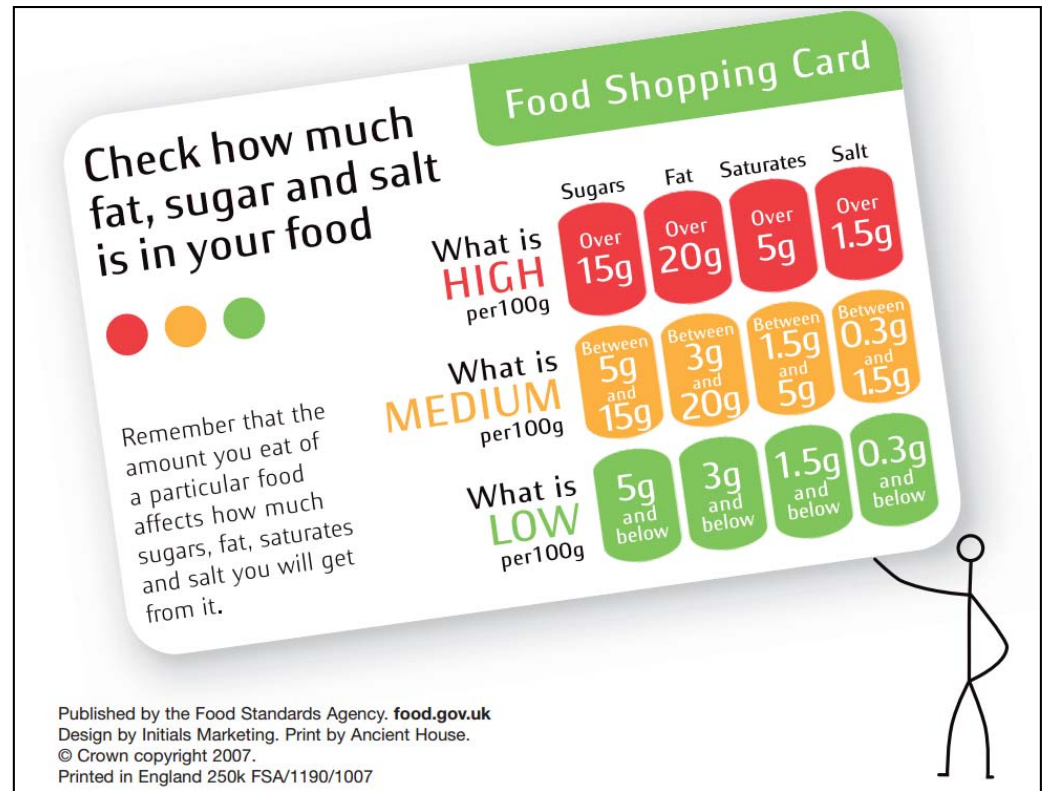
The Food Standards Agency has suggested a traffic light system to help people easily see the nutritional value of the food they buy.

Traffic light your cereals!

Use the traffic light system to analyse the nutritional value of the cereals you have brought in.

How many ways could you rank them from healthiest to least healthy?

Estimate how much sugar, fat and salt you eat in an average serving of your favourite cereal.



Are there any problems with the card?
What if a cereal was exactly 15% sugar?
How could you improve it?

Top 15 brands (2011)

<http://www.ethicalconsumer.org/buyersguides/food/breakfastcereal.aspx>

Here are the top 15 brands by popularity rated from a 2011 survey.

Looking at the traffic lights, are there any surprises here?

Brand	sugar	salt*	total fat	sat fat	fibre
1. Kellogg's Special K	17	1.15	1.5	0.5	2.5
2. Weetabix**	4.4	0.65	2	0.6	10
3. Kellogg's Crunchy Nut	35	0.9	5	0.9	2.5
4. Quaker Oat So Simple****	1	<0.1	7.7	1.3	10.5
5. Kellogg's Corn Flakes*	8	1.3	0.9	0.2	3
6. Kellogg's Coco Pops	35	0.75	2.5	1	2
7. Cheerios	21.5	1.23	3.8	0.9	7.1
8. Shreddies	14.9	0.76	1.9	0.4	9.9
9. Kellogg's Rice Krispies	10	1.15	1	0.2	1
10. Shredded Wheat	0.7	<0.1	2.2	0.5	11.6
11. Kellogg's Frosties	37	0.9	0.6	0.1	2
12. Alpen	23.1	0.28	5.8	0.8	7
13. Kellogg's All Bran	18	1.15	3.5	0.7	27
14. Dorset Cereals organic museli	27.7	0.14	8.9	1.5	8.2
15. Sugar Puffs***	35	<0.1	1.6	0.2	4

Comparing traffic lights

Look at the traffic light criteria below.
Which do you think is better for people to use when they are shopping? Why?

	Green (Low)	Amber (Medium)	Red (High)
Sugar	≤ 5.0g/100g	>5.0 to ≤ 12.5g/100g	>12.5g per 100g
Salt	≤ 0.3g/100g	>0.3 to ≤ 1.5g/100g	>1.5g/100g
Fat	≤ 3.0g/100g	>3.0 to ≤ 20.0g/100g	>20.0g/100g

<http://www.actiononsalt.org.uk/news/Salt%20in%20the%20news/2012/64061.html>

Food Shopping Card

Check how much fat, sugar and salt is in your food

Remember that the amount you eat of a particular food affects how much sugars, fat, saturates and salt you will get from it.

	Sugars	Fat	Saturates	Salt
What is HIGH per100g	Over 15g	Over 20g	Over 5g	Over 1.5g
What is MEDIUM per100g	Between 5g and 15g	Between 3g and 20g	Between 1.5g and 5g	Between 0.3g and 1.5g
What is LOW per100g	5g and below	3g and below	1.5g and below	0.3g and below

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<http://tna.europarchive.org/20120419000433/http://www.food.gov.uk/multimedia/pdfs/publication/foodtrafficlight1107.pdf>

Thursday, 04 June 2020

Lesson 10

Shopping deals

Key learning

Understand percentages in context

Analyse the different offers available in shops

Make comparisons to decide on best value



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You will need...


For this lesson, you will need to have examples of discount offers you have seen for different types of shops.



Supermarket discounts

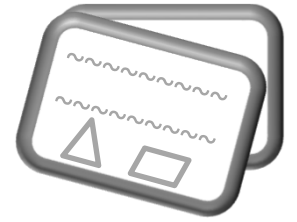


Clothes shops



Online shopping

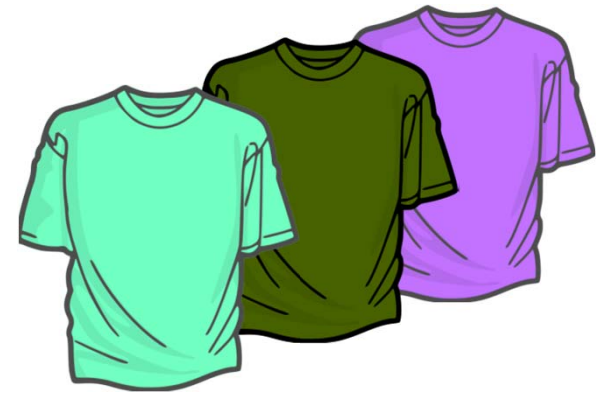
Discount



Sally is buying some t-shirts.

The shop has an offer of 20% off what you spend above £30.

The total of the t-shirts is £45. How much will she have to pay?



Discount

Davey is buying a new fridge. The fridge he wants costs £195.
He sees the following deals.

Discount kitchens

$\frac{1}{3}$ off all fridges!

Sub-zero deals

20% off all fridges!

Where should he buy the fridge?

How much does he save by choosing the cheaper deal?



Which deal?

Xavier is planning a holiday. He sees the two deals below.



Vince's Vacations

10% off the price of your holiday.



Helen's Holidays

5% off your holiday and an extra discount of £20 if you spend over £200!

The price of his holiday is £380 before the discount.
Which travel agent should he book through?

Danny's holiday costs the same **after discount** at both agents.
What is the original price of Danny's holiday?

Which deal?

Look at the deals below.

Barry's Breaks

10% off the price
of your holiday.

Tina's Trips

£30 discount when you
spend £150 or more

Gail's Getaways

20% off whatever
you spend over £200

Which do you think is the best?

Why?

Which deal?

Barry's Breaks

10% off the price of your holiday.

Gail's Getaways

20% off whatever you spend over £100.

Tina's Trips

£30 discount when you spend £150 or more.

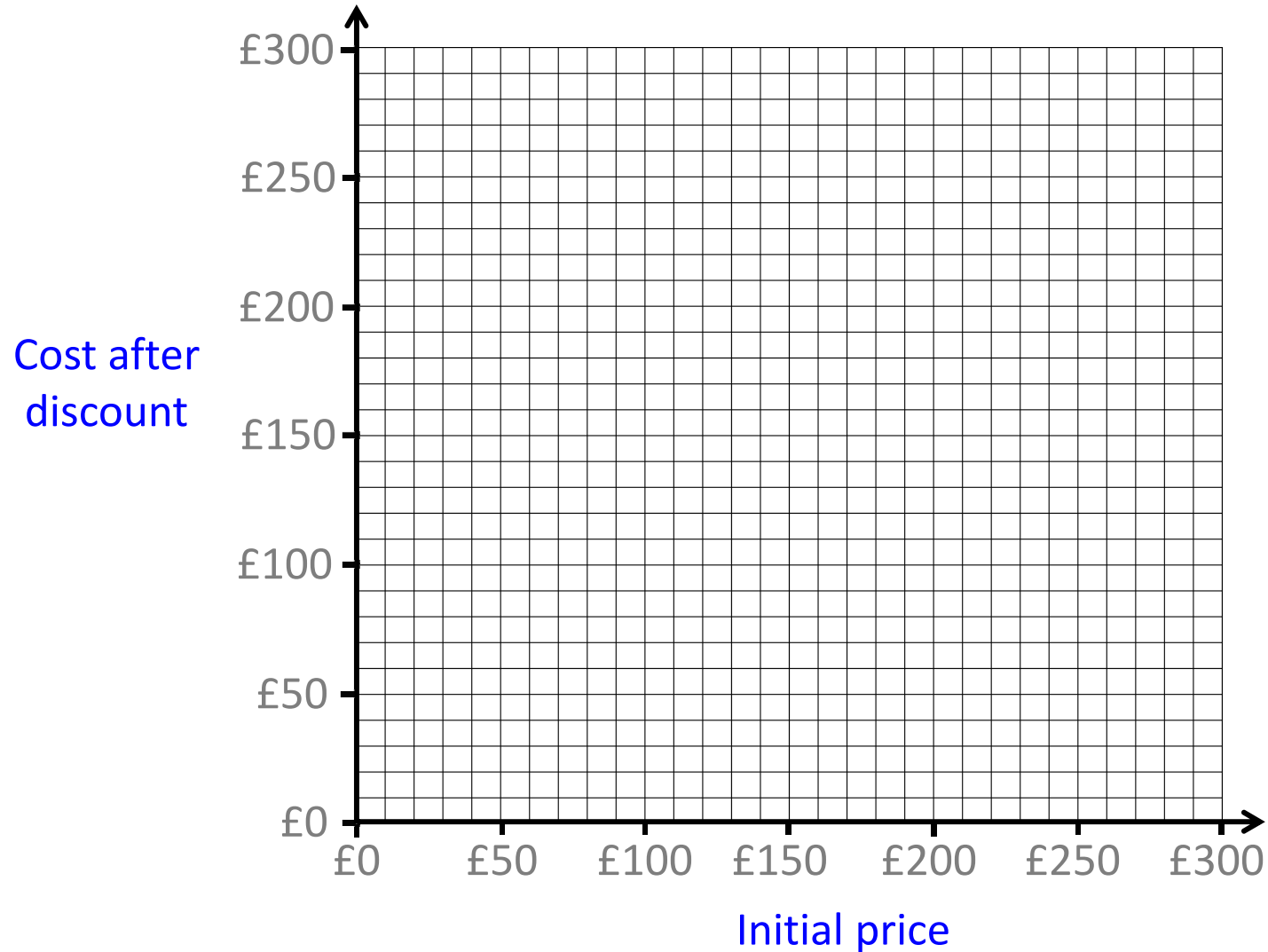
How much would you pay for a holiday costing £250 with each discount deal?

Find the price ranges of holidays where each of the deals will give the best final price.

Find a holiday price where Gail's Getaways will be the most expensive deal.


Which deal?

How could plotting points of the prices you have calculated show the best price range for each deal?

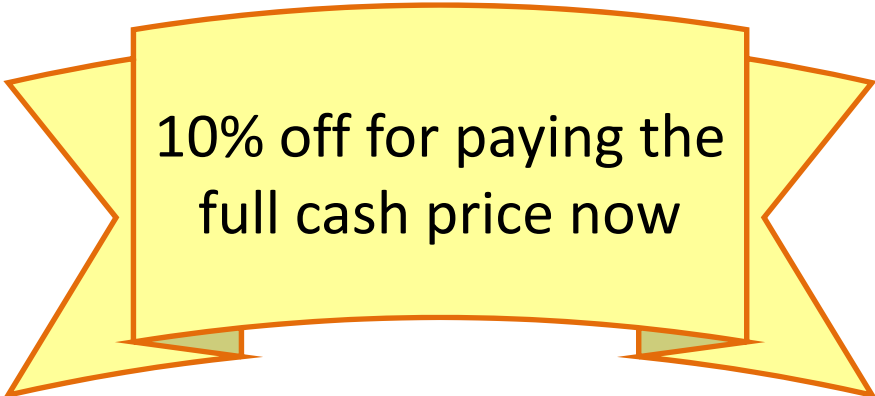


Payment plans

Sandip is buying a new TV. He sees the deals below.



Buy your TV with 12
monthly payments of £27



10% off for paying the
full cash price now

How much **will he save** by paying the full cash price now.

Your investigation

Look for other discount offers and investigate which are the best.



20th - 30th April
On Orders Over £50
including items in our end of season clearance
USE DISCOUNT CODE AT THE CHECKOUT **D012**