

I SEE REASONING YEAR 4

Tasks to inspire mathematical thinking

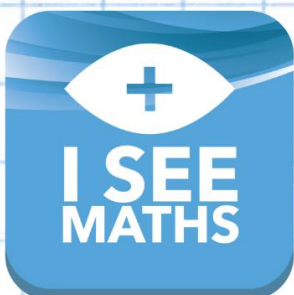
SAMPLE

Different Ways:
340 can be made
with 3 hundreds and
4 tens or...

Explain:

The answer to $56 - 28$
is the same as $54 - 30$
because...

I... so...
 $7 \times 5 = 35$
 $7 \times 6 =$
 $7 \times 12 =$

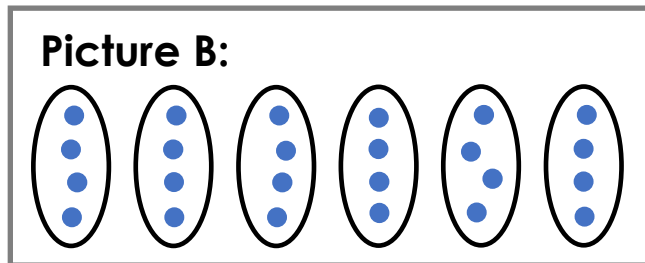
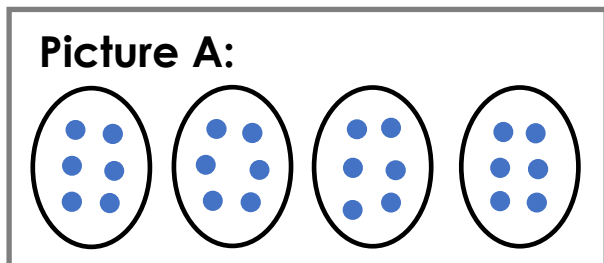


BY GARETH METCALFE

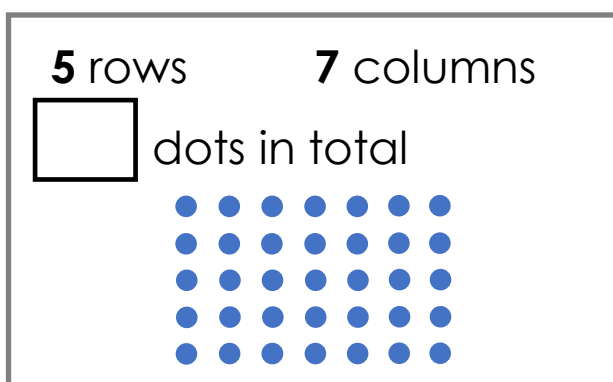
Available for digital download

Read the Pictures

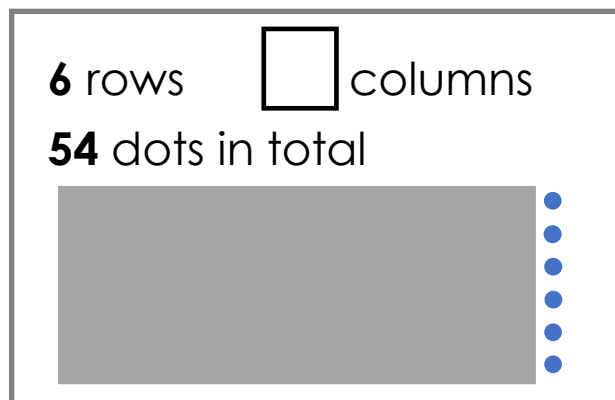
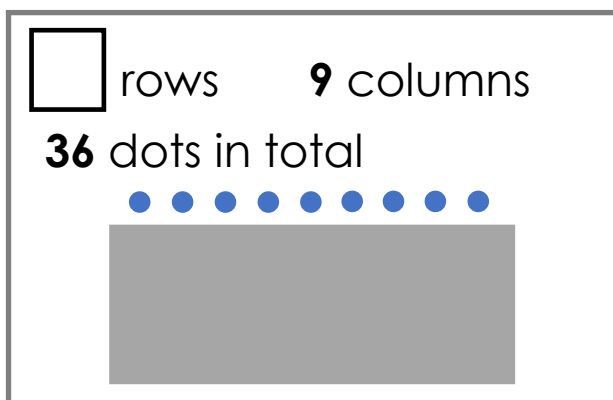
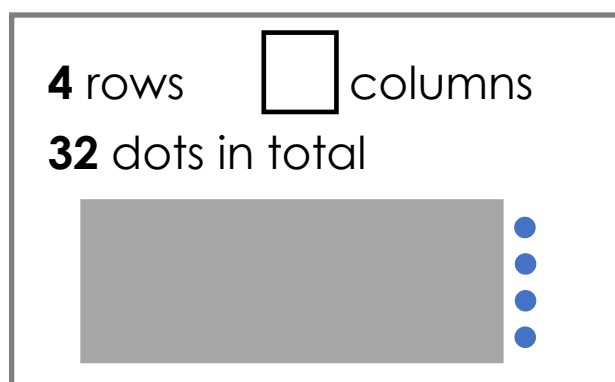
Which picture shows $24 \div 6$?



Read the Pictures



Some dots are hidden.



Explore

How many arrays can be made with:

- (a) 19 counters
- (b) 20 counters
- (c) 21 counters

Example arrays with 10 counters:



Draw

Draw a picture to show the answer to each question:

(a) 3 friends spend £18 at the café. **How much does each person pay?**

(b) Footballs cost £6 each. **How many footballs can be bought with £18?**

Extend: Write two different questions that represent $40 \div 5$

Which Method?

For $24 \div 8$, how many **groups** of 8 in 24? Answer: 3

For $60 \div 4$, 60 is **shared** into 4 equal groups. Answer: 15

Do you answer each question by **sharing** or **grouping**?

$$60 \div 30 = \square$$

$$60 \div 5 = \square$$

$$39 \div 3 = \square$$

$$80 \div 4 = \square$$

$$100 \div 25 = \square$$

Think of a question that you answer by sharing/grouping.

True or False?

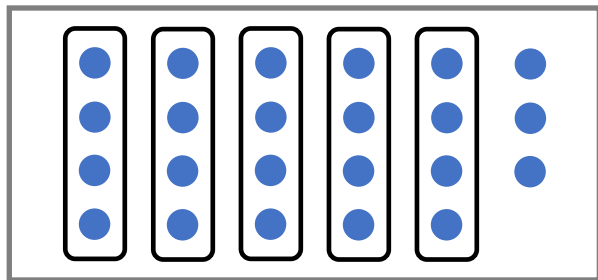
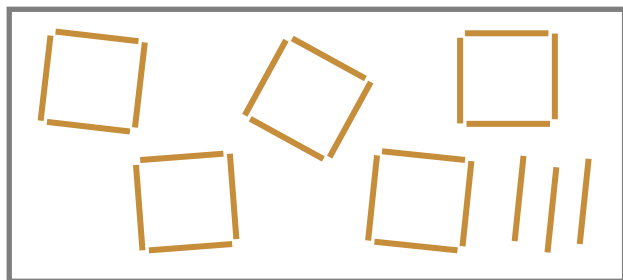
✓ or ✗

$8 \div 40 = 5$ $8 = 40 \div 5$
 $8 \div 5 = 40$ $8 = 5 \div 40$
 $40 \div 8 = 5$ $5 = 40 \div 8$

$8 \times 5 = 40$

Read the Pictures

Both pictures show the **number of 4s in 23**:



$$23 \div 4 = \square \text{ remainder } \square$$

Draw pictures to show the **number of 6s in 20**.

Explore

There are triangles and matchsticks are left over.



Rearrange the same number of matchsticks.

There are squares and matchsticks are left over.

There are **3** and **4** matchsticks are left over.

Explore

There are hexagons and matchsticks are left over.



Rearrange the same number of matchsticks.

There are triangles and matchsticks are left over.

There are **3** and **2** matchsticks are left over.

Different Ways

I make **squares** using between 30→40 matchsticks.

I have **1 matchstick left over**.

How many matchsticks could I have used?

Find different possible answers.

Different Ways

I make **4 lots** of the **same shape** using matchsticks.

I have **3 matchsticks left over**.

How many matchsticks could I have used?

Find different possible answers.

Explain

Question A: How many **triangles** can be made with **14 matchsticks**?



Question B: How many **triangles** can be made with **28 matchsticks**?



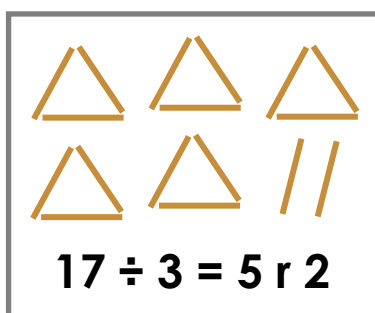
*Explain why doubling the number of matchsticks **does not** double the number of triangles that can be made.*

I know... so...

$$23 \div 3 = \square \text{ r } \square$$

$$13 \div 3 = \square \text{ r } \square$$

$$17 \div 6 = \square \text{ r } \square$$



$$19 \div 3 = \square \text{ r } \square$$

$$34 \div 3 = \square \text{ r } \square$$

$$47 \div 3 = \square \text{ r } \square$$

I know... so...

$32 \div 8 = 4$

$38 \div 8 =$

$30 \div 4 = 7 \text{ r } 2$

$38 \div 4 =$

$50 \div 6 = 8 \text{ r } 2$

$44 \div 6 =$

$37 \div 3 = 12 \text{ r } 1$

$39 \div 3 =$

$24 \div 3 = 8$

$48 \div 6 =$

$14 \div 4 = 3 \text{ r } 2$

$54 \div 4 =$

Small Difference Questions

$12 \div 4 =$

$14 \div 4 =$

$28 \div 4 =$

$34 \div 4 =$

$34 \div 8 =$

$\square \div 8 = 4 \text{ r } 6$

$17 \div 5 =$

$17 \div 3 =$

$19 \div 3 =$

$19 \div 5 =$

$\square \div 5 = 4 \text{ r } 2$

$32 \div 5 =$

$\square \div 3 = 7$

$23 \div 3 =$

$26 \div 3 =$

$26 \div 6 =$

$\square \div 6 = 5 \text{ r } 2$

$38 \div 6 =$

Extend: add another two question to each sequence.

Small Difference Questions

$21 \div 8 =$

$24 \div 8 =$

$24 \div 4 =$

$48 \div 8 =$

$46 \div 8 =$

$\square \div 8 = 6 \text{ r } 2$

$12 \div 3 =$

$30 \div 3 =$

$42 \div 3 =$

$48 \div 3 =$

$\square \div 3 = 15 \text{ r } 2$

$\square \div 3 = 17 \text{ r } 2$

$18 \div 6 =$

$22 \div 6 =$

$22 \div 3 =$

$44 \div 6 =$

$\square \div 6 = 8 \text{ r } 1$

$\square \div 6 = 9 \text{ r } 2$

Extend: add another two question to each sequence.

Different Ways

Fill in each box with a single-digit number:

$19 \div \square = \square \text{ r } 1$

$26 \div \square = \square \text{ r } 2$

$39 \div \square = \square \text{ r } 3$

$19 \div \square = \square \text{ r } 1$

$26 \div \square = \square \text{ r } 2$

$39 \div \square = \square \text{ r } 3$

$19 \div \square = \square \text{ r } 1$

$26 \div \square = \square \text{ r } 2$

$39 \div \square = \square \text{ r } 3$

$19 \div \square = \square \text{ r } 1$

$26 \div \square = \square \text{ r } 2$

Small Difference Questions

$40 \div \square = 40$

$30 \div \square = 1$

$60 \div 60 = \square$

$40 \div \square = 20$

$30 \div \square = 3$

$60 \div 30 = \square$

$40 \div 20 = \square$

$30 \div \square = 30$

$\square \div 6 = 10$

$40 \div 1 = \square$

$30 \div \square = 2$

$\square \div 60 = 1$

When dividend and the quotient are the same, the divisor is...

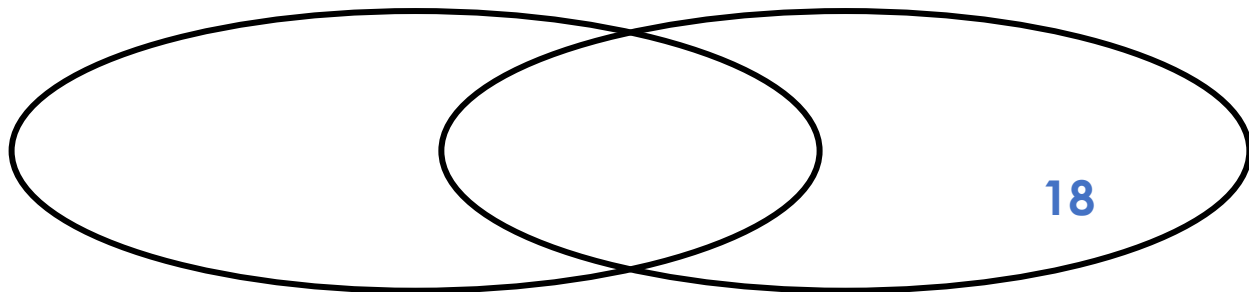
Explore

Put the numbers in the correct part of the Venn diagram:

20 36 42 46 100

Divides by **4**, no remainder

Divides by **6**, no remainder



Extend: Put another number in each section.

Explain

Circle the questions with a **2-digit quotient**:

$54 \div 6 =$

$84 \div 7 =$

$46 \div 4 =$

$90 \div 10 =$

$48 \div 5 =$

Explain how you know.

Which Method?

To calculate $78 \div 6$, how can 45 be partitioned?

Split 78 into 60 and 18

Break 78 into 70 and 8

Partition 78 into 48 and 30

Explain the Mistakes

Mistake A:

$$\begin{array}{l}
 72 \div 4 \\
 \swarrow \quad \searrow \\
 70 \div 4 = 20 \quad 2 \div 4 = 2 \\
 \hline
 72 \div 4 = 22
 \end{array}$$

Mistake B:

$$\begin{array}{l}
 72 \div 4 \\
 \swarrow \quad \searrow \\
 60 \div 4 = 12 \quad 12 \div 4 = 3 \\
 \hline
 72 \div 4 = 15
 \end{array}$$

Different Ways

$$\begin{array}{l}
 84 \div 6 \\
 \swarrow \quad \searrow \\
 \square \div 6 = \square \quad 24 \div 6 = 4 \\
 84 \div 6 = \square
 \end{array}$$

$$\begin{array}{l}
 84 \div 6 \\
 \swarrow \quad \searrow \\
 \square \div 6 = \square \quad 42 \div 6 = 7 \\
 84 \div 6 = \square
 \end{array}$$

$$\begin{array}{l}
 112 \div 7 \\
 \swarrow \quad \searrow \\
 \square \div 7 = \square \quad 42 \div 7 = 6 \\
 112 \div 7 = \square
 \end{array}$$

$$\begin{array}{l}
 112 \div 7 \\
 \swarrow \quad \searrow \\
 \square \div 7 = \square \quad 56 \div 7 = 8 \\
 112 \div 7 = \square
 \end{array}$$

I know... so...

$40 \div 4 = 10$

$60 \div 3 = 20$

$120 \div 4 = 30$

$32 \div 4 = 8$

$18 \div 3 = \square$

$12 \div 4 = \square$

$72 \div 4 = \square$

$78 \div 3 = \square$

$132 \div 4 = \square$

$76 \div 4 = \square$

$78 \div 6 = \square$

$140 \div 4 = \square$

Next Step

In each calculation, **what's the remainder?**

$$\begin{array}{r} 17 \\ 3 \overline{) 521} \end{array}$$

$$\begin{array}{r} 1 \square \\ 5 \overline{) 75} \end{array}$$

$$\begin{array}{r} 2 \square \\ 3 \overline{) 75} \end{array}$$

$$\begin{array}{r} 1 \square \\ 4 \overline{) 76} \end{array}$$

$$\begin{array}{r} 3 \square \\ 3 \overline{) 96} \end{array}$$

$$\begin{array}{r} 2 \square \\ 3 \overline{) 86} \end{array}$$

$$\begin{array}{r} 1 \square \\ 4 \overline{) 68} \end{array}$$

$$\begin{array}{r} 1 \square \\ 5 \overline{) 90} \end{array}$$

$$\begin{array}{r} 2 \square \\ 4 \overline{) 92} \end{array}$$

Extend: For each question, how is the dividend partitioned?

Correct or Incorrect?

✓ or ✗

$$\begin{array}{r} 11 \\ 4 \overline{) 64} \end{array}$$

$$\begin{array}{r} 15 \\ 5 \overline{) 65} \end{array}$$

$$\begin{array}{r} 24 \\ 3 \overline{) 72} \end{array}$$

$$\begin{array}{r} 14 \\ 6 \overline{) 84} \end{array}$$

$$\begin{array}{r} 15 \\ 5 \overline{) 85} \end{array}$$

$$\begin{array}{r} 21 \\ 4 \overline{) 84} \end{array}$$

$$\begin{array}{r} 35 \\ 6 \overline{) 90} \end{array}$$

$$\begin{array}{r} 29 \\ 3 \overline{) 87} \end{array}$$

Explain the mistakes.

...should be partitioned into...
The calculation... is incorrect.

Spot the Difference

(a) 64 people are going to the match. 4 people travel in each car. **How many cars are needed?**

(b) 4 people spend a total of £64 at the café.

How much do they pay each?

Answer (a) and (b). **What's the same? What's different?**

Different Methods

$$80 \div 10 =$$

$$78 \div 6 =$$

$$74 \div 2 =$$

$$84 \div 4 =$$

$$24 \div 1 =$$

$$30 \div 15 =$$

When you $\div 10$... When you $\div 1$...

When the dividend is double the divisor, the quotient...

Mental or Written?

$$42 \div 3 =$$

$$60 \div 4 =$$

$$42 \div 6 =$$

$$180 \div 10 =$$

$$60 \div 5 =$$

$$90 \div 6 =$$

I calculated... mentally because...

Written methods help for calculations like... because...

Explain

Which numbers **leave a remainder** when...

...divided by 6?

54 56 64 83 300

...divided by 8?

28 44 72 96 100

When $\div 6$, I know... does not leave a remainder because...

When $\div 4$ or $\div 6$, odd numbers...

Rank by Difficulty

$42 \div 7 =$

$46 \div 6 =$

$94 \div 2 =$

$51 \div 3 =$

$90 \div 30 =$

... can be calculated mentally by...

There are more steps to answer... than... because...

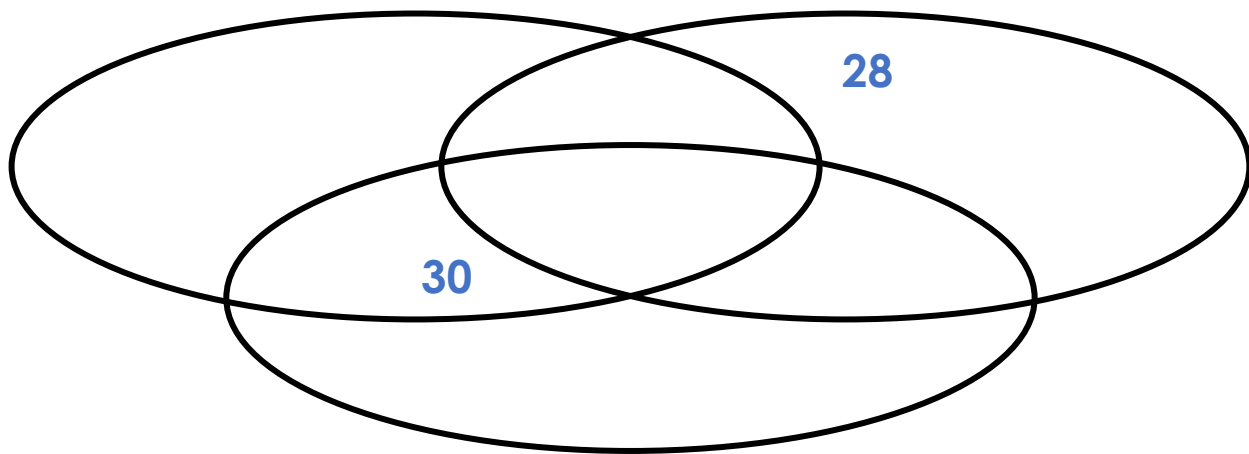
Explore

Put the numbers in the correct part of the Venn diagram:

15 21 25 36 40 46 60 64

Divides by 3, no remainder

Divides by 4, no remainder



Divides by 5, no remainder

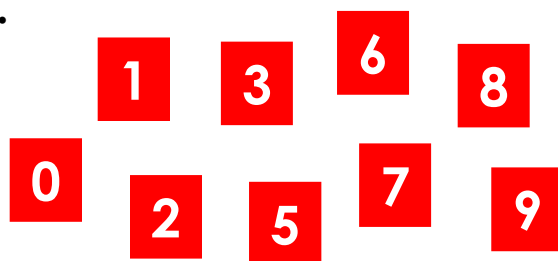
Extend: Put another number in each section.

How Many Ways?

Complete using the digits 0→9.

Position the digit 4 as shown:

$\square \mathbf{4} \div \square = \square \square$



Level 1: I can find an answer

Level 2: I can find different answers

Level 3: I know how many answers there are

Read the Pictures

Picture A:

Picture B:

Picture C:

Picture C is times as large as picture B.

× = ÷ =

Picture C is times as large as picture A.

× = ÷ =

Correct or Incorrect?

✓ or ✗

$35 \times 100 = \boxed{5300}$

$260 \div 10 = \boxed{2600}$

$10 \times \boxed{305} = 3500$

$800 \div \boxed{100} = 8$

$10 \times 150 = \boxed{1500}$

$400 \div 10 = \boxed{4}$

Correct the mistakes.

Small Difference Questions

$70 \times 10 = \boxed{}$

$40 \div 10 = \boxed{}$

$600 \div \boxed{} = 6$

$70 \times 1 = \boxed{}$

$40 \times 10 = \boxed{}$

$600 \div \boxed{} = 60$

$70 \div 1 = \boxed{}$

$4 \times 100 = \boxed{}$

$600 \div \boxed{} = 600$

$70 \div 10 = \boxed{}$

$40 \times 0 = \boxed{}$

$600 \times \boxed{} = 6000$

Contexts

In these questions, some of the numbers are hidden.

For each question, which operation is needed?

addition + multiplication \times division \div

(a) 10 friends spend a total of at the café.

How much money does each person pay?

(b) Mike is 3 years old. Tom is years old.

When Mike is 9 years old, what age will Tom be?

(c) Joy has times as much money as Zara. Zara has £12.

How much money does Joy have?

Small Difference Questions

Fill in 2 boxes to create a multiplication question:

eggs per box

boxes

eggs in total

Fill in 2 boxes to create a division question:

eggs per box

boxes

eggs in total

Contexts

Fill in the boxes to give possible answers:

To add challenge, use a different number in each box.

(a) **12** people camping. people per tent. tents.

(b) children at art club. There are boys and **12** girls.

(c) Tim has times as many conkers as Sam.

Sam has **12** conkers, Tim has conkers.

Which Answer?

Which number sentence(s) represents each question?

Eggs are packed in boxes of 6.

How many boxes are needed for 30 eggs?

$$6 \times \square = 30$$

$$6 \times 30 = \square$$

$$30 \div 6 = \square$$

Sam has 4 pairs of trousers and 8 t-shirts.

How many different outfits can he wear?

$$4 + 8 = \square$$

$$8 \div 4 = \square$$

$$4 \times 8 = \square$$

Which Picture?

Tim and three friends get the train. The total cost is £24.

How much does each person pay?

£24		
£8	£8	£8

£24			
£6	£6	£6	£6

Which bar model represents the questions correctly?

Explain the mistake.

Small Difference Questions

(a) There are 8 girls and 3 boys at the party.

How many children at the party?

(b) There are 8 girls at the party. There are 3 times as many boys as girls at the party. How many boys at the party?

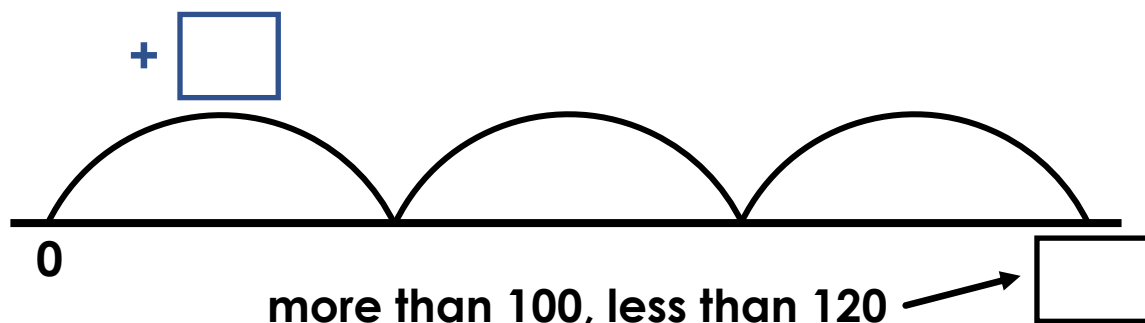
(c) There are 8 girls at the party. There are 3 times as many boys as girls at the party. How many children at the party?

Compare the questions. What's the same? What's different?

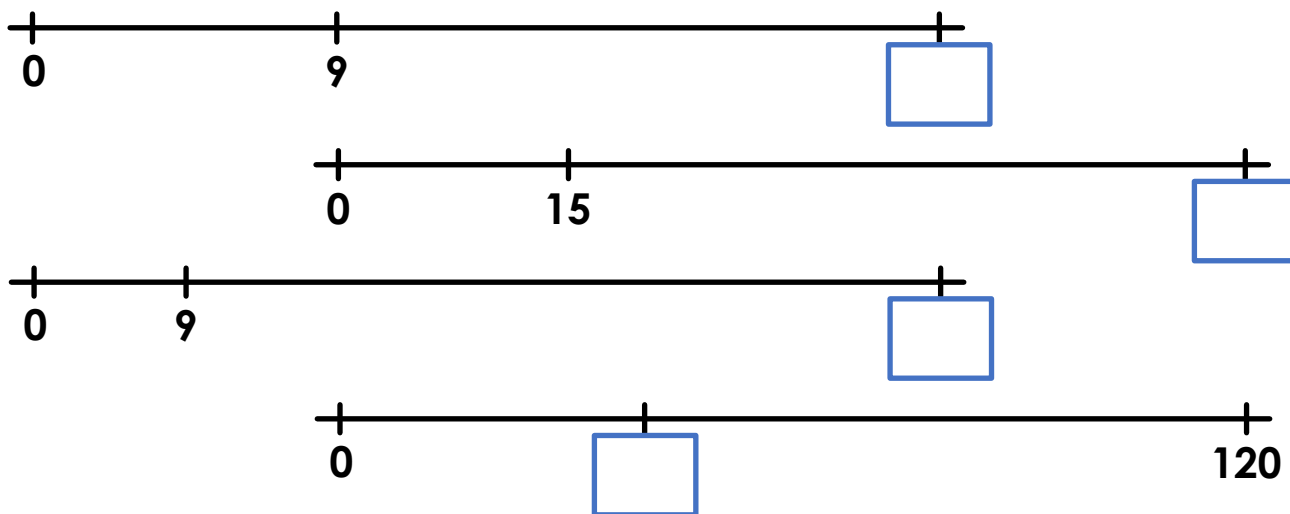
Different Ways

Each jump on the number line is the same.

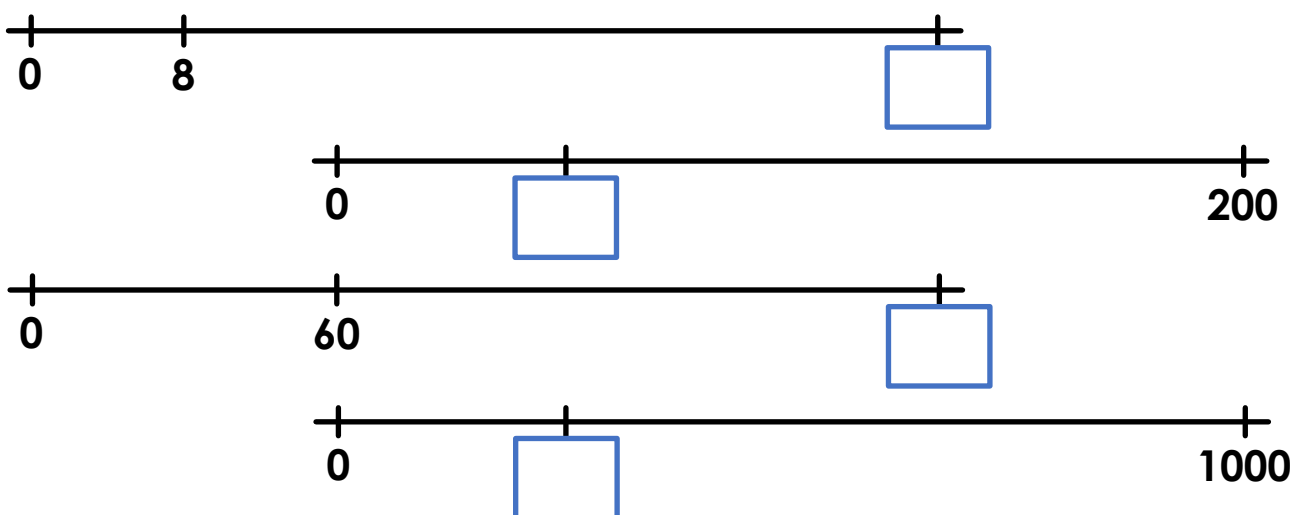
Which numbers could be in the blue box?



Estimate

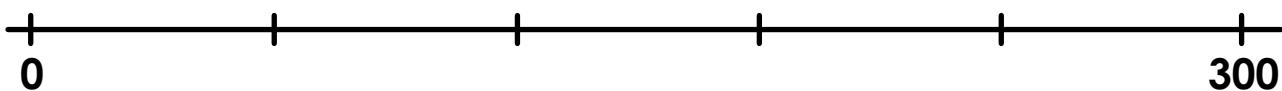
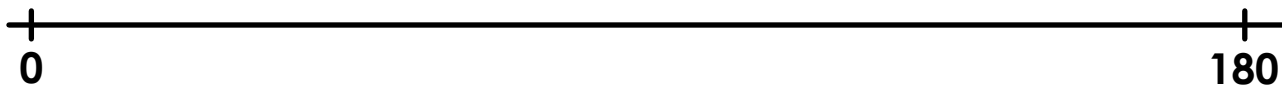
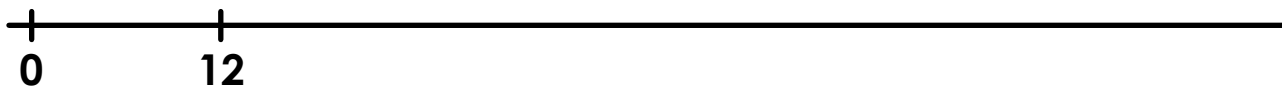
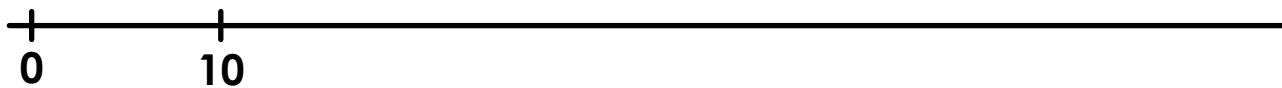


Estimate



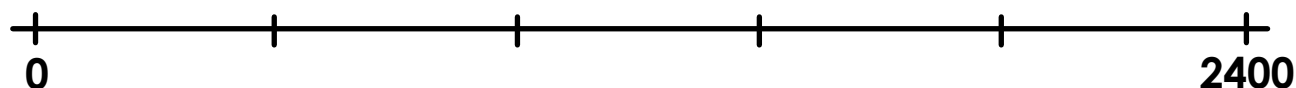
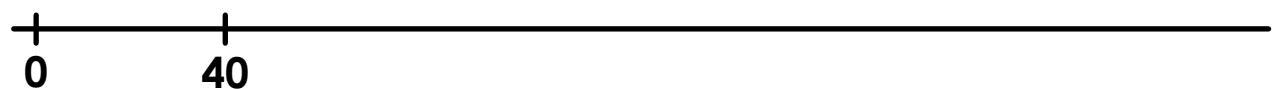
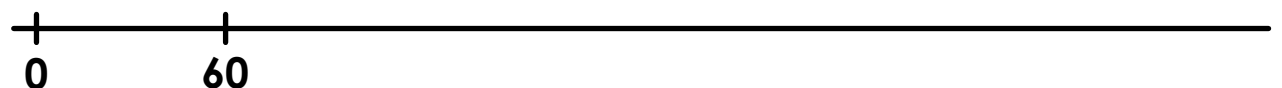
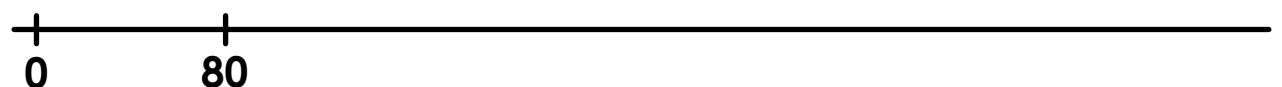
Estimate

Position **60** on each number line:



Estimate

Position **240** on each number line:



Context

In Frank's garden, the sunflower is 5 times as tall as the poppy.

The sunflower is less than 200cm tall.

The poppy is more than 30cm tall.

How tall could the sunflower be?

Read the Pictures

For each picture, write different multiplication and division number sentences:

$150 \div 5 = \square$	
$\square = 300 \times 5$	

Agree or Disagree?

Therefore $48 = 6 \times 8$	$8 \times 6 = 48$	Therefore $48 \div 8 = 6$
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Therefore $8 = 6 \times 48$

Therefore $6 = 54 \div 9$	$54 \div 9 = 6$	Therefore $540 \div 9 = 60$
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Therefore $9 \div 54 = 6$

I know... so...

$5 \times 9 = 45$

$\square \times \square = \square$

$\square = \square \times \square$

$\square \div \square = \square$

$40 \times 8 = 320$

$\square = \square \times \square$

$\square \div \square = \square$

$\square = \square \div \square$

Small Difference Questions

$15 \times 3 = \square$

$12 \div \square = 4$

$30 \div 5 = \square$

$15 = 3 \times \square$

$12 \times 4 = \square$

$30 \times 5 = \square$

$15 \div 3 = \square$

$\square \div 4 = 12$

$\square = 30 \times 5$

$\square = 15 \div 3$

$4 = 12 \div \square$

$\square \div 5 = 30$

$\square \div 15 = 3$

$4 = \square \div 12$

$30 = \square \div 5$

Extend: design your own sequence of 5 multiplication and division questions using the same two numbers.

Which Answer?

$5 \times \boxed{4} = 40 \div 2$

$5 \times \square = 40 \div 2$

$5 \times \boxed{8} = 40 \div 2$

$6 \times 5 = \boxed{30} \div 3$

$6 \times 5 = \square \div 3$

$6 \times 5 = \boxed{90} \div 3$

Small Difference Questions

$5 \times 6 = \square$

$6 \times 3 = \square$

$28 \div 4 = \square$

$5 \times 6 = \square + 3$

$6 \times 3 = \square + 2$

$28 \div 4 = \square + 1$

$5 \times 6 = \square - 3$

$6 \times 3 = \square \times 2$

$28 \div 4 = \square \times 1$

$5 \times 6 = \square \times 3$

$6 \times 3 = \square \div 2$

$28 \div 4 = \square \div 1$

Extend: design your own sequence of 4 questions. Use the same numbers but change the symbols used.

How Many Ways?

The missing numbers are positive whole numbers.

Fill the gaps:

$$\square \times 8 = 40 - \square$$

Level 1: I can find an answer

Level 2: I can find different answers

Level 3: I know how many answers there are

How Many Ways?

The missing number is a positive whole number.

Fill the gap:

$$24 \div \square > 4$$

Level 1: I can find an answer

Level 2: I can find different answers

Level 3: I know how many answers there are

Which Answers?

Circle the **factors of 20**

1 4 6 10 60

Circle the **factors of 100**

4 5 8 20 300

Mental or Written?

Which of the digits from 1 to 9 are factors of 90?

1 2 3 4 5 6 7 8 9

I worked out... mentally because I knew...

I know... so...

$$8 \times 5 = 40$$

$$6 \times 7 = 42$$

$$9 \times 5 = 45$$

$$4 \times \square \times 5 = 40$$

$$\square \times \square \times 7 = 42$$

$$\square \times \square \times \square = 45$$

Extend: create of your own example

I SEE REASONING – Y4

Answers

Division, page 2:

Read the Pictures: Both pictures show $24 \div 6$: picture A as grouping, (groups of 6 in 24); picture B as sharing (shared into 6 equal groups of 4).

Read the Pictures: Top left: 35 dots Bottom left: 4 rows
Top right: 8 columns Bottom right: 9 columns

Explore: (a) 1 ways: 19×1 array (2 ways with inverse arrays)
(b) 3 ways: 5×4 array, 10×2 array and 20×1 array (6 ways with inverse arrays)
(c) 2 ways: 7×3 array and 21×1 array (4 ways with inverse arrays)

Division, page 3:

Draw: (a) is more likely to be calculated by sharing than (b) especially if using objects, but that the answer to both calculations is the same.

Which Method? $60 \div 30 = 2$ (grouping) $60 \div 5 = 12$ (likely by grouping)
 $39 \div 3 = 13$ (likely sharing) $80 \div 4 = 20$ (sharing) $100 \div 25 = 4$ (grouping)

True or False? True statements: $40 \div 8 = 5$ $8 = 40 \div 5$ $5 = 40 \div 8$

Division, page 4:

Read the Pictures: 5 remainder 3

Explore: 6 triangles, 1 left over 4 squares, 3 left over pentagons

Explore: 4 hexagons, 2 left over 8 triangles, 2 left over octagons

Division, page 5:

Different Ways: 33 or 37 matchsticks

Different Ways: Example answers: 19 matchsticks by making squares; 23 matchsticks making pentagons; 27 matchsticks making hexagons. Note that it's not possible to make triangles with a remainder of 3 matchsticks.

Explain: Question A: 4 triangles (2 matchsticks left) Question B: 9 triangles (1 matchstick left). In this case, doubling the number of matchsticks more than doubles the number of triangles that can be made.

I know... so... $23 \div 3 = 7 \text{ r } 2$ $13 \div 3 = 4 \text{ r } 1$ $17 \div 6 = 2 \text{ r } 5$
 $19 \div 3 = 6 \text{ r } 1$ $34 \div 3 = 11 \text{ r } 1$ $47 \div 3 = 15 \text{ r } 2$

I SEE REASONING – Y4

Answers

Division, page 6:

I know... so... Top row: 4 r 6 7 r 2 8 Bottom row: 9 r 2 13 13 r 2

Small Difference Questions: Left column: 3 3 r 2 7 8 r 2 4 r 2 38

Middle column: 3 r 2 5 r 2 6 r 1 3 r 4 22 6 r 2

Right column: 21 7 r 2 8 r 2 4 r 2 32 6 r 2

Small Difference Questions: Left column: 2 r 5 3 6 6 5 r 6 50

Middle column: 4 10 14 16 47 53

Right column: 3 3 r 4 7 r 1 7 r 2 49 56

Division, page 7:

Different Ways: Left column: $19 \div 2 = 8 \text{ r } 1$ $19 \div 3 = 6 \text{ r } 1$ $19 \div 6 = 3 \text{ r } 1$

$19 \div 8 = 2 \text{ r } 1$ $19 \div 18 = 1 \text{ r } 1$

Middle column: $26 \div 3 = 8 \text{ r } 2$ $26 \div 4 = 6 \text{ r } 2$ $26 \div 6 = 4 \text{ r } 2$ $26 \div 8 = 3 \text{ r } 2$

$26 \div 12 = 2 \text{ r } 2$ $26 \div 24 = 1 \text{ r } 2$

Right column: $39 \div 4 = 9 \text{ r } 3$ $39 \div 6 = 6 \text{ r } 3$ $39 \div 9 = 4 \text{ r } 3$

Small Difference Questions: Left column: 1, 2, 2, 40

Middle column: 30, 10, 1, 15 Right column: 1, 2, 60, 60

Explore: Left oval: 20, 100 Centre: 36 Right oval: 42 Outside: 46

Division, page 8:

Explain: 2 digit quotients: $84 \div 7$ $46 \div 4$

Which Method? The red method is incorrect as 70 and 8 are not multiples of 6. The blue and green methods are both correct, the blue method of partitioning is more common as the calculation is easier.

Explain the Mistakes: Mistake A: 70 and 2 are not multiples of 4.

Mistake B: $60 \div 4 = 15$

Different Ways: $60 \div 6 = 10$ $84 \div 6 = 14$ $84 \div 6 = 7$ $84 \div 6 = 14$

$70 \div 7 = 10$ $112 \div 7 = 16$ $56 \div 7 = 8$ $112 \div 7 = 16$

I SEE REASONING – Y4

Answers

Division, page 9:

I know... so... Left column: 18, 19 Middle column: 6, 26, 13
Right column: 3, 33, 35

Next Step: Top row: 2, 1, 3, 0 Bottom row: 2, 2, 4, 1

Correct or Incorrect: Incorrect examples: $64 \div 4$ there should be 2 tens carried from 6 tens $65 \div 5$ the calculation $15 \div 5$ is incorrect
 $85 \div 5$ there should be 3 tens carried from 8 tens $90 \div 6$ the tens value in the answer should be 1, not 3

Division, page 10:

Spot the Difference: Both calculations: $64 \div 4 = 16$

(a) is a grouping context (how many 4s in 64?)

(b) is a sharing context (64 in 4 equal groups)

Different Methods: $80 \div 10 = 8$, uses knowledge of place value

$84 \div 4 = 21$, halve twice $78 \div 6 = 13$, suits written calculation

$24 \div 1 = 24$, the divisor is 1 so the dividend and the quotient are the same

$74 \div 2 = 37$, partition 74 into 60, 10 & 4, halve $30 \div 15 = 2$, two 15s in 30

Mental or Written? $42 \div 3 = 14$, suits written method

$180 \div 10 = 18$, use knowledge of place value $84 \div 4 = 21$, halve twice

$60 \div 5 = 12$, may have recall of number fact

$42 \div 6 = 7$, calculation needed is not changed using a written method

$90 \div 6 = 15$, suits written method

Explain: Left example: 56, 64 and 83 leave a remainder

Right example: 28, 44 and 100 leave a remainder

I SEE REASONING – Y4

Answers

Division, page 11:

Rank by Difficulty: $42 \div 7 = 6$, recall number fact

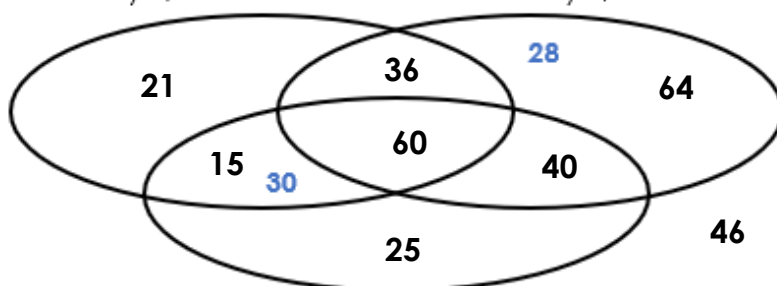
$51 \div 3 = 17$, suits written method

$46 \div 6 = 7 \text{ r } 4$, mental calculation involving a remainder

$90 \div 30 = 3$, count the 30s in 90

$94 \div 2 = 47$, partition 94 into 80, 10 and 4, halve

Explore: Divides by 3, no remainder Divides by 4, no remainder



Divides by 5, no remainder

How Many Ways? 3 ways: $34 \div 2 = 17$ $54 \div 3 = 18$ $84 \div 7 = 12$

Note: This excludes solutions with 1-digit answers e.g. $14 \div 2 = 07$

Multiplication and Division, page 12:

Read the Pictures: 10 times as large $320 \times 10 = 3200$ $3200 \div 10 = 320$

100 times as large $32 \times 100 = 3200$ $3200 \div 100 = 32$

Correct or Incorrect? Correct answers to incorrect examples:

$35 \times 100 = 3500$ $260 \div 10 = 26$ $10 \times 35 = 3500$ $400 \div 10 = 40$

Small Difference Questions: Left column: 700, 70, 70, 7

Middle column: 4, 400, 400, 0 Right column: 100, 10, 1, 10

Multiplication and Division, page 13:

Contexts: Calculations required: (a) $\square \div 10 = \text{cost per person}$

(b) $\square + 6 = \text{Tom's age}$ (c) $12 \times \square = \text{Joy's money}$

Small Difference Questions: Example answer left: 6 eggs per box, 4 boxes

Example answer right: 6 eggs per box, 30 eggs in total

Contexts: Example answers: (a) 3 people per tents, 4 tents

(b) 20 children, 8 boys (c) 2 times as many, 24 conkers

I SEE REASONING – Y4

Answers

Multiplication and Division, page 14:

Which Answer? Top: blue or green Bottom: red

Which Picture? The right bar model is correct. The left bar model is incorrect because four people got the train (Tim + 3 friends).

Small Difference Questions: (a) 11 children (b) 24 boys (c) 32 children

Multiplication and Division, page 15:

Different Ways: Numbers in the range 34→39

Estimate: Exact answers: 27 60 45 40 (children estimate spatially)

Estimate: Exact answers: 40 50 180 250 (children estimate spatially)

Multiplication and Division, page 16:

Estimate: 1st line: have 6 equal sections of length 10 to position 60

2nd line: have 5 equal sections of length 12 to position 60

3rd line: Split 180 into 3 equal sections to position 60

4th line: split 300 into 5 equal sections to position 60 (the first interval)

Estimate: 1st line: have 3 equal sections of length 80 to position 240

2nd line: have 4 equal sections of length 60 to position 240

3rd line: have 6 equal sections of length 40 to position 240

4th line: split 2400 into 10 equal sections to position 240 (halve 1st interval)

Context: 151cm→199cm

Multiplication and Division, page 17:

Read the Pictures: Example number sentences explore the inverse relationship between multiplication and division, place value and the layout of number sentences either side of the = sign. Examples:

$150 \div 5 = 30$ $50 \times 3 = 150$ $150 = 30 \times 5$ $1500 = 300 \times 5$ $1500 \div 500 = 3$

Agree or Disagree? Correct answers (top): blue and green

Correct examples (bottom): purple and orange

I know... so... Example answers (left): $9 \times 5 = 45$ $45 = 5 \times 9$ $45 \div 9 = 5$

Example answers (right): $320 = 40 \times 8$ $320 \div 8 = 40$ $40 = 320 \times 8$

I SEE REASONING – Y4

Answers

Multiplication and Division, page 18:

Small Difference Questions: Left column: 45, 5, 5, 5, 45

Middle column: 3, 48, 48, 3, 48 Right column: 6, 150, 150, 150, 150

Which Answer? Top question: blue Bottom question: 90

Small Difference Questions: Left column: 30, 27, 33, 10

Middle column: 18, 16, 9, 36 Right column: 7, 6, 7, 7

Multiplication and Division, page 19:

How Many Ways? 4 ways: $1 \times 8 = 40 - 32$ $2 \times 8 = 40 - 24$ $3 \times 8 = 40 - 16$
 $4 \times 8 = 40 - 8$

How Many Ways? 5 ways: 1, 2, 3, 4, 5

Which Answers? Left question: 1, 4, 10 Right question: 4, 5, 20

Mental or Written? 1, 2, 3, 5, 6, 9

I know... so... $4 \times 2 \times 5 = 40$ $3 \times 2 \times 7 = 40$ $3 \times 3 \times 5 = 45$

I SEE MATHS RESOURCES

A range of resources for developing deep, visual mathematics can be found at www.iseemaths.com

The ***I See Reasoning*** eBooks are available here:

[I See Reasoning Y3](#)

[I See Reasoning Y4](#)

[I See Reasoning Y5](#)

[I See Reasoning Y6](#)

The ***I See Problem-Solving*** eBooks are available here:

[I See Problem-Solving – UKS2](#)

[I See Problem-Solving – LKS2](#)

iPad app [Logic Squares](#) gets children applying calculation facts and thinking strategically as children complete crossword-style number sentences.

Information about conferences and in-school training led by Gareth Metcalfe can be found at www.iseemaths.com with a range of CPD options available. There are also a wide range of online training events running throughout the year.

Social Media:

Twitter: @gareth_metcalfe

Facebook: I See Maths