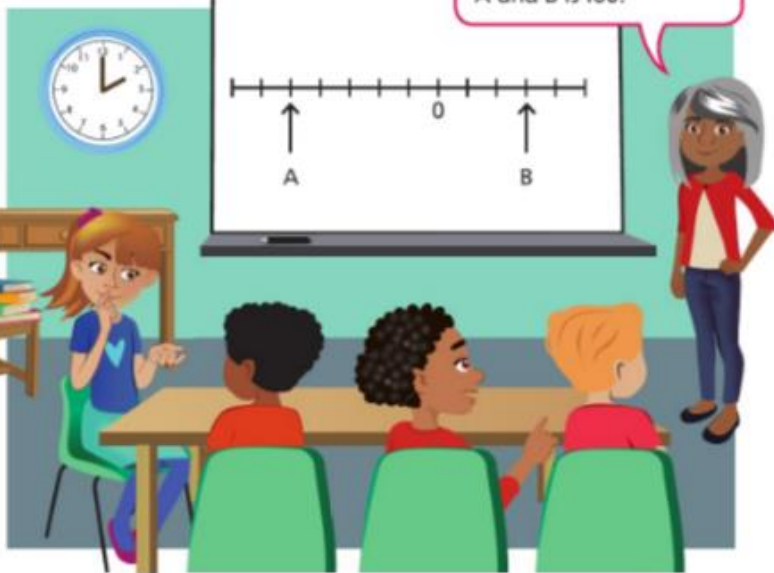
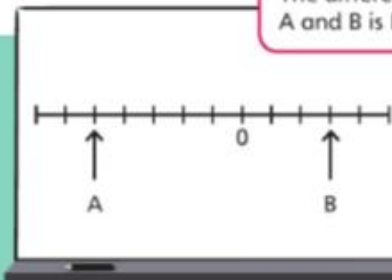


## Problem solving – negative numbers

### Discover



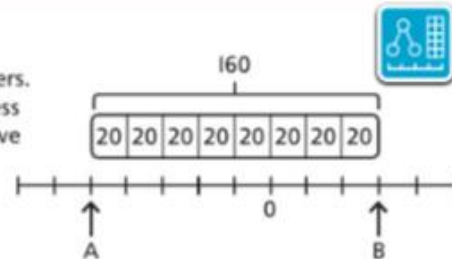
The difference between A and B is 160.



- 1** a) What are the values of A and B?
- b) Find the value of the point half-way between A and B.

### Share

- a) The number line represents positive and negative numbers. A must be negative as it is less than 0, and B must be positive as it is greater than 0.



160 must be shared equally between the 8 intervals between A and B.

$160 \div 8 = 20$  so each interval is 20.

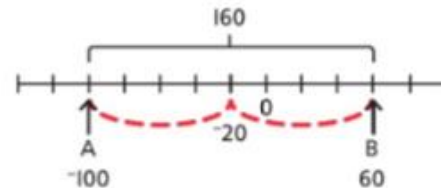
Point A is 5 intervals of 20 less than 0. The value of A is  $-100$ .

Point B is 3 intervals of 20 more than 0. The value of B is 60.

I tried a different method. I counted in different intervals from A to B until I found a difference of 160. I started with intervals of 10.

- b) We need to find the half-way point between  $-100$  and 60.

There are 8 intervals. So it must be 4 intervals of 20 more than  $-100$  and 4 intervals of 20 less than 60.



I can either halve the difference of 160 or halve the number of intervals.

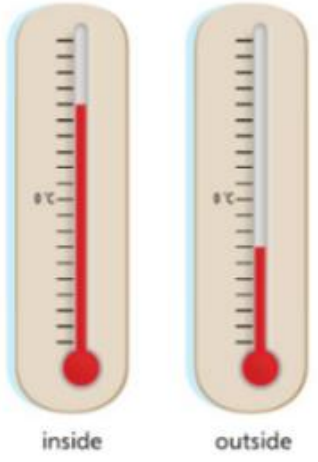
The value of the half-way point between A and B is  $-20$ .



**Think together**

1 These thermometers show the temperature inside and outside on a winter's day. The difference between the two temperatures is 45 °C.

- a) What is the inside temperature?  
The inside temperature is  °C.
- b) What is the outside temperature?  
The outside temperature is  °C.



I think I can use the same strategy again, and count in different intervals.



2 This sequence decreases by the same amount each time. What are the missing numbers?

26, 14, , , -22,

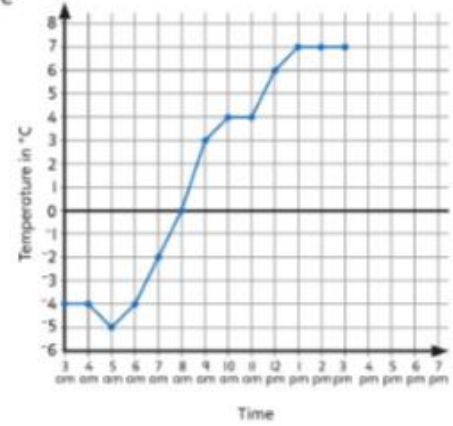
I will use a number line to help me work out the difference.



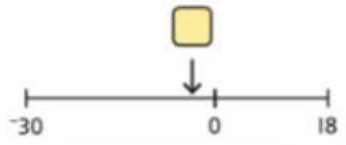
3 The graph shows the temperature in °C from 3 am to 3 pm on a winter's day.



- a) How many degrees warmer was it at 1 pm than at 5 am?  
It was  °C warmer.
- b) At 7 pm the temperature was 8 degrees colder than at 3 pm. What was the temperature at 7 pm?  
The temperature at 7 pm was  °C.



4 The numbers 18 and -30 are shown on this number line. Calculate the value of the half-way point.



This number line looks different because I cannot see any intervals.

I do not think that matters. We can still work out the difference between the two numbers.



## Problem solving – addition and subtraction



### Discover

I want to find out how many trees are in the forest now. I am going to subtract 875 from 2,692 first.

**Max**

I am going to subtract 875 from 1,975 first.

**Kate**

In 2016 there were 2,692 trees in this forest.

The following year, 875 damaged trees were cut down and 1,975 new trees were planted.

There are now  $\square$  trees in this beautiful forest.

- 1 a) Use Kate's method to find the number of trees in the forest now.
- b) Now use Max's method.

Why do you think Max is going to use this method?

### Share

- a) Kate subtracts 875 from 2,692 to find the number of trees left in the forest before more trees were planted.



I have estimated the answer is 1,800. I am going to use a written method for the calculations.

Th	H	T	O
2	6	9	2
-	8	7	5
1	8	1	7

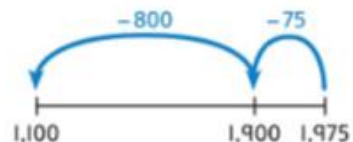
Add 1,975 to 1,817 to find the number of trees now.

Th	H	T	O
1	8	1	7
+	1	9	7
3	7	9	2

There are 3,792 trees in the forest now.

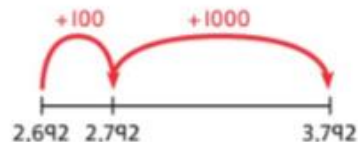
- b) Max subtracts 875 from 1,975 to find the difference between the number of extra trees planted and the number cut down.

$$1,975 - 875 = 1,100$$



Add the difference of 1,100 to 2,692.

$$2,692 + 1,100 = 3,792$$



There are 3,792 trees in the forest now.

I think I could do the subtraction mentally!

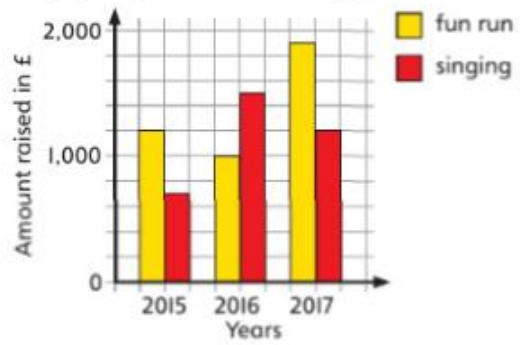


I think there is another way to solve this problem. I could add 2,692 and 1,975 first!



**Think together**

1 The bar chart shows the amount of money raised by a fun run and a singing competition over three years.



- a) How much more money was raised in total in 2017 than in 2015?  
£  more was raised in 2017 than in 2015.
- b) What is the difference between the total raised over the three years from fun runs and the total raised from singing competitions?  
The difference is £ .

2 Find the value of the triangle and the square.

$$10,000 + \triangle - 8,250 = 3,750$$

$$999 - \square + 500 = 1,200$$

The value of the triangle is .

The value of the square is .

I wonder if I can use addition or subtraction first to make each calculation easier.

3 Find the missing digits to complete these calculations.

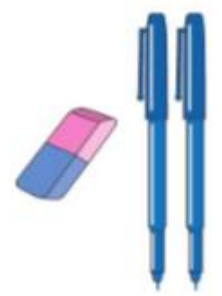
a) 
$$\begin{array}{r} \text{TTh Th H T O} \\ 536 \\ + \quad 5 \quad 9 \\ \hline 11 \quad 03 \end{array}$$

b) 
$$\begin{array}{r} \text{T O Tth Hth} \\ 6 \quad \cdot 8 \\ - 23 \cdot 6 \\ \hline 6 \cdot 29 \end{array}$$

4 Aki buys a rubber and a pen from the school shop. He pays £1.10.

Jamie buys 1 rubber and 2 pens from the school shop. She pays £1.75.

Calculate the cost of a rubber.



I am going to draw a bar model to help me represent this problem.

Remember to think about the different strategies you can use. Will you add or subtract first?

## Problem solving – four operations 1

### Discover



- 1 a) A computer game costs £12.50 more than a puzzle book. Zac buys 1 computer game and 2 puzzle books for £35. How much does each item cost?
- b) A box of pencils is half the price of a computer game. How many boxes of pencils can Isla buy for £35?

### Share

- a) A computer game is equal to the cost of a puzzle book + £12.50.

2 puzzle books and 1 computer game costs £35 in total.

Subtract £12.50 first:

$$£35 - £12.50 = £22.50$$

Now divide by 3 to work out the cost of 1 puzzle book.

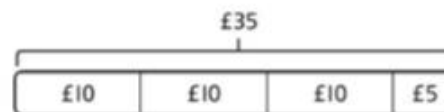
A puzzle book costs £7.50.

A computer game costs  $£7.50 + £12.50 = £20$ .

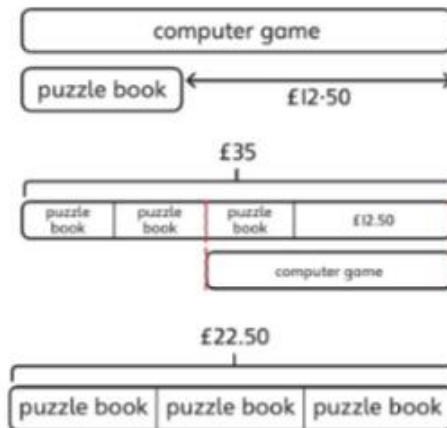
- b) A box of pencils is half the price of a computer game.

Pencils are half of £20 = £10.

$35 \div 10 = 3.5$  but Isla cannot buy half a box.



$3 \times 10 = 30$ , so Isla can buy 3 boxes of pencils for £35. She will have £5 left over.



I can divide 35 by 10 or simply think about the multiple of 10 that is closest to, but less than, 35.



**Think together**

1 A whistle costs 85p less than a toy car.  
 Isla buys 3 whistles and 1 toy car for £5.25.  
 How much does each item cost?  
 A whistle costs £  .  
 A toy car costs £  .



I wonder if we can use a similar strategy as before to help solve this problem.

Yes, let's use a bar model to compare the cost of the toy car and the whistle first.



2 Sand is sold in small bags and large bags.  
 There are 75 small bags and 60 large bags.  
 The total mass of the small bags is 300 kg. The total mass of the large bags is twice as much.  
 How much heavier is a large bag than a small bag?  
 A large bag is  kg heavier than a small bag.

Remember to think about how to represent the information you already know.

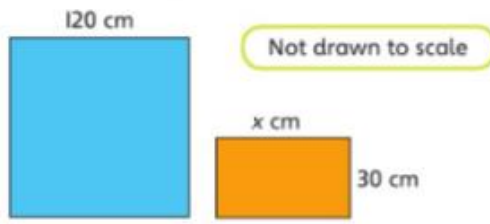


3 A drama group pays £538 to hire a coach to take 40 children to the theatre. The cost of the coach is shared equally between the children, rounded to the nearest £1.



Theatre tickets cost £14.75 each.  
 a) How much does each child pay in total for the trip?  
 b) Do the children pay enough money to pay for the coach?  
 Explain your thinking.

4 The perimeter of the rectangle is a third of the perimeter of the square.  
 What is the length of the longer side of the rectangle,  $x$ ?



I am going to calculate the perimeter of the square first and then find  $\frac{1}{3}$ .

I wonder if we can do it another way by finding  $\frac{1}{3}$  of the length of the square first.



## Problem solving – four operations 2

### Discover



Solve the puzzle to reach the next level.

= 35  
 = 25  
 = 50

- 1 a) What are the values of the shapes?
- b) On the next level of the game, the puzzle looks the same but both the totals are doubled. What are the values of the shapes?  
Lexi says, 'That's easy. The value of each shape must be doubled too!'  
Do you agree? Explain your answer.

### Share

a)

I am going to start by writing down the value of the stars. Then I am going to try other numbers to total 120 each time.

In the row, 2 stars and 1 hexagon total 120.

$$\begin{array}{c} 120 \\ \hline \star \quad \text{Hexagon} \quad \star \\ \hline \star = 35 \\ 120 - (35 \times 2) \\ \hline 120 - 70 = 50 \text{ so Hexagon} = 50 \end{array}$$

It is much easier to use calculations to help. I am going to look at the row first.

In the column, 2 stars and 2 triangles total 120.

$$\begin{array}{c} 120 \\ \hline \star \\ \triangle \\ \triangle \\ \star \\ \hline 2 \triangle = 120 - 70 = 50 \\ \triangle \text{ is half of } 50 \text{ so } \triangle = 25 \end{array}$$

b) Double the value of each shape.

$\triangle = 50$        $\star = 70$        $\text{Hexagon} = 100$

Work out the row and column totals with these values.

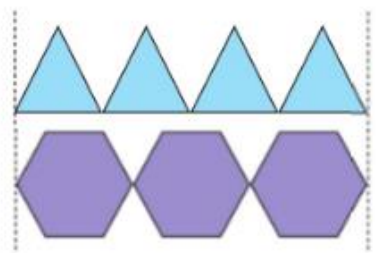
$$\begin{array}{c} \star \quad \text{Hexagon} \quad \star \\ \text{row: } 70 + 100 + 70 = 240 \end{array}$$

$$\begin{array}{c} \star \quad \triangle \quad \triangle \quad \star \\ \text{column: } 70 + 50 + 50 + 70 = 240 \end{array}$$

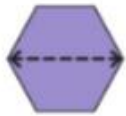
Lexi is correct because doubling the totals is the same as adding the values in the row or column twice.

**Think together**

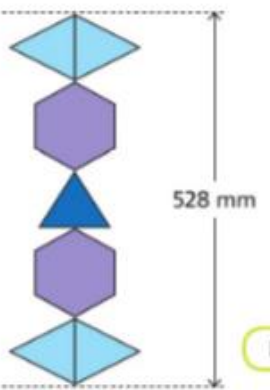
1 The shapes are arranged in a pattern.  
The base of each triangle is 90 mm.  
What is the width of each hexagon?



Not drawn to scale



2 The same shapes are arranged in another pattern. What is the height of the dark triangle in the middle of the pattern?



Not drawn to scale

I can label a copy of the diagram with the measurements that I know.



3 Lee does a multiplication calculation.  
The ones digit of his answer is 4.

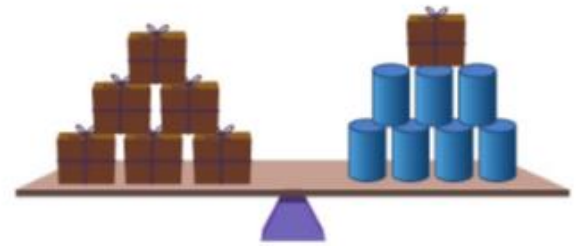
Which of these calculations could it be?

- A  $583 \times 8$
- B  $450 \times 4$
- C  $1,235 \times 4$
- D  $24,264 \times 6$
- E  $3,469 \times 6$



I wonder if I can solve this without working out the calculations.

4 The diagram shows boxes and tins on a balance scale.  
The mass of one box is 448 g.  
What is the mass of one tin?



I think that a tin will be lighter because there are more tins than boxes.

I think I will need to use multiplication and division for this problem.



Friday – 8.5.2020

Bank Holiday – VE Day

You may if you wish go onto TRRS and improve your score or go to Education City and focus on your set piece in classwork.