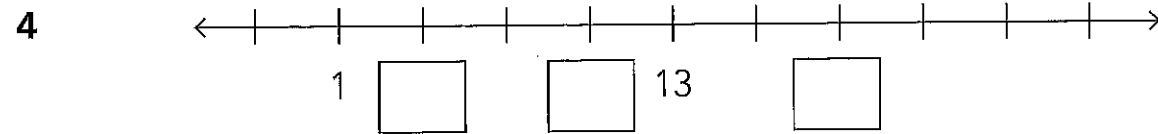
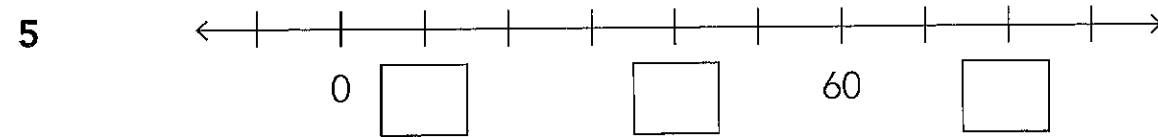


Size of gap =



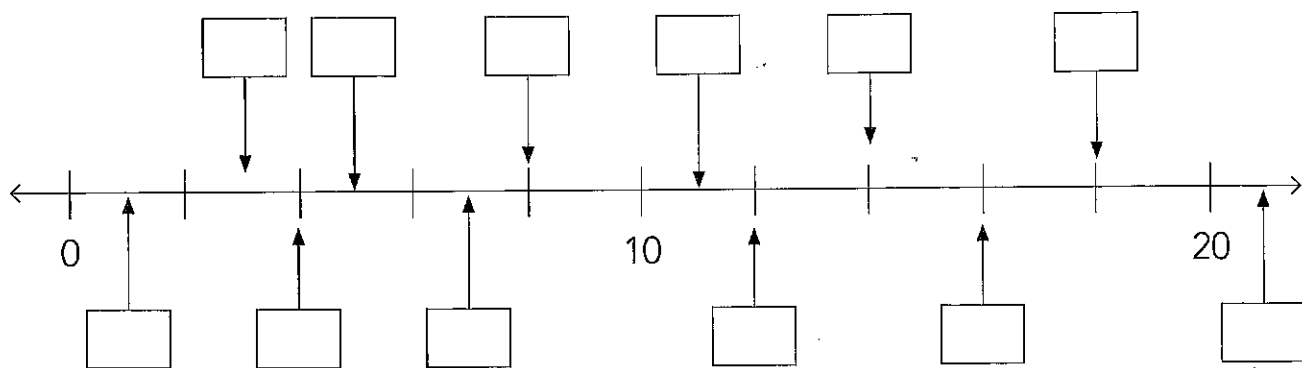
Size of gap =



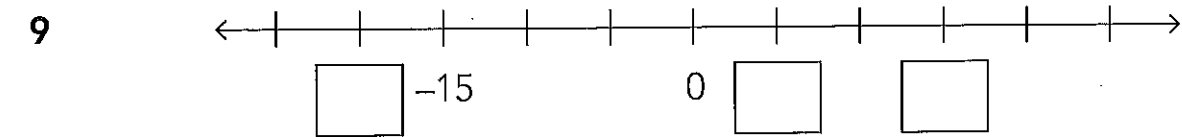
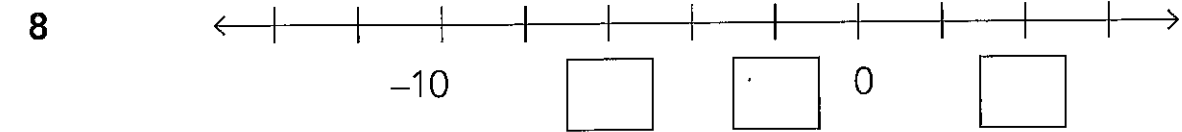
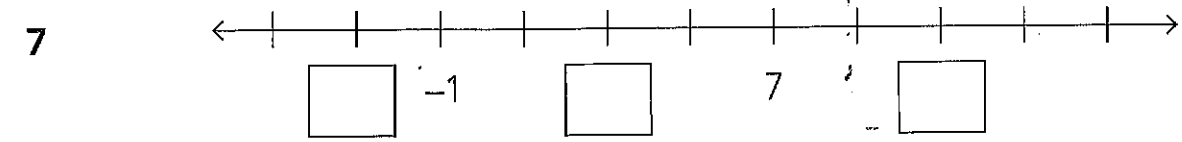
Size of gap =

6 Write the integer values for each point along the number line. Choose the most appropriate values from the list below. You will not need all the points on the list.

17	1	2	11	5	14
16	21	3	8	6	19
7	15	18	12	13	4



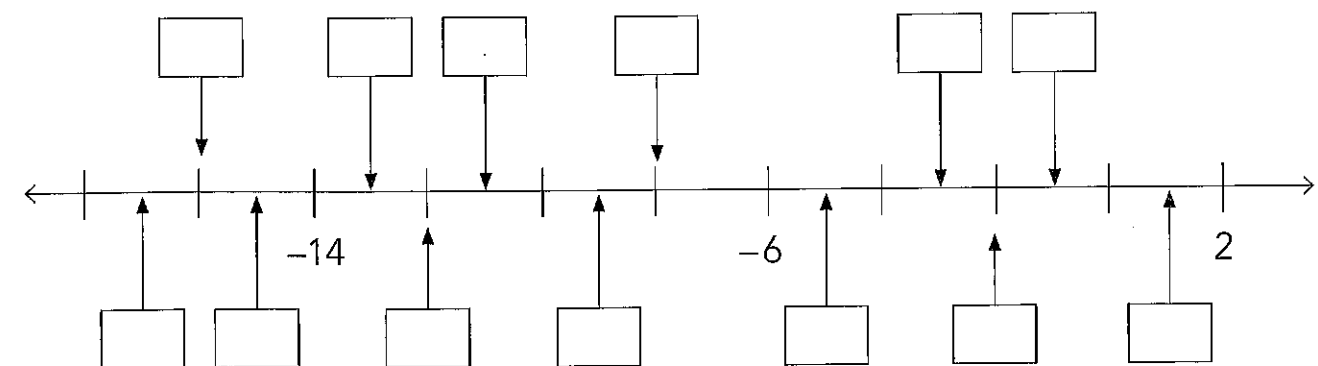
Write the missing integers on the number lines.



## Challenge 1

Write the integer values for each point along the number line. Choose the most appropriate values from the list below. You will not need all the points on the list.

-4	-11	-1	-16	-5	-7
1	0	-10	-13	-3	-15
-9	-12	-2	-14	-17	-8



# Multiplying and dividing

x/÷	+	-
+	+	-
-	-	+

Same signs ⇒ +  
Different signs ⇒ -

**Examples:**

- 1  $-2 \times 3 = -6$   
 $-8 \div 2 = -4$       Different signs ⇒ -
- $10 \div 5 = 2$   
 $-2 \times -4 = 8$       Same signs ⇒ +

- 2  $-3 \times 1 \times -4 = (-3 \times 1) \times -4$   
 $= (-3) \times -4$   
 $= 12$

If there is more than one multiply or divide sign, work from left to right.

Highlight the correct answer for each of the following.

1	$-2 \times -4$	6	-8
		8	-6
3	$-5 \times 1$	5	-4
		4	-5
5	$1 \times 3 \times -2$	-5	6
		-6	5

2	$-10 \div 2$	-5	5
		-8	8
4	$20 \div 4$	5	16
		24	-5
6	$8 \div -2 \times 3$	7	4
		12	-12

Calculate the following.

- 7  $-3 \times 2 =$  \_\_\_\_\_      8  $-9 \div -3 =$  \_\_\_\_\_
- 9  $-1 \times -5 =$  \_\_\_\_\_      10  $12 \div -2 =$  \_\_\_\_\_
- 11  $8 \times -2 =$  \_\_\_\_\_      12  $-10 \div -2 =$  \_\_\_\_\_
- 13  $6 \div 3 \times -1 =$  \_\_\_\_\_      14  $4 \times -3 \div -2 =$  \_\_\_\_\_

Fill in the gaps in order to complete correct calculations.

15  $2 \times \square = -8$       16  $-4 \times \square = -12$

17  $\square \div -2 = 6$       18  $-4 \div \square = -1$

19  $-5 \times \square = 15$       20  $\square \div 3 = -9$

21  $-2 \times \square \times -1 = 6$       22  $6 \div \square \times -2 = -4$

23 Place the numbers into the boxes below to make true statements. You can use each number once only and you won't need them all.

6	-10	-4	4
-5	3	10	-12
2	-2	-6	-3

$\square \times \square = \square$

$\square \div \square = \square$

$\square \times \square = \square$



# Types of numbers

## Multiples

- Multiples of a number are the results of multiplying the number by another number.

**Examples:** The multiples of **2** are: **2, 4, 6, 8, 10, ...**  
 The multiples of **5** are: **5, 10, 15, 20, ...**

These are the answers from the times tables.

Highlight the numbers that are multiples of the given numbers. There are two answers to each question.

1	5	20	23
		3	15
3	3	10	9
		6	19
5	10	20	100
		1	45

2	7	5	21
		13	7
4	9	18	21
		22	36
6	4	16	22
		24	18

7 Complete the table.

Number	First five multiples
2	2, 4, 6, 8, 10
5	
9	
3	
4	
10	
11	
7	
8	
6	

8 Complete the table by stating if these are true or false.

Statement	True or False
12 is a multiple of 3	
10 is a multiple of 4	
8 is a multiple of 2	
18 is a multiple of 6	
13 is a multiple of 3	
2 is a multiple of 1	
21 is a multiple of 7	
15 is a multiple of 5	
19 is a multiple of 2	
9 is a multiple of 4	

## Factors

- Factors of a number are all the numbers that **divide** into it exactly.

**Examples:** The factors of **8** are: **1, 2, 4, 8.**  
 The factors of **12** are: **1, 2, 3, 4, 6, 12.**

Highlight the numbers that are factors of the given numbers. There are two answers to each question.

1	12	3	7
		4	10
3	15	8	1
		7	5
5	8	5	4
		6	2

2	10	5	6
		8	2
4	21	9	6
		7	3
6	18	8	6
		12	2

7 Complete the table.

Number	Factors
10	1, 2, 5, 10
8	
12	
9	
15	
6	
18	
21	
20	
13	
24	
50	

8 Complete the table by stating if these are true or false.

Statement	True or False
2 is a factor of 15	
1 is a factor of 7	
5 is a factor of 10	
3 is a factor of 12	
6 is a factor of 18	
2 is a factor of 1	
7 is a factor of 20	
4 is a factor of 12	
3 is a factor of 13	
4 is a factor of 20	
8 is a factor of 18	
1 is a factor of 15	

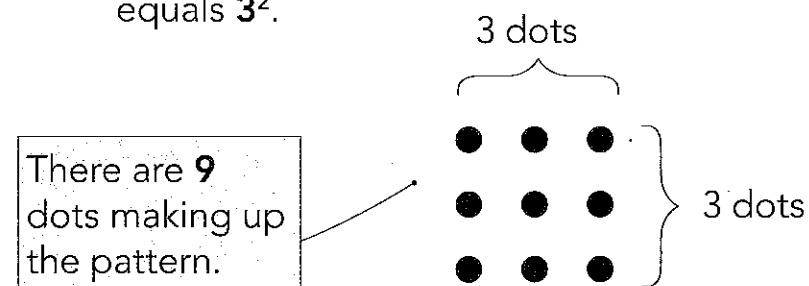
9 Highlight the numbers that belong in the boxes.

Multiples			Number	Factors		
12	2	8	<b>12</b>	1	3	16
42	24	9		44	12	
19	36	28		14	32	4
10	5	45	<b>10</b>	4	5	10
25	40	50		25		
30	28	2		2	1	3
16	40	48	<b>8</b>	10	6	8
20	12	4		1	12	4
24	2	26		3	2	20
32	1	6	<b>9</b>	2	6	3
24	27	36		18	20	9
18	9	3		1	4	27
55	1	2	<b>15</b>	60	45	1
15	5	30		15	5	8
20	45	3		30	7	3

### Square numbers

- A square number is a product of (x) two equal counting numbers (counting numbers are 1, 2, 3, ...).
- Square numbers can be drawn as a square pattern of dots.

**Examples:** 9 is a square number because it is a product of 3 and 3, and it equals  $3^2$ .



6 is **not** a square number because it cannot be written as a product of two equal numbers. Nor can 6 dots be drawn in a square.

1 Complete the patterns and fill in the missing numbers.

Square number	Picture	Notation
1		$1^2$
	•• ••	$2^2$
9		
16		$4^2$
	••••• ••••• ••••• •••••	
36		$6^2$



# Powers

- Powers are used to indicate how many times a number (the base) is multiplied by itself.

The **2** is called the **base**.

The **3** is known as the **power** or the **exponent** or the **index**.

**Example:**

$$2^3 = 2 \times 2 \times 2 \\ = 8$$

- When a power is **2**, we say the number is **squared**, e.g.  $5^2$  means five **squared** (= 25).
- When a power is **3**, we say the number is **cubed**, e.g.  $2^3$  means two **cubed** (= 8).
- **Important:** **anything**<sup>1</sup> = itself e.g.  $7^1 = 7$   
**anything**<sup>0</sup> = 1 e.g.  $7^0 = 1$

The power indicates how many times you need to multiply.

**Examples:**

$$4^3 = 4 \times 4 \times 4 \\ = 64$$

$$3^2 = 3 \times 3 \\ = 9$$

## Finding powers on your calculator

- Powers of numbers can get really big, so knowing how to find them on your calculator is **very** useful.

**For squares:** use a button that looks like this:

 e.g. show that  $12^2 = 144$ .

**For cubes:** use a button that looks like this:

 e.g. show that  $6^3 = 216$ .

**For all other powers:** use a button that looks like this:

 or  or 

Write the following as powers.

1  $4 \times 4 =$  \_\_\_\_\_ 2  $6 \times 6 \times 6 =$  \_\_\_\_\_

3  $5 \times 5 \times 5 \times 5 =$  \_\_\_\_\_ 4  $9 \times 9 =$  \_\_\_\_\_

5  $8 =$  \_\_\_\_\_ 6  $3 \times 3 \times 3 =$  \_\_\_\_\_

7  $2 \times 2 \times 2 \times 2 \times 2 =$  \_\_\_\_\_ 8  $1 \times 1 \times 1 =$  \_\_\_\_\_

Write out what the following mean and then calculate their values.

9  $2^3 = 2 \times 2 \times 2 =$  \_\_\_\_\_ 10  $3^3 =$  \_\_\_\_\_

11  $6^2 =$  \_\_\_\_\_ 12  $8^2 =$  \_\_\_\_\_

13  $7^3 =$  \_\_\_\_\_ 14  $4^1 =$  \_\_\_\_\_

15  $5^3 =$  \_\_\_\_\_ 16  $10^3 =$  \_\_\_\_\_

17  $13^2 =$  \_\_\_\_\_ 18  $20^3 =$  \_\_\_\_\_

Use your calculator to find the values of the following.

19  $7^2 + 4^3 =$  \_\_\_\_\_ 20  $3^2 - 2^3 =$  \_\_\_\_\_

21  $4^2 \times 5^2 =$  \_\_\_\_\_ 22  $10^2 \div 2^2 =$  \_\_\_\_\_

23  $\frac{4^3}{2^3} =$  \_\_\_\_\_ 24  $5^2 + 4^3 - 3^2 =$  \_\_\_\_\_



# Roots

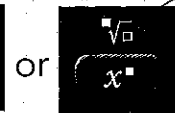
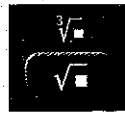
- Finding a root is the opposite of finding a power.
- The **square root** is written as  $\sqrt{\quad}$ . You do not need to write  $\sqrt{\quad}^2$ .

e.g.  $\sqrt{9} = \sqrt{3 \times 3}$   
 $= 3$

- The **cube root** is written as  $\sqrt[3]{\quad}$ .


e.g.  $\sqrt[3]{8} = \sqrt[3]{2 \times 2 \times 2}$   
 $= 2$

You can do this on your calculator with either



or

To access the yellow function, use the shift key.



Find the following roots.

1  $\sqrt{4} =$  \_\_\_\_\_ 2  $\sqrt{25} =$  \_\_\_\_\_

3  $\sqrt{9} =$  \_\_\_\_\_ 4  $\sqrt{16} =$  \_\_\_\_\_

5  $\sqrt{36} =$  \_\_\_\_\_ 6  $\sqrt{81} =$  \_\_\_\_\_

7  $\sqrt{100} =$  \_\_\_\_\_ 8  $\sqrt{49} =$  \_\_\_\_\_

9  $\sqrt[3]{8} =$  \_\_\_\_\_ 10  $\sqrt[3]{27} =$  \_\_\_\_\_

11  $\sqrt[3]{125} =$  \_\_\_\_\_ 12  $\sqrt[3]{512} =$  \_\_\_\_\_

13  $\sqrt[3]{216} =$  \_\_\_\_\_ 14  $\sqrt[3]{64} =$  \_\_\_\_\_



# Order of operations

- **BEDMAS** helps us to remember the order of operations.
- If you have several division signs or several multiplication signs, work from left to right.

Fill in the table below and use it to help you remember the order to use in calculations:

<b>B</b>	
<b>E</b>	
<b>D</b>	
<b>M</b>	
<b>A</b>	
<b>S</b>	

Remember: when there is more than one of these, work from left to right.

**Examples:**

1  $4 + 8 \times 2$   
 $= 4 + (8 \times 2)$  — Multiplication first  
 $= 4 + 16$   
 $= 20$  — Addition last

2  $1 + (6 - 2) \div 2$  — Brackets first  
 $= 1 + 4 \div 2$  — Division next  
 $= 1 + 2$   
 $= 3$  — Addition last

Highlight the correct answer for each of the following.

1	$8 - 2 \times 2$	4	8
		2	12
3	$3 + 2^2$	5	7
		-1	1
5	$(6 - 1)^2$	36	25
		5	1
7	$12 \div (3 + 1)$	4	3
		8	5

2	$\frac{(2 + 4)}{2}$	5	3
		2	4
4	$2 \times (7 - 1)$	8	6
		12	13
6	$8 + 6 \div 2$	12	10
		7	11
8	$4 - \frac{(3 + 3)}{6}$	1	4
		6	3