1:01 Numbers Above One Million

Hundred millions	Ten millions	Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Units
2	3	7	6	4	9	1	0	5

CONCEPT

1 Use numerals to write:

a forty-nine million seven hundred and sixty thousand six hundred and twenty-one

b eighty-three million one hundred and thirty-two thousand five hundred and forty-nine

2 Write the value for each coloured digit.

a 37**4**68901 **b** 2**3**674768 **c** 43 1**6**9235

d **9**6347607 **e** 6**7**911213 **f** 16**5**273406

3 Arrange each group of numbers in ascending order.

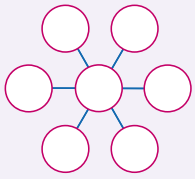
a 26349721 62419637 43296714

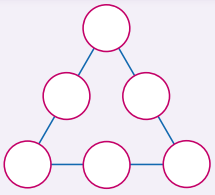
b 65375670 63497624 56811769

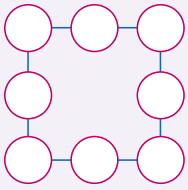
c 32693475 41623912 17634658

4 Is each number below closer to 30 000 000 or 40 000 000?

a 32645762 **b** 34177624 **c** 36396408







INVESTIGATION

5 **a** Use the digits 1, 2, 3, 4, 5, 6, 7. Write one digit in each space so that all the lines add up to the same sum.

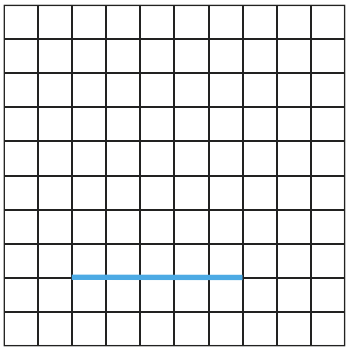
b Use the digits 1, 2, 3, 4, 5, 6. Write one digit in each space so that the sum of the numbers along each side is the same.

c Use the digits 1, 2, 3, 4, 6, 7, 8, 9. Write one digit in each space so that the sum of the numbers along each side is the same.

1:02 Square Numbers

1 Draw a square on each coloured side.

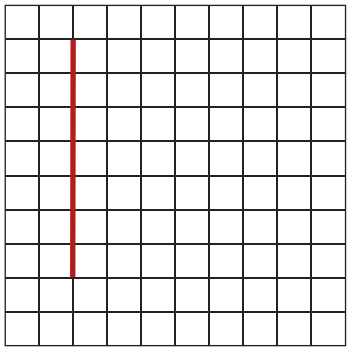
a



Area of blue square

= ☐ small squares

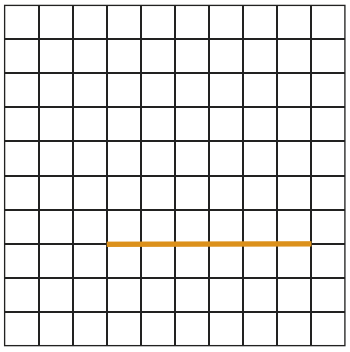
b



Area of red square

= ☐ small squares

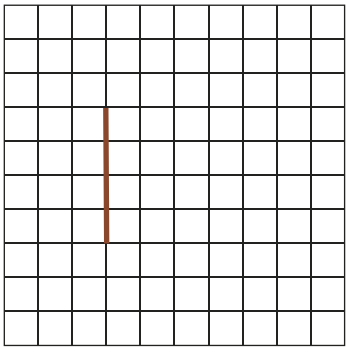
c



Area of orange square

= ☐ small squares

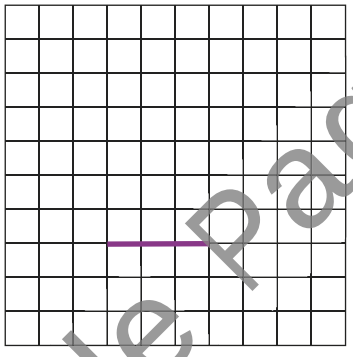
d



Area of brown square

= ☐ small squares

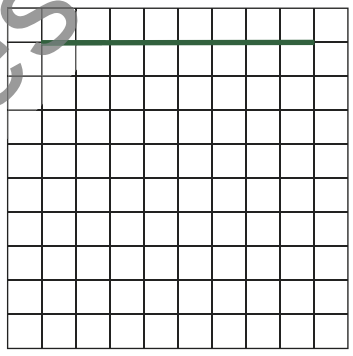
e



Area of purple square

= ☐ small squares

f

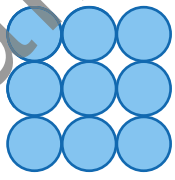


Area of green square

= ☐ small squares

CONCEPT

The result of multiplying a counting number by itself is called a **square number**.



2 **a** Here we have 3 rows of 3 counters.

$3 \times 3 =$ ☐

b What shape does this array look like?

☐

c Make square arrays using 4, 9, 16 and 25 counters.

3 List all of the square numbers up to 100.

☐

4 Use a calculator to find at least seven more square numbers.

☐

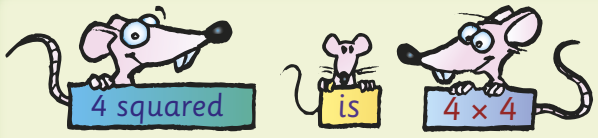
ICT

5 Explain why the numbers 1, 4, 9, 16, … are called square numbers.

☐

Whole Numbers 2: Identify and describe properties of prime, composite, square and triangular numbers. Outcomes: MA3-1WM, MA3-4NA

1:03 Square Numbers

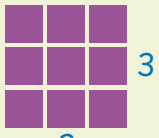


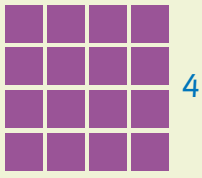
A whole number times itself gives a **square number**.

CONCEPT


1
1 squared


2
2 squared


3
3 squared


4
4 squared

1, 4, 9 and 16 are square numbers.

The number of blocks in a square pattern is a square number.
3 squared is 3 × 3.

1 = 1 × 1

4 = 2 × 2 | 9 = 3 × 3

16 = 4 × 4 | ☐ = 5 × 5 | ☐ = 6 × 6

1 Use place-value blocks to find these square numbers.

a 5 squared = ☐ **b** 6 squared = ☐ **c** 7 squared = ☐

d 8 squared = ☐ **e** 9 squared = ☐ **f** 10 squared = ☐

g 2 × 2 = ☐ **h** 4 × 4 = ☐ **i** 7 × 7 = ☐ **j** 3 × 3 = ☐

k 6 × 6 = ☐ **l** 10 × 10 = ☐ **m** 1 × 1 = ☐ **n** 8 × 8 = ☐

2 Look carefully at the first ten square numbers below.

1 (+3) 4 (+5) 9 (+7) 16 (+9) 25 36 49 64 81 100

a Complete the pattern shown here.

b Write down the next two square numbers after 100. ☐, ☐

c Write down the square numbers from those above that are also even.

☐, ☐, ☐, ☐, ☐

Each factor is written only once.

3 Complete:

a 9 = ☐ squared **b** 25 = ☐ squared

c 16 = ☐ squared **d** 36 = ☐ squared

4 Use blocks to find all factors of:

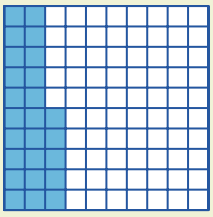
a 25: ☐, ☐ and ☐ **b** 9: ☐, ☐ and ☐ **c** 49: ☐, ☐ and ☐

d 4: ☐, ☐ and ☐ **e** 16: ☐, ☐, ☐, ☐ and ☐

1:04 Percentages

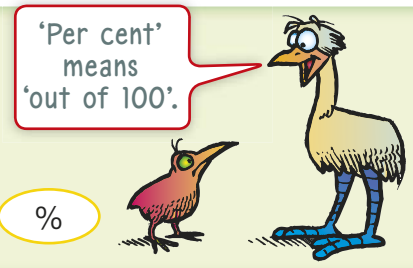
25%

25 hundredths



$\frac{25}{100}$

0·25

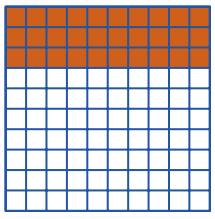


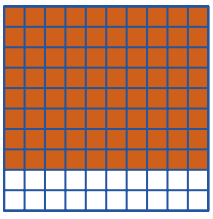
%

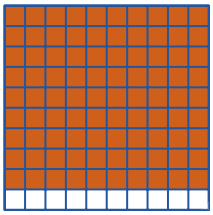
per cent

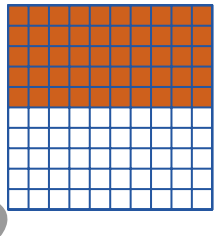
CONCEPT

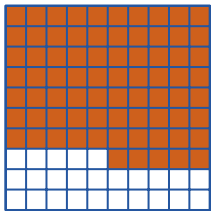
1 What percentage of each square is coloured?

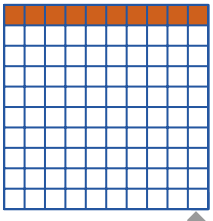
a 

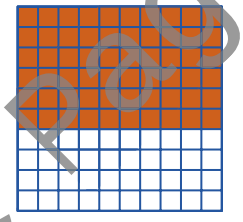
b 

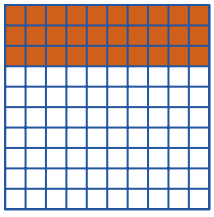
c 

d 

e 

f 

g 

h 

2 What percentage of each square is not coloured in Question 1?

a ____ b ____ c ____ d ____

e ____ f ____ g ____ h ____

3 Complete the following.

a	0·25	$\frac{\quad}{100}$ =	%	b	0·35	$\frac{\quad}{100}$ =	%	c	0·65	$\frac{\quad}{100}$ =	%
d	0·75	$\frac{\quad}{100}$ =	%	e	0·15	$\frac{\quad}{100}$ =	%	f	0·55	$\frac{\quad}{100}$ =	%
g	0·90	$\frac{\quad}{100}$ =	%	h	0·40	$\frac{\quad}{100}$ =	%	i	0·80	$\frac{\quad}{100}$ =	%

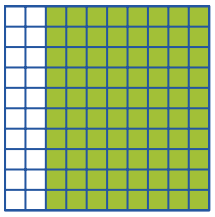
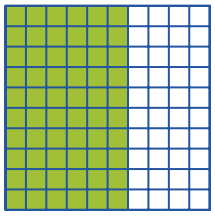
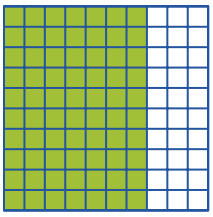
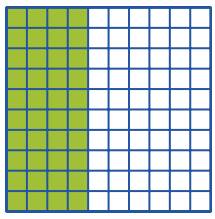
Percentages in the Environment

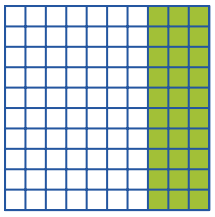
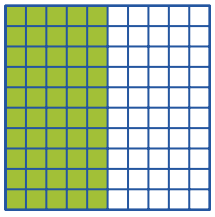
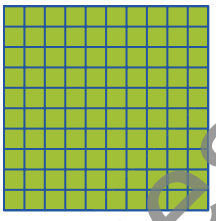
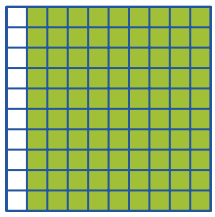
- Collect examples of percentages from newspapers and packets.
- Discuss the different ways in which percentages are used.

ACTIVITY

1:05 Percentages

1 What percentage of each square is coloured?

a  b  c  d 

e  f  g  h 

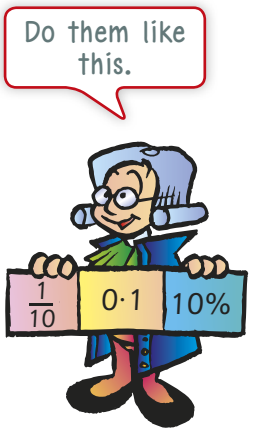
2 What percentage of each square is not coloured in Question 1?

a b c d

e f g h

3 Complete the following.

a	$\frac{25}{100}$	0·	%	b	$\frac{55}{100}$	0·	%	c	$\frac{75}{100}$	0·	%
d	$\frac{95}{100}$	0·	%	e	$\frac{65}{100}$	0·	%	f	$\frac{45}{100}$	0·	%
g	$\frac{9}{10}$	0·	%	h	$\frac{3}{10}$	0·	%	i	$\frac{7}{10}$	0·	%
j	$\frac{4}{10}$	0·	%	k	$\frac{5}{10}$	0·	%	l	1	·0	%

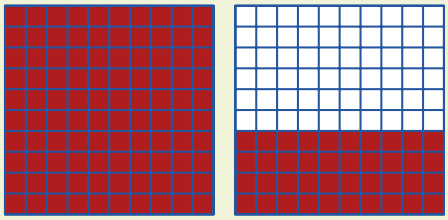


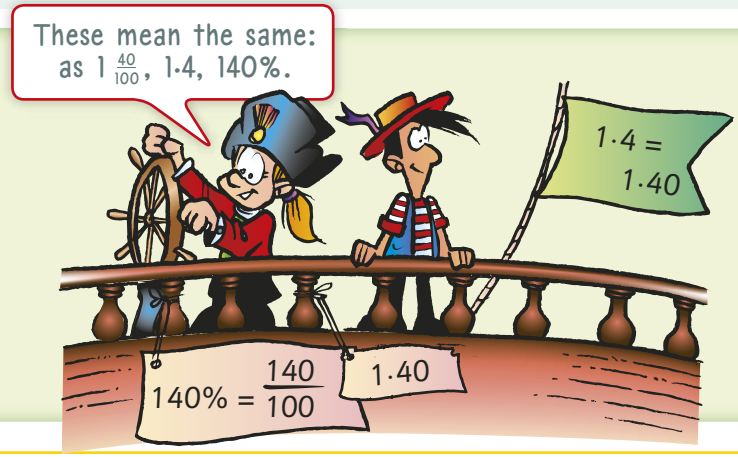
4 Draw lines to connect the equivalent numbers.

a			b			c			d		
	0·25	45%		0·7	55%		0·35	85%		0·3	65%
	0·5	60%		0·55	70%		0·1	90%		0·65	40%
	0·45	25%		0·8	95%		0·85	10%		0·4	30%
	0·6	50%		0·95	80%		0·9	35%		1	100%

1:06 Percentages

1 whole and 40 hundredths





CONCEPT

1 Write the percentage equivalent for each common fraction.

a	$\frac{3}{10}$	**b**	$\frac{9}{10}$	**c**	$\frac{75}{100}$	**d**	$\frac{6}{10}$	**e**	$\frac{25}{100}$
f	$\frac{4}{10}$	**g**	$\frac{65}{100}$	**h**	$\frac{35}{100}$	**i**	$\frac{5}{10}$	**j**	$\frac{1}{10}$

2 Write the percentage equivalent for each decimal.

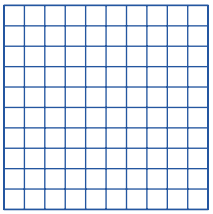
a	0·15	**b**	0·45	**c**	0·85	**d**	1·55	**e**	2·95
f	1·8	**g**	0·2	**h**	2·7	**i**	1·1	**j**	0·05

3 Write the decimal equivalent for each percentage.

a	25%	**b**	40%	**c**	290%	**d**	75%	**e**	10%
f	35%	**g**	25%	**h**	165%	**i**	5%	**j**	115%

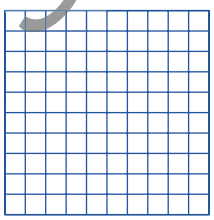
4 For each square, colour and write the equivalent percentage.

a



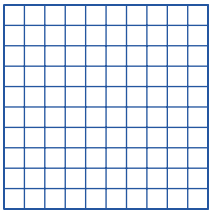
0·3 = ____ %

b



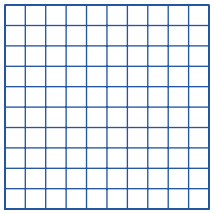
1·15 = ____ %

c



0·89 = ____ %

d



1·7 = ____ %

Learn these facts

$\frac{1}{2}$ = 50% = 0·5

$\frac{1}{4}$ = 25% = 0·25

$\frac{3}{4}$ = 75% = 0·75

$\frac{1}{10}$ = 10% = 0·1

$\frac{2}{10}$ = 20% = 0·2

1 = 100% = 1·0

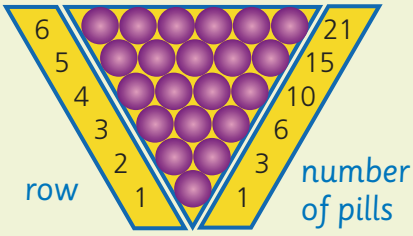
$1\frac{1}{2}$ = 150% = 1·5

Fractions and Decimals 2: Make connections between equivalent fractions, decimals and percentages. Outcomes: MA3-1WM, MA3-7NA

1:07 Triangular Numbers

A triangular number is the sum of counting numbers, starting from 1,
e.g. 1 + 2 + 3 + 4 = 10.

CONCEPT



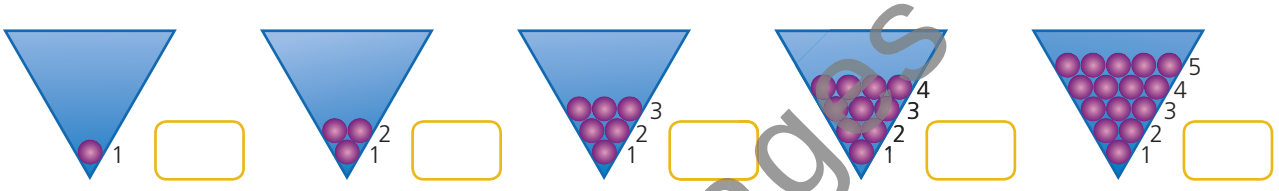
If the pills form a triangle, the number of pills is a triangular number.

Chemists used to count pills in triangular pill trays.

Other triangular numbers:

Triangular number	Pattern
28	1 + 2 + 3 + 4 + 5 + 6 + 7
36	1 + 2 + 3 + 4 + 5 + 6 + 7 + 8
45	1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9

1 How many pills are in each of these pill trays?



2 How many counting numbers were added to give the triangular number:

a 10? **b** 36? **c** 6? **d** 45?

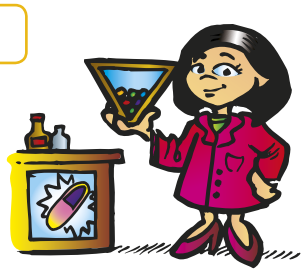
3 Nine counting numbers were added to give the triangular number 45.

a What would you add to 45 to find the next triangular number?

What is the triangular number found by adding the first:

b 10 counting numbers? **c** 11 counting numbers?

d 12 counting numbers? **e** 13 counting numbers?

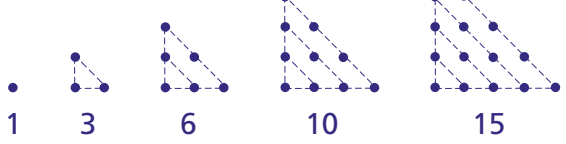


4 Add these consecutive triangular numbers. (Consecutive means 'following one after the other'.)

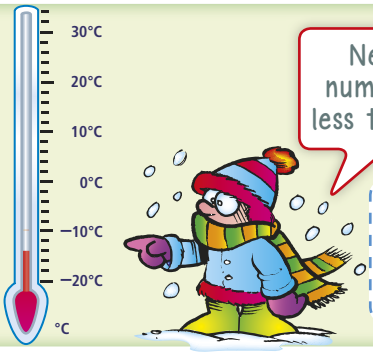
a 10 and 15 **b** 15 and 21 **c** 21 and 28 **d** 28 and 36

5 What is the result when two consecutive triangular numbers are added?

6 Explain how triangles are being used to generate triangular numbers.



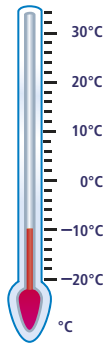
1:08 Negative Numbers

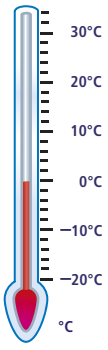


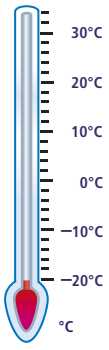
CONCEPT

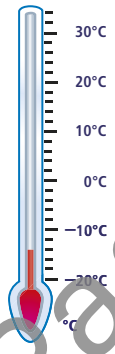
Integers are whole numbers.
… −2, −1, 0, 1, 2, …

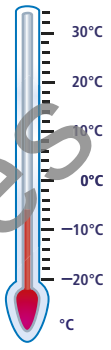
1 Record the temperature shown on each thermometer.

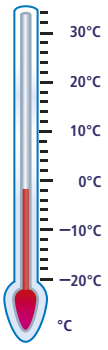
a  °C

b  °C

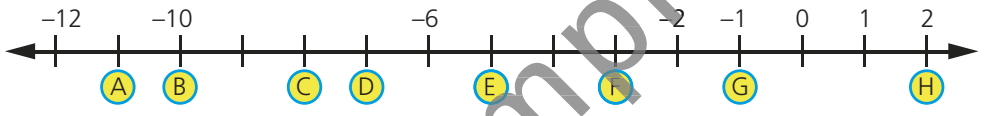
c  °C

d  °C

e  °C

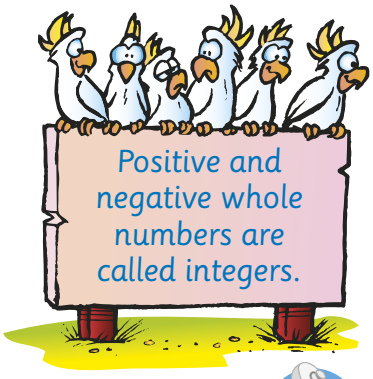
f  °C

2 Record the integers shown on the number line.

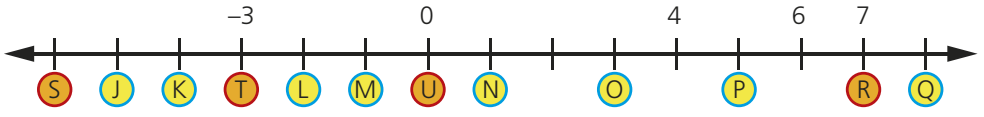


a H ____ b G ____ c F ____ d A ____

e D ____ f B ____ g C ____ h E ____



3 Record the integers shown on the number line.



a K ____ b L ____ c Q ____ d O ____

e N ____ f J ____ g P ____ h M ____

i R ____ j S ____ k T ____ l U ____

4 Using a calculator, start from 3 and continue to take away 1.

ICT

____

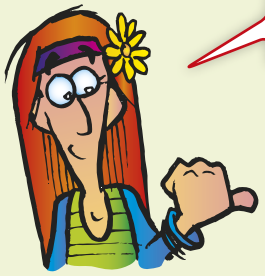
____

Use the internet to find places that have had negative temperatures. Record your findings.

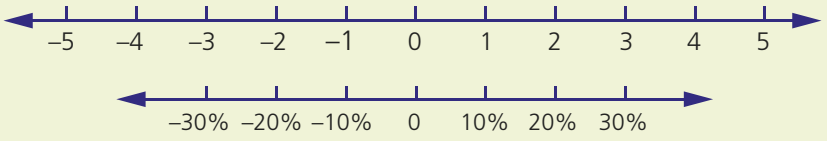
ICT

Whole Numbers 2: Investigate everyday situations that use integers; locate and represent these numbers on a number line. Outcomes: MA3-1WM, MA3-2WM, MA3-4NA

1:09 Positive and Negative Numbers

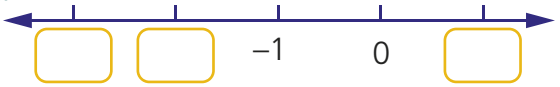


We place negative numbers to the left of 0 and positive numbers to the right.

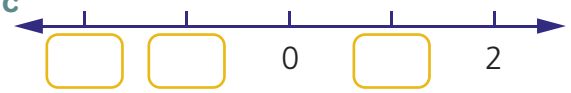


CONCEPT

1 Fill in the missing numbers on the number line.

a 

b 

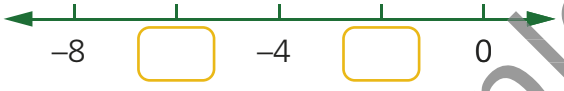
c 

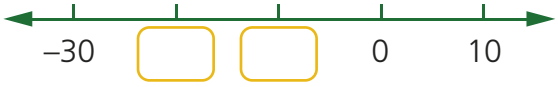
d 

2 Fill in the missing numbers on the number line.

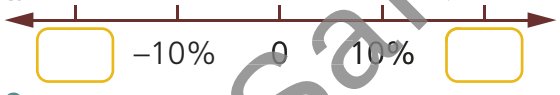
a 

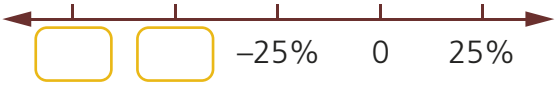
b 

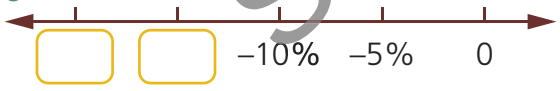
c 

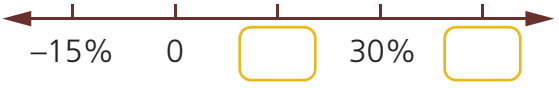
d 

3 Fill in the missing percentages on the number line.

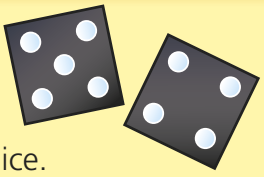
a 

b 

c 

d 

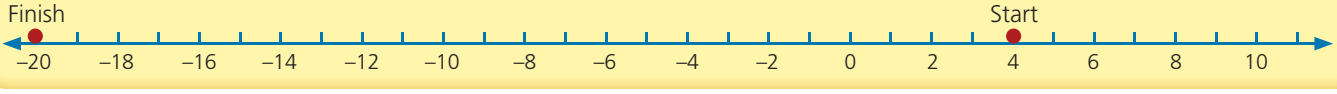
Positive and Negative Integers Game



FUN SPOT

- The goal is to reach –20 on the number line.
- Each player starts at 4 on the number line. Take turns to roll two dice.
- An odd number can be used to move left, an even number to move right. The other dice represents how far you move along the number line.

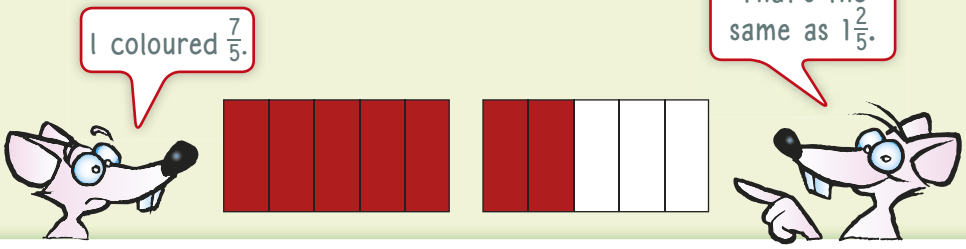
  Example:  and a  can mean: 'move 4 to the left' or 'move 5 to the right'.



1:10 Improper Fractions and Mixed Numerals

CONCEPT

Improper fraction

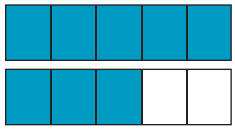


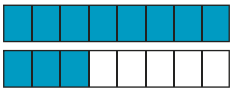
Mixed numeral

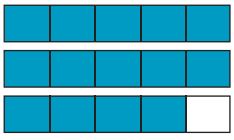
1 Write an improper fraction and mixed numeral for the coloured part in each model.

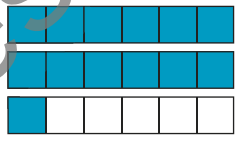
a 

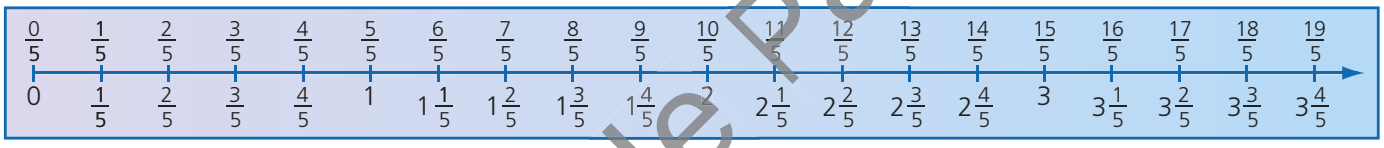
b 

c 

d 

e 

f 



2 Use the number line above to write the mixed numeral for:

a $\frac{6}{5}$ b $\frac{11}{5}$ c $\frac{9}{5}$ d $\frac{13}{5}$ e $\frac{16}{5}$

f $\frac{12}{5}$ g $\frac{17}{5}$ h $\frac{7}{5}$ i $\frac{9}{5}$ j $\frac{8}{5}$

3 Use the number line to write the improper fraction for:

a $1\frac{4}{5}$ b $2\frac{3}{5}$ c $3\frac{2}{5}$ d $1\frac{1}{5}$ e $2\frac{2}{5}$

f $3\frac{1}{5}$ g $1\frac{2}{5}$ h $2\frac{1}{5}$ i $3\frac{4}{5}$ j $1\frac{3}{5}$

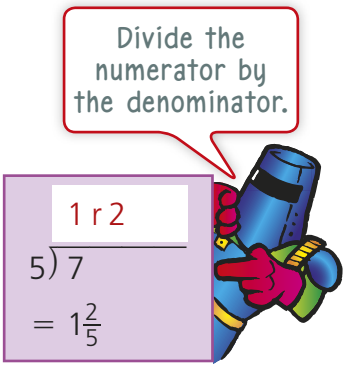
4 Write the mixed numeral for:

a $\frac{5}{4}$ b $\frac{13}{10}$ c $\frac{9}{8}$

d $\frac{7}{6}$ e $\frac{9}{4}$ f $\frac{17}{10}$

g $\frac{11}{8}$ h $\frac{13}{12}$ i $\frac{13}{8}$

j $\frac{11}{4}$ k $\frac{17}{6}$ l $\frac{17}{12}$



Fractions and Decimals 2: Compare fractions with related denominators and locate and represent them on a number line. Outcomes: MA3-1WM, MA3-7NA