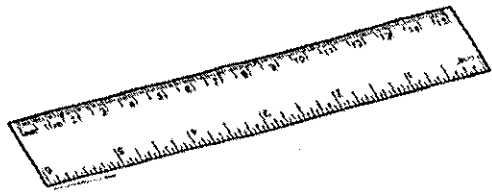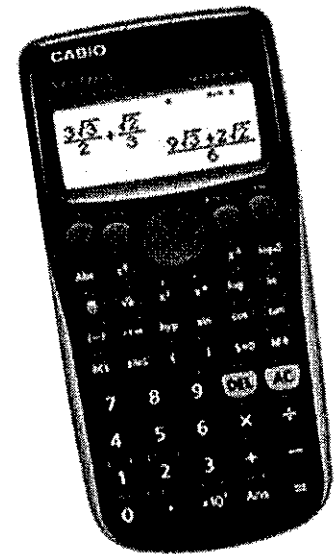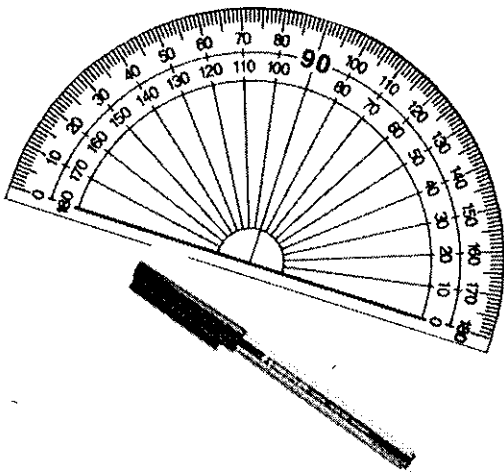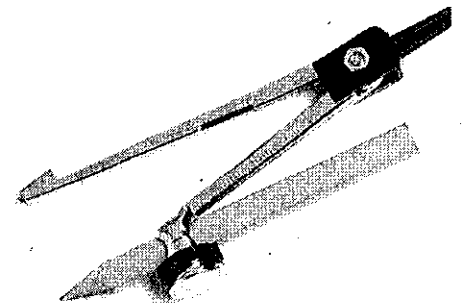ANSWERS

ARE YOU READY FOR YEAR 7 MATHS @ HELE'S?

Hele's School

Name

Welcome to maths at Hele's!

Please complete the first section of this booklet before you start in September and mark it!

The second section has a variety of challenges for you to complete if you would like to.

The answers are on our website: www.heles.plymouth.sch.uk/documents-for-parents/

Key Terms

Please write down the definitions for each of these key terms that you will be

covering in the first term of year 7.

Can you learn how to spell them all by September?

Try and use your own words to explain them. You could use a dictionary to help.

Average	
Horizontal	
Vertical	
Thousand	
Hundredth	
Negative	
Positive	
Obtuse	
Triangle	
Opposite	
Isosceles	
Quadrilateral	
Integer	
Triangular number	
Square number	

Cross Number!

Solve the sum and write the answer in **words** in the space provided.
Now search for the words in the answer grid below, the answer may be in any direction!!
The first one has been done for you.

1). 47 - 31 = __SIXTEEN__
2). 50 - 24 = TWENTY SIX
3). 34 + 17 = FIFTY ONE
4). 93 - 50 = FORTY THREE
5). 24 + 29 = FIFTY THREE
6). 85 - 64 = TWENTY ONE
7). 46 + 18 = SIXTY FOUR
8). 71 - 39 = THIRTY TWO
9). 67 - 48 = NINETEEN
10). 26 + 46 = SEVENTY TWO
11). 96 - 66 = THIRTY
12). 54 - 37 = SEVENTEEN
13). 13 + 46 = FIFTY NINE
14). 27 + 38 = SIXTY FIVE
15). 64 - 33 = THIRTY ONE
16). 80 - 58 = TWENTY TWO
17). 39 + 11 = FIFTY
18). 70 - 57 = THIRTEEN
19). 53 - 33 = TWENTY
20). 21 + 67 = EIGHTY EIGHT
21). 19 + 18 = THIRTY SEVEN
22). 27 + 18 = FORTY FIVE
23). 61 - 47 = FOURTEEN
24). 16 + 33 = FORTY NINE
25). 75 - 60 = FIFTEEN
26). 46 + 23 = SIXTY NINE
27). 29 + 47 = SEVENTY SIX
28). 94 - 87 = SEVEN
29). 58 + 24 = EIGHTY TWO
30). 26 + 65 = NINETY ONE
31). 48 + 44 = NINETY TWO
32). 43 - 33 = TEN
33). 21 + 66 = EIGHTY SEVEN
34). 63 - 55 = EIGHT
35). 72 - 63 = NINE
36). 19 + 74 = NINETY THREE

T	E	S	I	X	T	Y	F	O	U	R	E	N	I	N	Y	T	X	I	S
E	X	E	L	O	W	D	M	W	G	E	W	O	G	I	R	M	G	J	E
N	L	V	O	O	S	S	N	T	H	N	S	I	H	N	G	N	H	H	N
B	Y	E	T	W	E	N	T	Y	S	I	X	U	Y	E	T	B	G	Y	I
E	N	N	P	E	V	A	B	T	J	N	C	Y	T	T	H	G	I	E	N
O	W	T	Y	T	E	N	I	N	J	Y	F	T	R	Y	R	F	O	Y	E
W	N	Y	X	L	N	Q	N	E	E	T	F	I	F	O	G	O	L	U	O
T	O	T	R	O	H	W	V	W	L	R	Y	R	I	N	H	R	K	W	W
Y	K	W	T	W	E	I	F	T	Y	O	N	E	I	F	E	T	T	F	D
T	E	O	Y	H	I	V	A	I	F	E	E	T	E	G	Y	T	O	F
H	X	S	U	Y	I	G	T	S	Y	D	V	E	Y	E	T	T	H	U	R
G	R	T	R	L	R	C	U	R	E	S	N	R	E	H	G	R	E
I	S	S	H	K	I	T	D	R	S	O	I	H	N	R	I	T	V
E	I	W	Y	H	Y	X	E	H	W	Y	H	N	T	O	E	E	E	I
S	V	I	F	Y	T	Z	T	E	T	T	W	E	Y	E	Y	E	F
T	P	I	G	H	F	N	Y	F	N	N	H	D	P	T	T	V	T	N	Y
H	T	N	I	N	E	T	E	E	N	O	G	F	O	E	R	C	H	R	T
A	J	R	U	R	F	E	W	X	P	I	R	I	N	I	X	G	F	R
L	T	T	H	I	R	T	Y	S	E	V	E	N	I	I	H	Z	I	D	O
Y	M	U	F	I	F	T	Y	G	C	S	E	V	E	N	T	E	E	N	F

Multiplication and Division

Complete without a calculator! Then check your answers on a calculator.

1a i) $5 \times 6 = 30$

ii) $6 \times 2 = 12$

iii) $9 \times 3 = 27$

iv) $6 \times 4 = 24$

v) $7 \times 6 = 42$

2a i) $6 \times 0 = 0$

ii) $7 \times 8 = 56$

iii) $10 \times 6 = 60$

iv) $36 \div 6 = 6$

v) $32 \div 8 = 4$

3a i) $27 \div 3 = 9$

ii) $72 \div 9 = 8$

iii) $11 \times 7 = 77$

iv) $12 \times 8 = 96$

v) $108 \div 9 = 12$

4a i) $40 \times 7 = 280$

ii) $2 \times 80 = 160$

iii) $30 \times 4 = 120$

iv) $160 \div 20 = 8$

v) $280 \div 70 = 4$

b i) $\boxed{5} \times 2 = 10$

ii) $20 \div \boxed{5} = 4$

iii) $5 \times \boxed{3} = 15$

iv) $\boxed{12} \div 2 = 6$

v) $\boxed{6} \times 5 = 30$

b i) $\boxed{7} \times 6 = 42$

ii) $63 \div \boxed{9} = 7$

iii) $\boxed{56} \div 8 = 7$

iv) $6 \times \boxed{9} = 54$

v) $\boxed{8} \times 8 = 64$

b i) $\boxed{54} \div 9 = 6$

ii) $10 \div \boxed{1} = 10$

iii) $4 \times \boxed{8} = 32$

iv) $\boxed{12} \times 11 = 132$

v) $84 \div \boxed{7} = 12$

b i) $\boxed{8} \times 60 = 480$

ii) $8 \times \boxed{20} = 160$

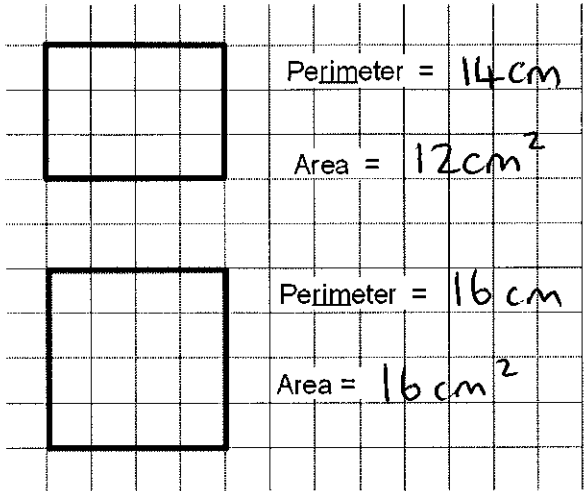iii) $120 \div \boxed{30} = 4$

iv) $\boxed{100} \div 2 = 50$
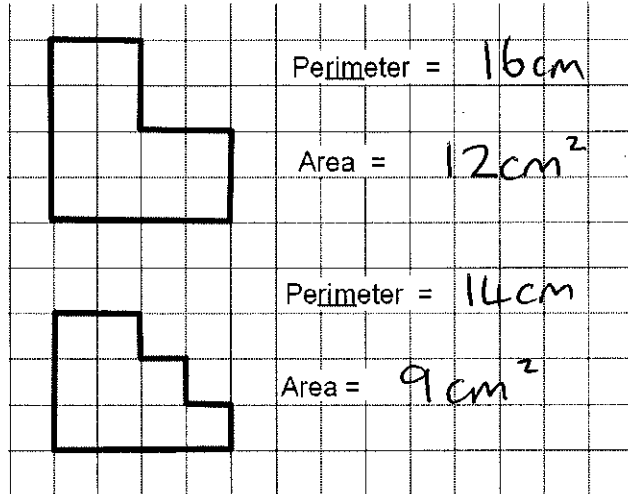
v) $6 \times \boxed{90} = 540$

Perimeter and Area of Shapes

Find the perimeter and area of each of these shapes. Each square represents a square centimetre…

1

Perimeter = 14 cm

Area = 12 cm^2

Perimeter = 16 cm

Area = 16 cm^2

2

Perimeter = 16 cm
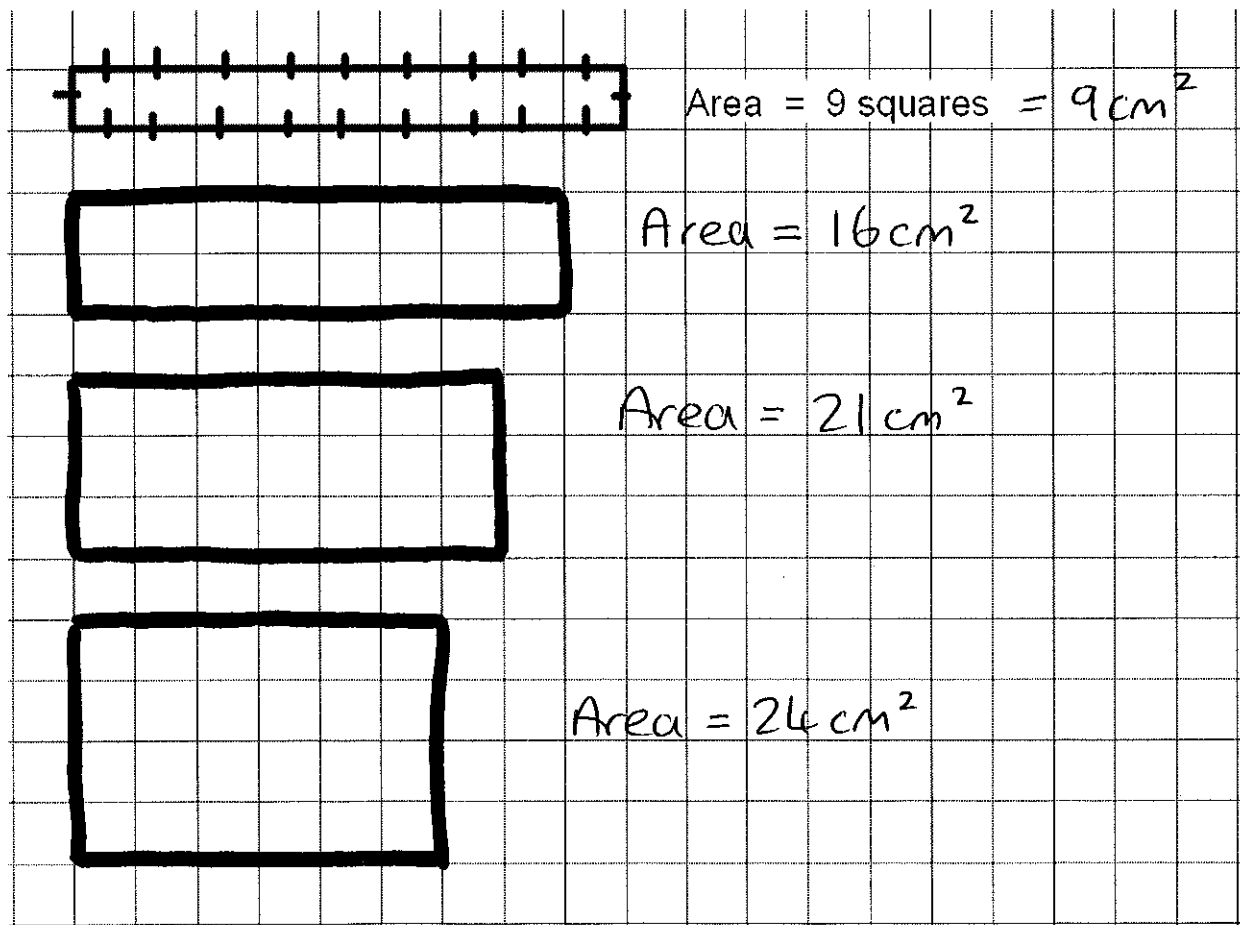
Area = 12 cm^2

Perimeter = 14 cm

Area = 9 cm^2

3 Draw as many different rectangles as you can on the grid below that have a perimeter of 20cm and work out their area. (The first one is done for you)

Area = 9 squares = 9 cm^2

Area = 16 cm^2

Area = 21 cm^2

Area = 24 cm^2

Angles

1. State the type of angle (whether each angle is acute, obtuse or reflex).

2. Estimate the size of each angle.

3. Measure each angle accurately using a protractor.

1).   2).   3).   4).

5).   6).   7).   8).

9).   10).   11).   12).

155   153

13).   14).   15).   16).

70

126   96
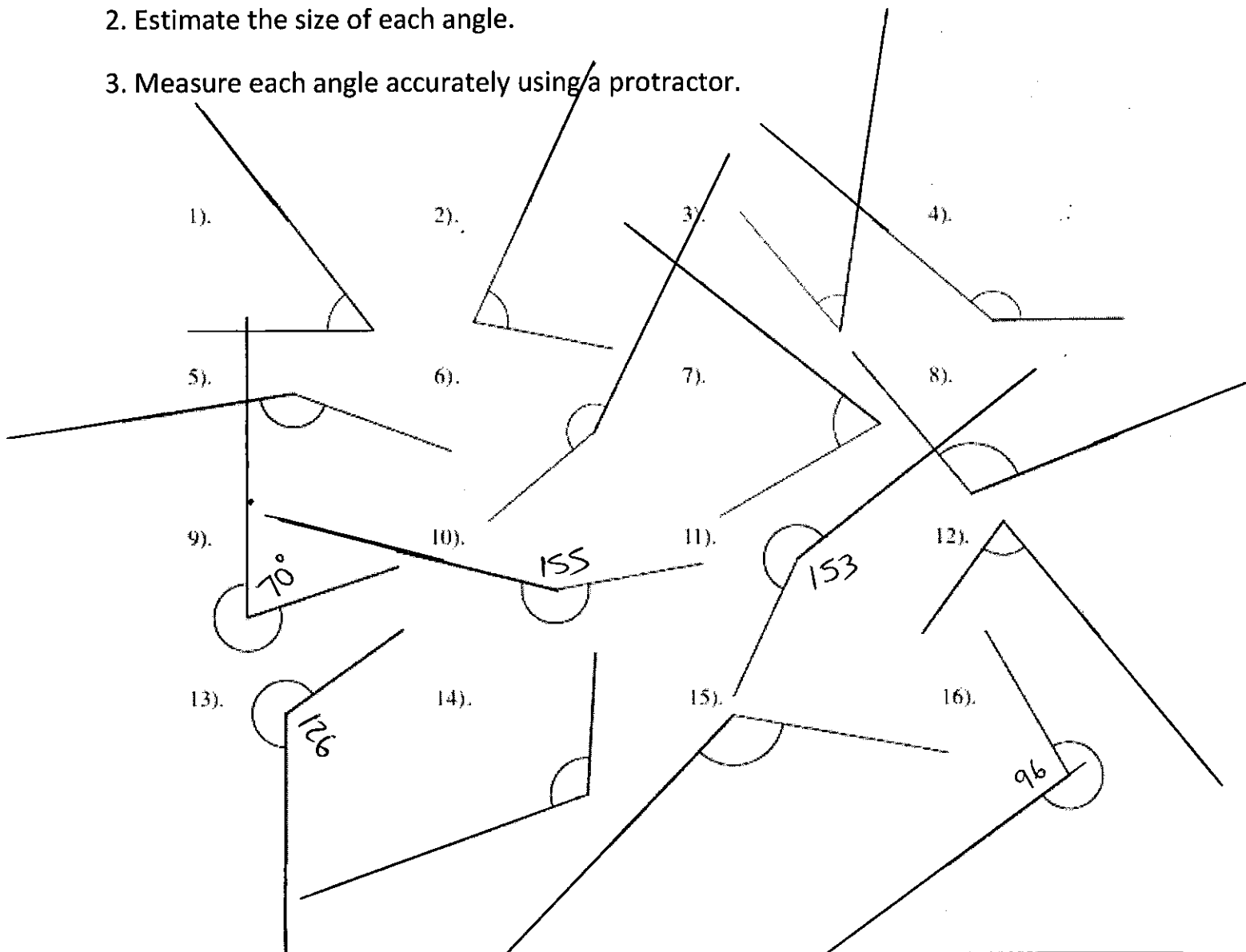
	Type of angle	Estimate	Measurement		Type of angle	Estimate	Measurement
1	acute		$53°$	9	reflex		$290°$
2	acute		$75°$	10	reflex		$205°$
3	acute		$49°$	11	reflex		$207°$
4	obtuse		$140°$	12	acute		$75°$
5	obtuse		$152°$	13	reflex		$234°$
6	obtuse		$156°$	14	obtuse		$113°$
7	acute		$70°$	15	obtuse		$125°$
8	obtuse		$110°$	16	reflex		$264°$

$$\left(\text{All } \pm 1° \right)$$

Subtraction   Can you use the column method to complete these sums? You must show your workings!

1. 76 − 34 =

$$\begin{array}{r} 76 \\ -\ 34 \\ \hline 42 \end{array}$$

2. 872 − 651 =

$$\begin{array}{r} 872 \\ -\ 651 \\ \hline 221 \end{array}$$

3. 80 − 45 =

$$\begin{array}{r} {}^{7}\cancel{8}{}^{1}0 \\ -\ 45 \\ \hline 35 \end{array}$$

4. 564 − 273 =

$$\begin{array}{r} 4\cancel{5}{}^{1}64 \\ -\ 273 \\ \hline 291 \end{array}$$

5. 8189 − 147=

$$\begin{array}{r} 8189 \\ -\ 147 \\ \hline 8042 \end{array}$$

6. 238 − 59 =

$$\begin{array}{r} {}^{1}\cancel{2}{}^{12}\cancel{3}{}^{1}8 \\ -\ 59 \\ \hline 179 \end{array}$$

7. 89.6 − 4.2 =

$$\begin{array}{r} 89.6 \\ -\ 4.2 \\ \hline 85.4 \end{array}$$

8. 615.47 − 23.5

$$\begin{array}{r} 5\cancel{6}{}^{1}1\cancel{5}{}^{14}.47 \\ -\ 23.50 \\ \hline 591.97 \end{array}$$

Averages:

What is meant by the following terms?

Mean	The mean is found by adding up all the data values and then dividing by how many items you have
Mode	The mode is the most frequent value.
Median	The median is the middle data value when the data is in order

Andrew is a cricketer. These are the number of runs Andrew has scored in his last 11 innings...

42 18 26
112
31 40 25
58
63 63 72

Michael is also a cricketer! These are the number of runs Michael has scored in his last 11 innings...

0 0 0
0
614 0 0
1 0 0 1

18, 25, 26, 31, 40, 42, 58, 63, 63, 72, 112

Who is the Better Cricketer...

Or ← You need to decide.

Andrew   Michael?

Can you work out the mean, mode, median and range to help you make your decision?

Could you argue that the other cricketer is better?

	mean	mode	median	range
Andrew	50	63	42	94
Michael	56	0	0	614

Show me your methods for multiplication and division

We are more interested in _your_ method than the answer.

| 23 x 34 782	234 ÷ 6 39
345 x 241 83145	374 ÷ 11 34
1234 x 546 673764	2564 ÷ 12 213·67 (to two decimal places)
12.7 x 3.4 43·18	3.52 ÷ 0.8 4·4

Shape:

For each shape write the name and properties of the sides, angles and symmetry. The first shape has been done as an example:
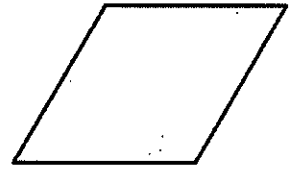
1.
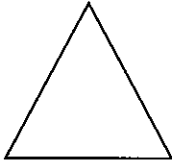
Equilateral Triangle
Equal length sides, none are parallel.
Equal size angles, all 60°.
Rotational symmetry order 3.
No reflection symmetry.

2.
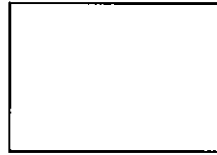
Rectangle
Opposite sides equal in length and parallel.
All angles 90°
Rotational symmetry order 2
Two lines of symmetry

3.

Rhombus
All sides equal in length
Opposite angles equal
Opposite sides parallel
Rotational symmetry order 2
Two lines of symmetry

4.

Trapezium
One pair of parallel sides

5.
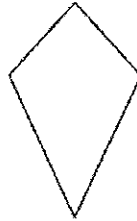
Kite
Two pairs of adjacent sides equal
One pair of equal angles
One line of symmetry

6.

Parallelogram
Opposite sides equal in length and parallel
Opposite angles equal
No lines of symmetry
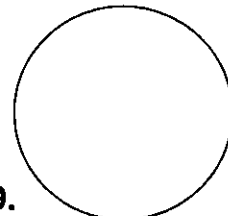Rotational symmetry order 2

7.
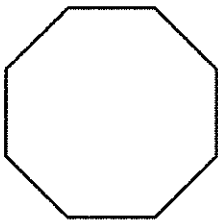
Regular Octagon
All sides equal in length
All angles equal (135°)
Rotational symmetry order 8
Eight lines of symmetry

8.
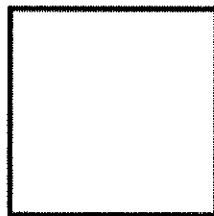
Square
All sides equal in length
Opposite sides are parallel
All angles 90°
Rotational symmetry order 4
Four lines of symmetry

9.

Circle
Infinite lines of symmetry
360° in a circle

Fractions

Without using a calculator please answer the following

1) $\dfrac{4}{5}$ + $\dfrac{2}{5}$ = $\dfrac{6}{5} = 1\dfrac{1}{5}$

2) $\dfrac{6}{13}$ - $\dfrac{4}{13}$ = $\dfrac{2}{13}$

3) $\dfrac{6}{10}$ - $\dfrac{1}{5}$ = $\dfrac{6}{10} - \dfrac{2}{10} = \dfrac{4}{10} = \dfrac{2}{5}$

4) $\dfrac{7}{8}$ + $\dfrac{1}{16}$ = $\dfrac{14}{16} + \dfrac{1}{16} = \dfrac{15}{16}$

5) $\dfrac{5}{8}$ X $\dfrac{1}{2}$ = $\dfrac{5}{16}$

6) $\dfrac{3}{7}$ ÷ $\dfrac{2}{5}$ = $\dfrac{3}{7} \times \dfrac{5}{2} = \dfrac{15}{14} = 1\dfrac{1}{14}$

7)   Cancel $\dfrac{35}{56}$ down to its lowest terms. $\dfrac{5}{8}$

8)   Cancel $\dfrac{60}{80}$ down to its lowest terms. $\dfrac{6}{8} = \dfrac{3}{4}$

9)   What is $\dfrac{5}{7}$ of £35 ? $35 \div 7 = 5$ $5 \times 5 = 25$ Answer £25

10)   What is $\dfrac{3}{10}$ of 340g ? $340 \div 10 = 34$ $34 \times 3 = 102$ Answer 102g

11)   Convert this fraction from improper to mixed. $4\dfrac{3}{4} = \dfrac{19}{4}$

12)   Convert this fraction from mixed to improper. $\dfrac{34}{5} = 6\dfrac{4}{5}$

This is the only sheet you need to return to your maths teacher!

Thank you for completing the first section of the booklet.

Are you going on to try the challenges?!

When you have finished please let us know what you think about this booklet by commenting below:
(students, parents, carers feel free to all comment if you would like to!)

What do you think was helpful about the booklet, what went well?

What do you think could be better about the booklet?

Challenges!

1. Can you complete the multiplication square?

X	8	5	2	10	7	9
4	32	40	8	40	28	36
7	56	35	14	70	49	63
11	88	55	22	110	77	99
3	24	15	6	30	21	27
12	96	60	24	120	84	108
6	48	30	12	60	42	54

2. Work out each multiplication.   Each shape is a different value (0 to 12)

$\underset{2}{\square} \times \underset{2}{\square} \times \underset{2}{\square} = \underset{8}{)}$ $\underset{3}{\square} \times \underset{3}{\square} = \underset{9}{\text{✳}}$

$\underset{2}{\square} \times \underset{4}{\oslash} = \underset{8}{)}$ $\underset{2}{\square} \times \underset{5}{\bigstar} = \underset{10}{\hexagon}$

$\underset{3}{\square} \times \underset{4}{\oslash} = \underset{12}{\bullet}$ $\underset{3}{\square} \times \underset{1}{\diamondsuit} = \underset{3}{\square}$

$\underset{3}{\square} \times \underset{2}{\square} = \underset{6}{\triangle}$ $\underset{1}{\diamondsuit} \times \underset{10}{\hexagon} = \underset{10}{\hexagon}$

$\underset{6}{\triangle} \times \underset{2}{\square} = \underset{12}{\bullet}$ $\underset{2}{\square} \times \underset{0}{\blacktriangledown} = \underset{0}{\blacktriangledown}$

$\underset{2}{\square} \times \underset{2}{\square} = \underset{4}{\oslash}$ $\underset{0}{\blacktriangledown} \times \underset{8}{)} = \underset{0}{\blacktriangledown}$

3. Venn Diagrams Challenge

In a class there are:

- 8 students who play cricket and hockey
- 7 students who do not play cricket or hockey
- 13 students who play hockey
- 19 students who play cricket
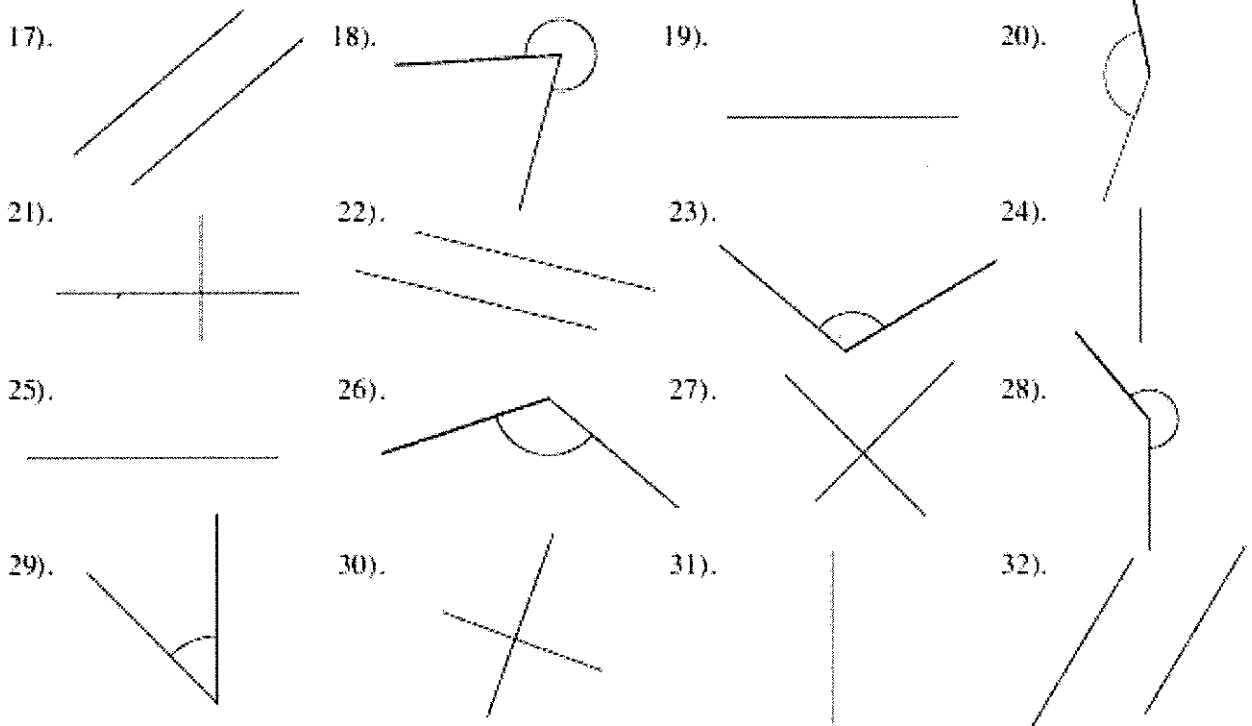
Can you show this information on the Venn Diagram below?

Cricket   Hockey

11   8   5

7
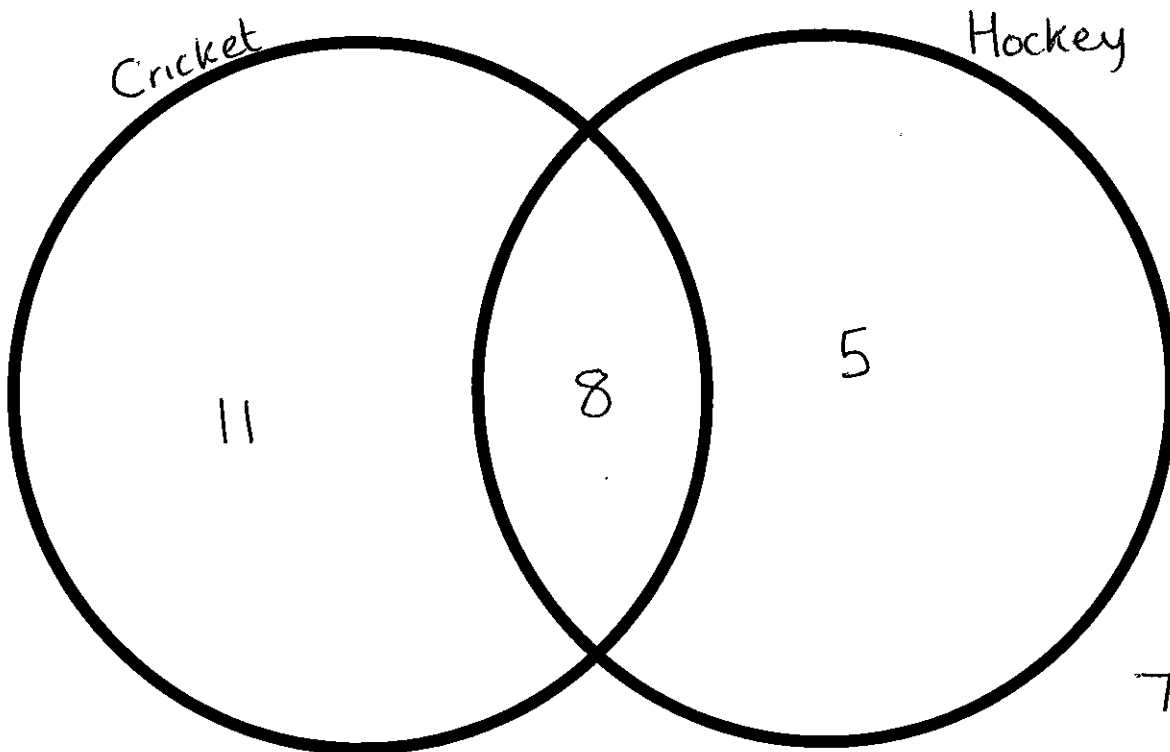
How many students are there in the class? 31 students

4. Angles Challenge:

Write which word or words from the table best describes each diagram below:

Acute	Perpendicular	Obtuse	Parallel
Vertical	Horizontal	Reflex	Angle

17).   18).   19).   20).

21).   22).   23).   24).

25).   26).   27).   28).

29).   30).   31).   32).

17. Parallel
18. Reflex angle
19. Horizontal
20. Obtuse angle
21. Perpendicular
22. Parallel
23. Obtuse angle
24. Vertical

25. Horizontal
26. Obtuse angle
27. Perpendicular
28. Reflex angle
29. Acute angle
30. Perpendicular
31. Vertical
32. Parallel

5. Area and Perimeter Challenge:

```
        ┌──────────────┐
        │              │  5
        └──────────────┘
              10
```
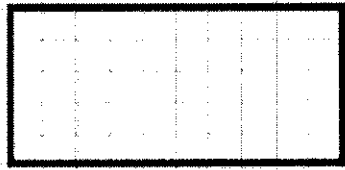
Area = 50 units²
Perimeter = 30 units

```
    ┌──────────────┐
    └──────────────┘  2
          10
```
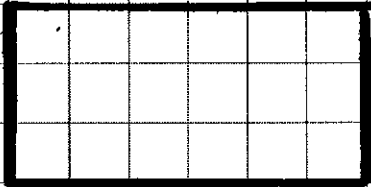
Area = 20 units²
Perimeter = 24 units

Can you find a rectangle where the perimeter and the area have the same numerical value?

```
    ┌──────────────┐
    │              │  3
    └──────────────┘
          6
```

Area = 18 cm²
Perimeter = 18 cm

6. Can you solve these three sets of problems?

25 x 2⃞3 = 57⃞5   ⃞23 x 3⃞58 = 82⃞34

899 x 1⃞ = 9⃞889   ⃞70 x 3⃞2 = 66⃞40

1⃞1 x ⃞78 = 30⃞38   1⃞82 x ⃞39 = 60⃞098

Each red box represents a missing digit.
Can you find out what they are?

The calculations are obscured by ink blots. What do you think the calculations would look like if there were no blots?

59
35 + 24 = ⬛⬛

X 2·1
27 ⬛ = 56.7

4.⬛1 = 2.2
4·3 - 2·1 = 2·2

21.9 + 3.72 ⬛   25·62

10·43
⬛ - 9.3 = 1.13

⬛ 36
↖ Could be $6^2 = 36$
$2 \times 18 = 36$
$4 \times 9 = 36$
$100 - 64 = 36$
etc.

Each of the following shapes has a value:

▲ = 7   ⬛ = 17   ● = ?

The value of the circle changes in each of the following problems.
Can you discover its value in each problem, if the value of the shapes are being added together?

(a) ▲ ● ⬛17   = 25   1

(b) ⬛17 ▲ ▲ ●   = 51   20

(c) ▲ ▲ ● ● ⬛17 ⬛17   = 136   44

(d) ● ● ●   = 48   16

(e) ▲ ● ▲ ⬛17 ▲ ● ▲ = 100   27·5

7. Shape Challenge Problem:

Pick one flag and investigate some of the following:-

Japan

Israel

United Kingdom

Canada

South Africa

Guyana

Switzerland

Macedonia.
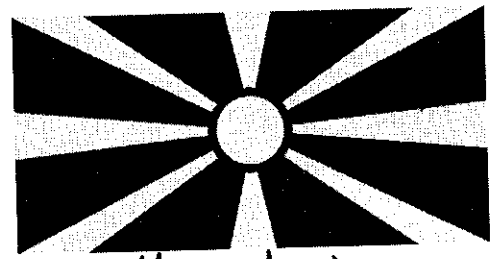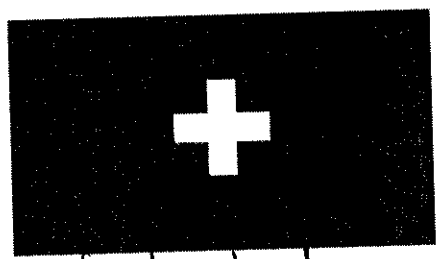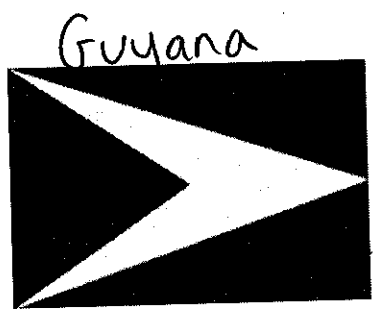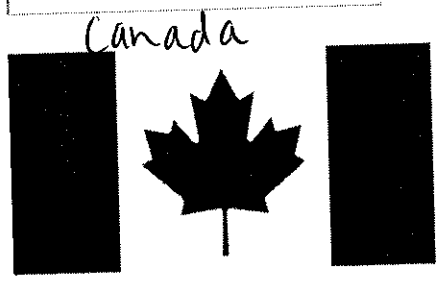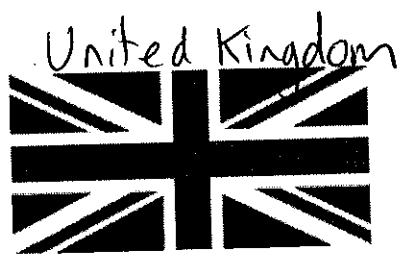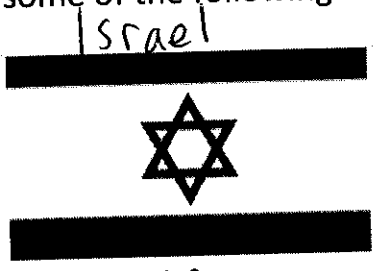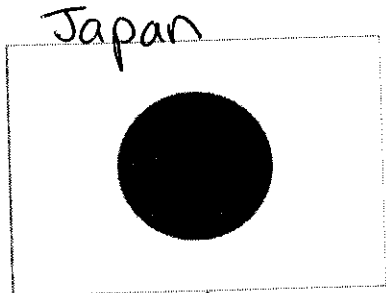
What Country is your chosen flag?

What shapes can you see in it? Can you describe them?

Does the flag have any lines of reflective symmetry? Can you draw them in?

Can you find any pairs of parallel or perpendicular lines? Can you mark them on the flag?

8. Could you?

Can you discuss this with your new maths teacher?

1. Could you stand the population of the Earth on the Isle of Wight?
2. Could you drink enough in a lifetime to empty a swimming pool?
3. Could you fit a million grains of rice into an empty litre container?
4. Could you carry one kilometre of toilet paper without any help?
5. Could you wrap up a 150mm × 1000mm × 100mm box using a single A4 sheet of paper?
6. Could you drive in town at 10 metres per second?
7. Could you build a garage using no more than 1000 bricks?
8. Could you find a cat that weighs more than five thousand paper clips?
9. Could you eat your body weight in dairy milk chocolate in one year?
10. Could you buy your height in dairy milk bars (side by side) with £10?

Pick one of the above questions and decide if you could! Can you explain why or why not?
To communicate your answer mathematically you should:
- *Decide on what calculation you need to do to answer the numerical question,*
- *Think about estimation,*
- *Look up facts,*
- *Work with units in context.*