

## Mathematics Enhancement Programme

### TEACHING SUPPORT: Year 5

#### EXERCISES

The following exercises are taken from Year 5 Practice Books 5a and 5b. They illustrate more of the problem-solving questions rather than the routine ones. Do try these questions before looking at the solutions and suggested strategies.

1. You have these number cards. 2 3 4 0 0 0

Use them to make, where possible, two different 6-digit numbers which are:

- a) divisible by 10: .....
- b) divisible by 10, but not by 100: .....
- c) divisible by 100, but not by 10: .....
- d) not divisible by 10: .....

(p3, Q4)

2. Write the units of measure that you know in the correct place in the table.

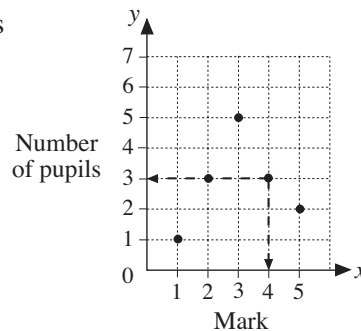
Number of times, or the fraction of, the basic unit	1000	100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
<i>Units of length</i>				metre (m)			
<i>Units of mass</i>				gram (g)			
<i>Units of capacity</i>				litre (ℓ)			

(p4, Q1)

3. The graph shows the marks scored by a class of 14 pupils in a test which had 5 marks in total.

For example, 3 pupils scored 4 marks, or 4 marks were scored by 3 pupils.

So this data point has coordinates (4, 3).



- a) Complete the table.
- |                  |   |   |   |   |   |
|------------------|---|---|---|---|---|
| Mark             | 1 | 2 | 3 | 4 | 5 |
| Number of pupils |   |   |   | 3 |   |

- b) i) Which mark did most pupils score? This is the **mode**.
- ii) How many pupils scored it?
- c) List the marks of every pupil in increasing order in your exercise book.
- d) Calculate the **mean** in your exercise book and write it here.

(p6, Q2)

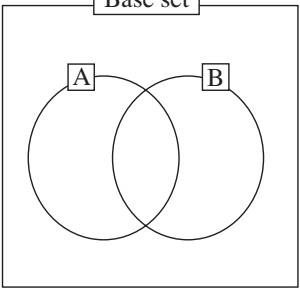
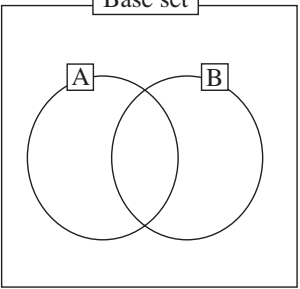
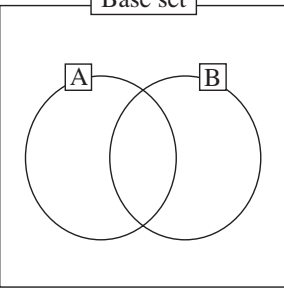
4. Do these multiplications in a clever way in your exercise book.

- a)  $3 \times 4 \times 25$     b)  $5 \times 63 \times 20$     c)  $63 \times 77 \times 0$     d)  $1 \times 2 \times 4 \times 8$   
 e)  $1 \times 2 \times 3 \times 4 \times 5 \times 6$     f)  $5 \times 2 \times 7 \times 2 \times 7 \times 5$     g)  $2 \times 8 \times 125 \times 4$

(p11, Q4)

5. The base set is :  $U = \{-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5\}$

Write the numbers in the Venn diagrams.

<p>a)</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px; text-align: center;">Base set</div>  <p>A = {negative numbers} B = {positive numbers}</p>	<p>b)</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px; text-align: center;">Base set</div>  <p>A = {at least zero} B = {at most zero}</p>	<p>c)</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px; text-align: center;">Base set</div>  <p>A = {more than -3} B = {less than 4}</p>
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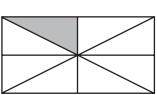
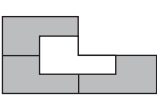


(p22, Q3)

6. Fill in the missing numbers.

- |  |   |   |
|--|---|---|
| a) 8 is more than 0 by <input style="width: 40px;" type="text"/>   | 8 - 0 = <input style="width: 40px;" type="text"/>     | <input style="width: 40px;" type="text"/> + 0 = 8     |
| b) -8 is less than <input style="width: 40px;" type="text"/> by 8  | -8 - 0 = <input style="width: 40px;" type="text"/>    | <input style="width: 40px;" type="text"/> + 0 = -8    |
| c) 8 is more than 2 by <input style="width: 40px;" type="text"/>   | 8 - 2 = <input style="width: 40px;" type="text"/>     | <input style="width: 40px;" type="text"/> + 2 = 8     |
| d) 8 is more than -3 by <input style="width: 40px;" type="text"/>  | 8 - (-3) = <input style="width: 40px;" type="text"/>  | <input style="width: 40px;" type="text"/> + (-3) = 8  |
| e) -3 is more than -7 by <input style="width: 40px;" type="text"/> | -3 - (-7) = <input style="width: 40px;" type="text"/> | <input style="width: 40px;" type="text"/> + (-7) = -3 |
| f) 4 is less than <input style="width: 40px;" type="text"/> by 9   | 4 - 13 = <input style="width: 40px;" type="text"/>    | <input style="width: 40px;" type="text"/> + 13 = 4    |
| g) -2 is less than 3 by <input style="width: 40px;" type="text"/>  | -2 - 3 = <input style="width: 40px;" type="text"/>    | <input style="width: 40px;" type="text"/> + (-3) = -2 |

(p25, Q3)

7. What part of the shapes are shaded?

a)		b)		c)		d)		e)		f)	
.....		.....		.....		.....		.....		.....	

(p26, Q1)

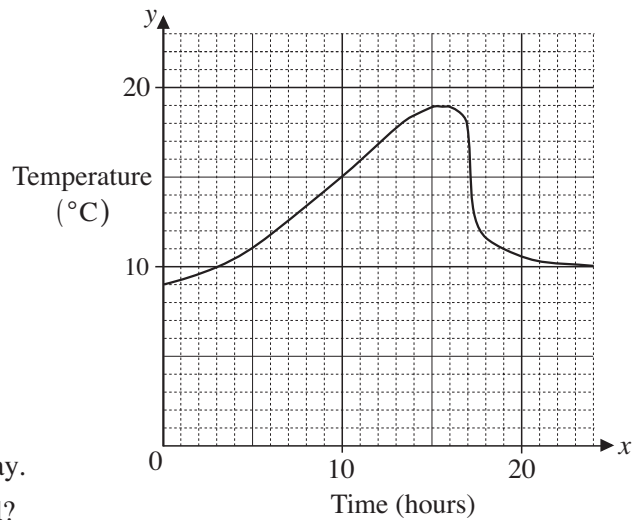
**8.** Write these numbers as decimals. Do necessary calculations in your exercise book.

- |                        |                            |                          |
|------------------------|----------------------------|--------------------------|
| a) $\frac{35}{10} =$   | b) $\frac{7}{100} =$       | c) $\frac{1003}{100} =$  |
| d) $\frac{1003}{10} =$ | e) $\frac{89}{10} =$       | f) $83 + \frac{7}{10} =$ |
| g) $\frac{3}{100} =$   | h) $\frac{68}{100} =$      | i) $\frac{527}{100} =$   |
| j) $1 + \frac{1}{2} =$ | k) $15 + \frac{2}{5} =$    | l) $\frac{1}{4} =$       |
| m) $\frac{6}{20} =$    | n) $143 + \frac{17}{50} =$ | o) $2\frac{3}{4} =$      |

(p28, Q2)

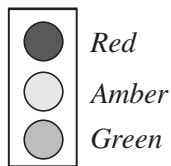
**9.** The graph shows the variation in temperature over one day.

- What temperature was it at 10.00 am?  
.....
- At what time of day was it hottest?  
.....
- During which times was the temperature rising?  
.....
- There was a downpour during the day.  
When do you think that it happened?



(p34, Q1)

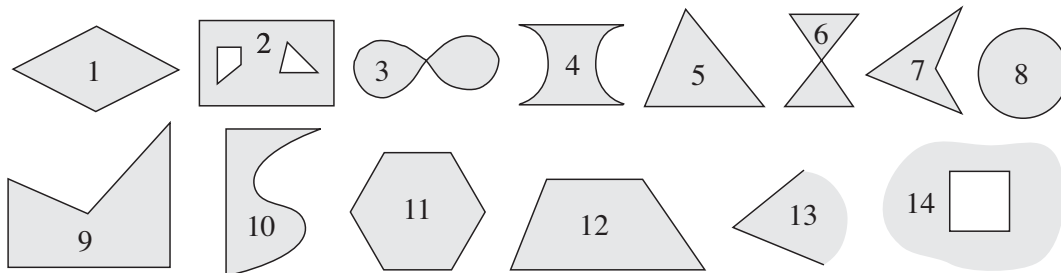
**10.**



Traffic lights light up in the order: R, RA, G, A, R  
What other possible combinations could be used?

(p40, Q5)

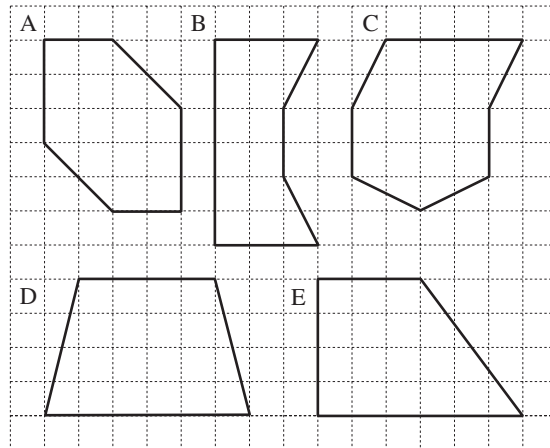
**11.** List the numbers of the plane shapes which match the descriptions.



- a) It is enclosed only by straight lines.
- b) It is enclosed by straight and curved lines.
- c) It is enclosed only by curved lines.
- d) It is not enclosed.
- e) It has parallel sides.
- f) It has perpendicular sides.
- g) It has exactly 4 straight sides
- h) It has exactly 6 vertices.

(p42, Q1)

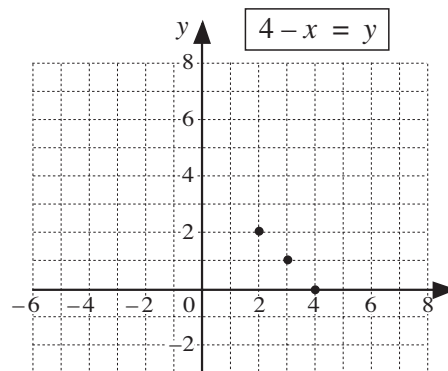
12. a) Write inside each polygon its area in unit squares.



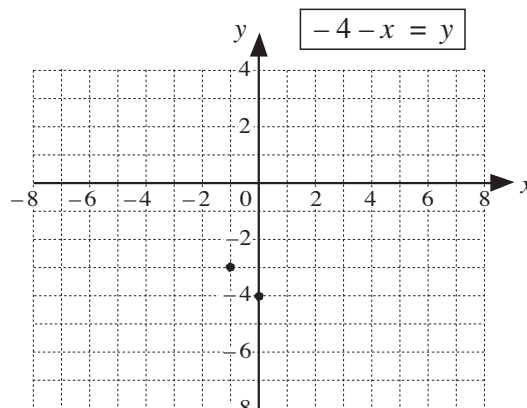
- b) Which polygon has: i) the greatest area  ii) the smallest area?
- c) Which polygons have equal areas? (p45, Q4)

13. Fill in the missing differences. Continue drawing the graphs.

- a)  $(+ 4) - (+ 6) =$
- $(+ 4) - (+ 5) =$
- $(+ 4) - (+ 4) = -2$
- $(+ 4) - (+ 3) =$
- $(+ 4) - (+ 2) = 0$
- $(+ 4) - (+ 1) =$
- $(+ 4) - 0 = + 4$
- $(+ 4) - (- 1) =$
- $(+ 4) - (- 2) =$



- b)  $(- 4) - (+ 2) =$
- $(- 4) - (+ 1) =$
- $(- 4) - 0 = - 4$
- $(- 4) - (- 1) = - 3$
- $(- 4) - (- 2) = - 2$
- $(- 4) - (- 3) =$
- $(- 4) - (- 4) = 0$
- $(- 4) - (- 5) =$
- $(- 4) - (- 6) =$



(p59, Q1)

14. Fill in the products and notice how they change.

$$5 \times 3 = \square$$

$$5 \times 2 = \square$$

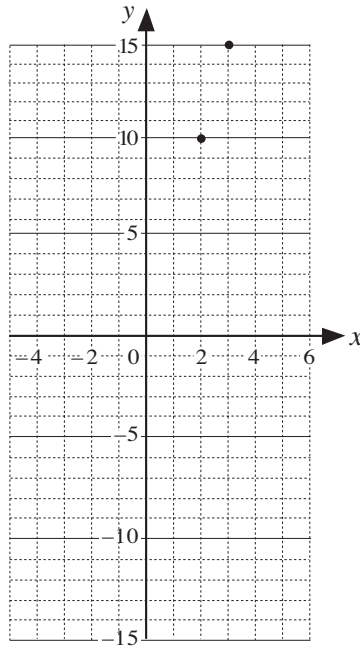
$$5 \times 1 = \square$$

$$5 \times 0 = \square$$

$$5 \times (-1) = \square$$

$$5 \times (-2) = \square$$

$$5 \times (-3) = \square$$

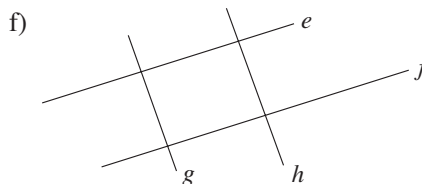
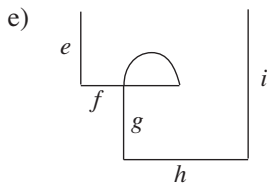
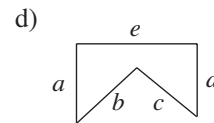
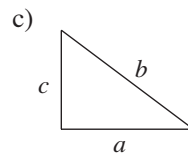
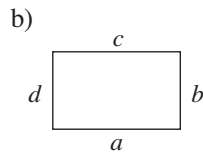
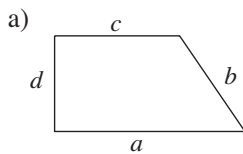


$$5 \times x = y$$

Complete the graph.

(p62, Q1)

15. Mark on the diagrams, or list by their letters, the **perpendicular** and **parallel** lines.




(p73, Q5)




16. Decide whether the statements are true or false. Write a  $\checkmark$  or a **X**.

- |  |   |
|--|---|
| a) Every rectangle is a trapezium.     | g) Not all parallelograms are trapeziums.   |
| b) Every trapezium is a rectangle.     | h) A trapezium can be concave.              |
| c) Every rhombus is a parallelogram.   | i) A trapezium need not be a quadrilateral. |
| d) Every parallelogram is a rhombus.   | j) There is no rhombus which is concave.    |
| e) A parallelogram can be a trapezium. | k) All rhombi are convex.                   |
| f) All parallelograms are trapeziums.  | l) Not every parallelogram is a rhombus.    |

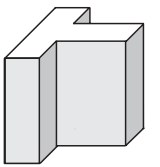
(p76, Q3)




**17.** Each solid was cut from a cube with edges 3 units long. Draw how you would see it from the front, from the side and from above. Calculate its volume.

a)  *Front view* *Side view* *Top view*

Volume = .....

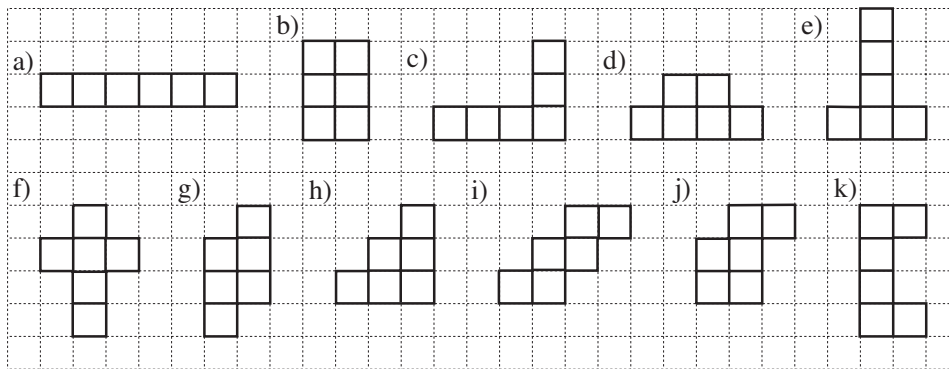
b)  *Front view* *Side view* *Top view*

Volume = .....

(p78, Q2)

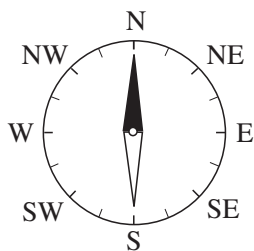
**18. Hexominoes** are formed by connecting 6 squares along at least one side. Here are 11 examples of different hexominoes.



- i) In your exercise book, draw as many other different hexominoes as you can. How many hexominoes have you found altogether?
- ii) Colour the hexominoes in the diagram and in your exercise book which could be used as the net for a cube. How many did you colour?

(p80, Q3)

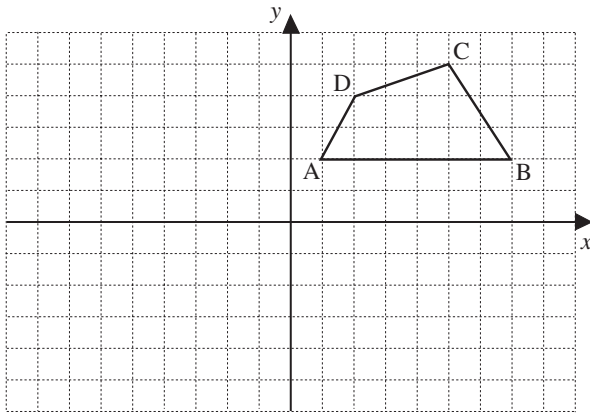
**19.** Measure or calculate the angles between the given compass directions.



- |               |                      |                |                      |
|---------------|----------------------|----------------|----------------------|
| a) S and W    | <input type="text"/> | b) S and NE    | <input type="text"/> |
| c) E and SW   | <input type="text"/> | d) N and SE    | <input type="text"/> |
| e) NW and SW  | <input type="text"/> | f) NW and E    | <input type="text"/> |
| g) SSW and SE | <input type="text"/> | h) SSW and NNE | <input type="text"/> |

(p85, Q3)

20. Reflect the quadrilateral in the  $x$ -axis, then reflect its image in the  $y$ -axis.

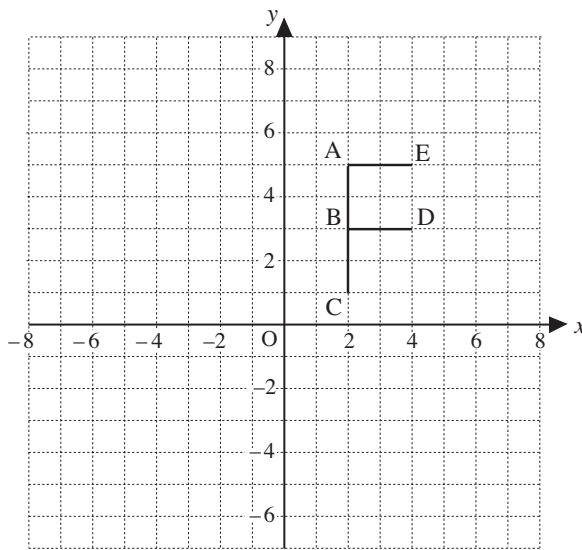


Are these statements true or false?

- a)  $BC = B'C'$
- b)  $BC = B''C''$
- c)  $BC \parallel B'C'$
- d)  $BC \parallel B''C''$
- e)  $BC \perp B'C'$

(p90, Q4)

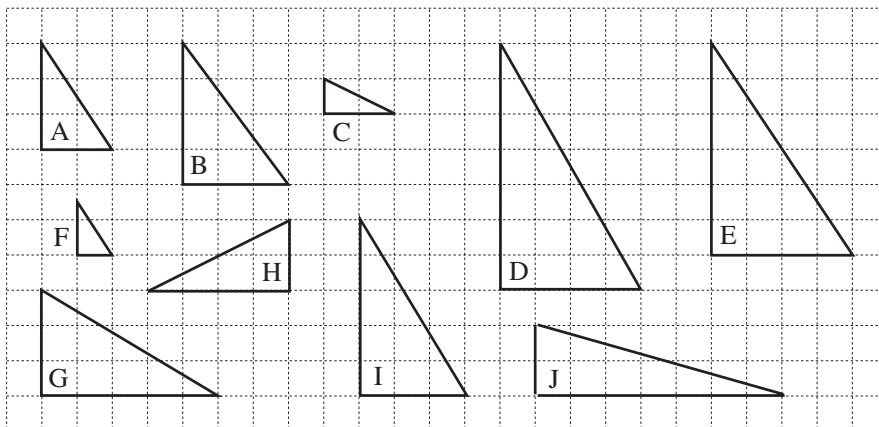
21.



- a) **Translate** shape F so that the coordinates of point C' are (5, 2).
- b) **Reflect** the original shape F in the  $x$ -axis.
- c) **Rotate** the original shape F by  $90^\circ$  around point O.
- d) **Rotate** the original shape F by  $180^\circ$  around point O.

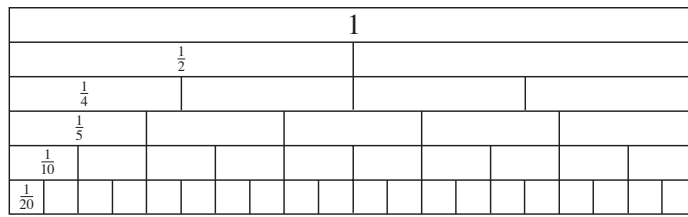
(p94, Q1)

22. Colour **similar** triangles in the same colour. Calculate their areas in your exercise book.



(p95, Q2)

**23.** Write different forms of the same quantities from the diagram.



$$1 = \frac{2}{2} = \frac{4}{4} = \frac{5}{5} = \frac{10}{10} = \frac{20}{20} \quad \frac{1}{2} = \quad \frac{1}{4} =$$

$$\frac{3}{4} = \quad \frac{1}{5} = \quad \frac{2}{5} = \quad \frac{3}{5} =$$

$$\frac{4}{5} = \quad \frac{1}{10} = \quad \frac{3}{10} = \quad \frac{7}{10} = \quad \frac{9}{10} =$$

(p98, Q1)

**24.** Calculate the sums and differences.

a)  $\frac{3}{5} + \frac{3}{10} =$       b)  $\frac{7}{8} + \frac{1}{4} =$       c)  $\frac{1}{2} + \frac{1}{10} - \frac{2}{5} =$

d)  $\frac{4}{11} + \frac{5}{11} - \frac{2}{11} =$       e)  $\frac{7}{12} - \frac{1}{3} =$       f)  $\frac{5}{7} - \frac{5}{21} =$

g)  $\frac{2}{3} + \frac{2}{9} - \frac{3}{18} =$       h)  $\frac{1}{4} + \frac{3}{8} - \frac{5}{16} =$       i)  $1\frac{1}{5} - \frac{3}{10} =$

(p105, Q4)

**25.** The farmer had some chickens. He sold  $\frac{5}{8}$  of them and had 180 chickens left. How many chickens did the farmer have at first?

(p110, Q3)

**26.** Fill in the missing numbers. Check that they make the statements true.

a)  $\frac{2}{5} \times \square = \frac{4}{5}$       b)  $\square \times \frac{5}{9} = \frac{15}{9}$       c)  $\frac{3}{10} \times \square = \frac{30}{10}$

d)  $\frac{5}{8} \times \square = \frac{5}{4}$       e)  $\frac{\square}{6} \times 4 = \frac{10}{3}$       f)  $\frac{5}{\square} \times \square = 10$

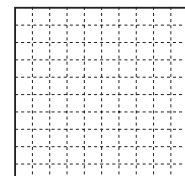
(p112, Q2)

**27.** Use the diagram to help you do this addition in different ways.

$$0.2 + \frac{1}{10} + \frac{37}{100} + 0.17 + \frac{3}{100}$$

Calculate using:

- a) fractions: .....
- b) decimals: .....
- c) percentages: .....



(p125, Q1)



**28.** Answer the questions by writing a ratio or a fraction, as required.

In a group of students at a youth camp, 3 are *Americans*, 4 are *British* and 1 is *Greek*.

a) What part of the group is:

*American*  *British*  *Greek*  *British or Greek?*

b) What is the ratio in the group of:

- i) *American* students to *British* students .....
- ii) *American* students to *Greek* students .....
- iii) *British* students to *American* students .....
- iv) *British* students to *Greek* students .....
- v) *Greek* students to *American* students .....
- vi) *Greek* students to *British* students? .....

c) The group is going on a trip in a minibus. They get on the bus in a random order. How certain are you of these events occurring?

If you think that it is **certain** to happen, write **C**, if you think that it is **possible but not certain**, write **P** and if you think that it is **impossible**, write **I**.

- i) The first 4 students to get on the bus are *American*.
- ii) The last student to get on the bus is *American* or *British* or *Greek*.
- iii) The first student to get on the bus is *Greek*.
- iv) The first 4 students to get on the bus are an *American*, a *Greek*, an *American* and a *British* student in that order.
- v) Two *Americans*, a *British* and the *Greek* student are the first four to get on the bus.

- d) i) Which nationality is the most likely to get on the bus first? .....
- ii) Is the first student to get on the bus more likely to be *American* or *British*? .....

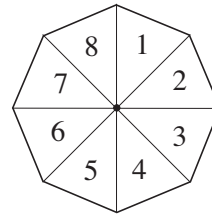
(p131, Q2)

**29.** How certain are you of these outcomes occurring? Write **C** for **certain**, **P** for **possible but not certain** or **I** for **impossible**.

- a) The final of the next *Football World Cup* will be in 2005.
- b) The next time I toss a coin I will get a *Head* or a *Tail*.
- c) The next time I throw two dice the total will be more than 6.
- d) The next time I throw two dice the total will be more than 12.
- e) It will rain next week in my home town.

(p135, Q2)

**30.** The diagram shows a spinner used in a board game.



When the spinner is spun, what is the probability that it lands on:

- a) 1                       b) 8
- c) an even number                       d) a number less than 8
- e) a number greater than 8                       f) a number greater than 0?

(p140, Q2)

**31.** Mike is growing two different varieties of tomato plants in his greenhouse.

During one week, he keeps a record of the number of tomatoes he picks from each type of plant and notes the data in a table.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Variety A	5	5	4	1	0	2	5
Variety B	5	3	3	3	7	9	6

- a) For **Variety A**, what is the:
- i) mode                       ii) median                       iii) mean?
- b) For **Variety B**, what is the:
- i) mode                       ii) median                       iii) mean?
- c) Compare the two sets of data. Which variety do you think is best and why?

(p150, Q1)

**32.** We have 80 books altogether. They are arranged on 3 shelves.

If we moved 7 books from the top shelf to the middle shelf and took 8 books away from the bottom shelf, there would be an equal number of books on each shelf.

How many books are on each shelf?

(p151, Q5)

**33.** What is the smallest possible, 3-digit, positive integer which fulfils these conditions?

- If it is multiplied by 3, the result is also a 3-digit number.
- If it is multiplied by 4, the result is a 4-digit number.

(p153, Q4)

**34.** What are the four consecutive **odd** numbers which add up to 80?

(p155, Q7)

35. How many positive 3-digit numbers less than 500 are there in which the middle digit is half of the sum of the two outside digits?

(p158, Q4)


36. What is the greatest 3-digit natural number in which the **product** of its digits is 108?

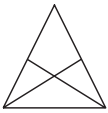
(p159, Q4)

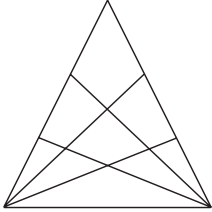
37. Use each of the digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 **only once** to make **five** whole numbers, so that one number is twice, another number is three times, another number is four times and the last number is five times the smallest number.

(p167, Q3)

38. How many triangles can you see in each of these diagrams?

a)   triangles

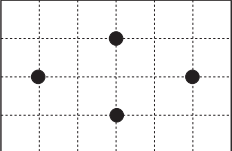
b)   triangles

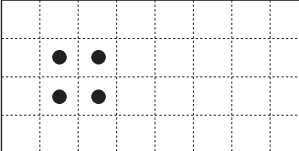
c)   triangles

How many triangles do you think will be in the next triangle in the sequence?  triangles


(p170, Q3)

39. Each diagram is the map of a field in which there are 4 wells. Show how the field could be divided into 4 **congruent** parts so that each part has exactly one well.

a) 

b) 

(p172, Q5)

40.  *Freddy Fox* decided that from that day forward he would always tell the truth on Mondays, Wednesdays and Fridays but he would always tell lies on the other days of the week.

One day he said, "*Tomorrow I will tell the truth.*"  
On which day of the week do you think he said this?

(p174, Q2)