Stage 6 Mathematics

Puzzle pieces containing the following statements:

- identify common factors, common multiples and prime numbers
- divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$]
- solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
- express missing number problems algebraically
- calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3) and extending to other units [eg, mm^3 and km^3]
- calculate and interpret the mean as an average
- perform mental calculations, including with mixed operations and large numbers
- multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$]
- recall and use equivalences between simple fractions, decimals and percentages including in different contexts.
- generate and describe linear number sequences
- calculate the area of parallelograms and triangles
- interpret and construct pie charts and line graphs and use these to solve problems
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- solve problems which require answers to be rounded to specified degrees of accuracy
- use simple formulae
- recognise when it is possible to use the formulae for area and volume of shapes
- draw and translate simple shapes on the coordinate plane, and reflect them in the axes
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- compare and order fractions, including fractions >1
- use written division methods in cases where the answer has up to two decimal places
- recognise that shapes with the same areas can have different perimeters and vice versa
- describe positions on the full coordinate grid (all four quadrants)
- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- convert between miles and kilometres
- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.
- solve number problems and practical problems that involve all of the above
- use estimation to check answers to calculations and determine in the context of a problem, an appropriate degree of accuracy.
- use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to 3 decimal places
- illustrate and name parts of circle, including radius, diameter and circumference and know that the diameter is twice the radius
- use negative numbers in context, and calculate intervals across zero
- solve problems involving addition, subtraction, multiplication and division
- multiply one-digit numbers with up to two decimal places by whole numbers
- solve problems Involving unequal sharing and grouping using knowledge of fractions and multiples
- solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
- compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- round any whole number to a required degree of accuracy
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to 3 decimal places
- solve problems involving similar shapes where the scale factor Is known or can be found
- enumerate possibilities of combinations of two variables
- recognise, describe and build simple 3-D shapes including making nets
- read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
- use their knowledge of the order of operations to carry out calculations involving the four operations
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$]
- solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and use percentages for comparison
- find pairs of numbers that satisfy number sentences involving two unknowns
- draw 2-D shapes using given dimensions and angles

1 a) Write these numbers using numerals:

i) Two million, six hundred and twenty thousand, two hundred and sixty:

....

ii) Two million, six hundred and two thousand, two hundred and six:

....

iii) Two million, six hundred thousand, two hundred and sixteen:

....

b) Write these numbers in words:

i) 2 343 817: ....

....

ii) 4 300 817: ....

....

iii) 3 300 007: ....

....

(NPV1, 6 marks)

2 Round 3 565 455 to:

| 3 565 455 |

a) the nearest 10:

....

d) the nearest 10 000:

....

b) the nearest 100:

....

e) the nearest 100 000:

....

c) the nearest 1000:

....

f) the nearest million:

....

(NPV2, 6 marks)

3 a)   15°C warmer than -2°C is   ....°C

b)   12°C colder than 10°C is   ....°C

c)   15°C colder than 3°C is   ....°C

d)   9°C warmer than -12°C is   ....°C

e)   12°C colder than -2°C is   ....°C

f)   20°C warmer than -8°C is   ....°C

(NPV3, 6 marks)

4   The temperature -20°C is rounded to the nearest 10

-20°C

a)   What is the warmest possible temperature?   ....°C

b)   What is the coldest possible temperature?   ....°C

(NPV4, 2 marks)

5   Calculate

a) 765 × 43

b) 2345 × 67

…………………….

…………………….

(ASMD1, 6 marks)

6   Calculate:

a) 2477 ÷ 15 to one decimal place

b) 943 ÷ 12, expressing any remainders as a fraction

……………………

……………………

(ASMD2, 4 marks)

7   There are 1245 pupils at a school.

A classroom has enough desks for 32 pupils.

What is the smallest number of classrooms needed?
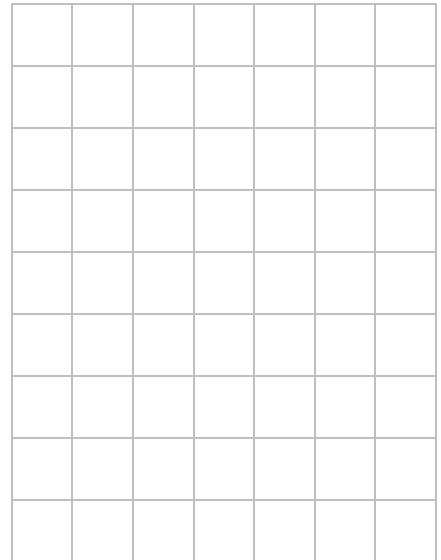
....
(ASMD3, 4 marks)

8   Calculate:

a) 60×40 **c)** $282 \div 3$

....

b) 120×700 **d)** $32\,000 \div 800$

....
(ASMD4, 8 marks)

9 a)   Find the highest common factor of 40 and 24.

....

b)   Find the smallest common multiple of 8 and 20.

....

c)   Find a prime number between 90 and 100.

....
(ASMD5, 5 marks)

10   Calculate:

a) $2 \times 5 + 4$ **c)** $60 \div 6 - 2$

....

b) $2 + 5 \times 4$ **d)** $60 - 6 \div 2$

....
(ASMD6, 8 marks)

11   Two numbers have a difference of 420. One of the numbers is 1747.

a)   What is the other number?

....

b)   Is this the only answer? Explain your answer

(ASMD7, 3 marks)

12   Find the value of Δ:

$$12809 + 4396 = Δ ÷ 15$$

Δ = ...
(ASMD8, 3 marks)

13   Karen is given the calculation 121 879 – 42 398.

She estimates that the answer is 60 000.

Do you agree with Karen? Explain your answer.

(ASMD9, 2 marks)

14   Simplify fully:

   a) $\frac{5}{10} =$

   b) $\frac{3}{12} =$

   c) $\frac{6}{18} =$

   d) $\frac{12}{16} =$

   e) $\frac{15}{40} =$

(F1, 5 marks)

15   Place the fractions in order from smallest to largest:

$$\frac{4}{10} \qquad \frac{1}{2} \qquad \frac{1}{5} \qquad \frac{7}{20} \qquad \frac{8}{8} \qquad \frac{5}{4}$$

(F2, 3 marks)

16   Calculate:

   a) $\frac{1}{2} + \frac{1}{8} =$

   b) $\frac{2}{3} + \frac{1}{4} =$

   c) $\frac{7}{10} - \frac{1}{4} =$

   d) $4\frac{3}{4} - \frac{1}{8} =$

(F3, 9 marks)

17   Calculate, writing the answer in its simplest form:

a) $\frac{1}{4} \times \frac{1}{2} =$

b) $\frac{2}{3} \times \frac{1}{4} =$

c) $\frac{3}{10} \times \frac{2}{5} =$

(F4, 5 marks)

18   Calculate:

a) $\frac{1}{3} \div 2 =$ **b)** $\frac{1}{2} \div 3 =$ **c)** $\frac{6}{10} \div 3 =$

(F5, 3 marks)

19   Two pizzas are shared equally between 3 people.

What fraction does each person receive?

....

(F6, 1 mark)

20   Find the value of Δ in each of these statements:

a) 0.23 × 100 = Δ   **e)** Δ ÷ 10 = 4.7

Δ = ...   Δ = ...

b) Δ × 10 = 1.4   **f)** 56 ÷ 100 = Δ

Δ = ...   Δ = ...

c) Δ × 1000 = 123   **g)** Δ ÷ 1000 = 4.5

Δ = ...   Δ = ...

d) 5.5 × 1000 = Δ   **h)** 4.2 × Δ = 420

Δ = ...   Δ = ...

(F7, 8 marks)

21   Calculate:

a)   0.2 × 4 =

b)   1.5 × 5 =

c)   2.55 × 6 =

(F8, 5 marks)

22   Calculate 2477 ÷ 21 to two decimal places.

....
(F9, 4 marks)

23   £550 is shared equally between 6 friends. How much does each person receive?

£....................
(F10, 3 marks)

24   In the same exam, Matt scored 42% and Dave scored $\frac{2}{5}$.

Who got the highest score?

Explain your answer.

(F11, 2 marks)

25   John and Jean share £60.

John receives 3 times as much as Jean.

How much do John and Jean get?

John: £ ………………….. Jean: £ …………………..

(RP1, 3 marks)

26   Find 15% of 300.

…………………….

(RP2, 3 marks)

27   These two rectangles are similar.

Find the length of the smaller rectangle.

2.5 cm

?

10 cm

16 cm
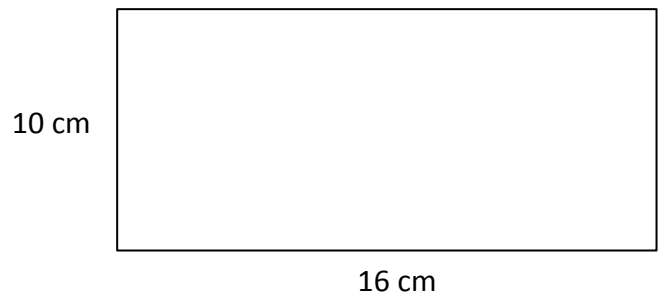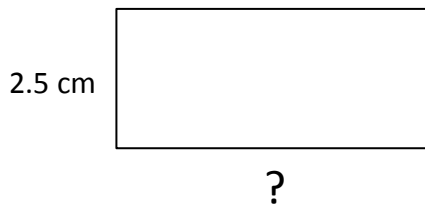
…………………… cm

(RP3, 2 marks)

28 $\frac{2}{5}$ of a piece of rope is 30 centimetres long

What is the full length of the rope?

…………………… cm

(RP4, 3 marks)

29   The perimeter of a rectangle can be calculated using the formula

$$P = 2(a + b)$$

where *a* is the width of the rectangle and *b* is the length of the rectangle.

Using the formula, calculate the perimeter of a rectangle with *a* = 10 cm and *b* = 15 cm.

P = …………………… cm

(AL1, 3 marks)

30   Find the next two terms of these sequences:

a)   2, 5, 8, 11, …………. , ………….

c)   1, 2, 4, 8, …………. , ………….

b)   20, 17, 14, 11, …………. , ………….

d)   2, 5, 9, 14, …………. , ………….

(AL2, 4 marks)

31   Which of the following algebraic statements correctly describes the following problem?

'four times a number and add 5 to get the answer 17'

Tick the one that does.

5n + 4 = 17   4n + 5 = 17   n⁴ + 5 = 17

(n + 4)⁵ = 17   4(n + 5) = 17

(AL3, 1 mark)

32 A and B are whole numbers.

$$A + B = 25$$

           A is a one-digit number.

           B is a two-digit number.

           Find all the possible values for A and B.

(AL4, 3 marks)

33 x and y are variables.

$$x + y = 4$$

           Find 5 different possibilities for x and y.

x	y

(AL5, 2 marks)

34   Josh is trying to run 10 kilometres in one week.

Here are the distances he runs on the first three days:

Day 1: 1.6 kilometres

Day 2: 850 metres

Day 3: 2.12 kilometres

How much further does he have to run?

....

(M1, 3 marks)

35   Are these statements true (T) or false (F)?

a)   2.54 km = 254 m   ………   **d)**   2542 g = 2.542 kg   ………

b)   254 cm = 2.54 m   ………   **e)**   2.543 litres = 254.3 ml   ………

c)   4320 mm = 43.2 cm   ………   **f)**   1200 cm = 1.2 m   ………

(M2, 6 marks)

36   Complete the statements:

a)   5 miles is approximately ………… km

b)   40 kilometres is approximately ………… miles

(M3, 2 marks)

37   Is it true (T) or false (F) that a rectangle with the same area can have a different perimeter?

Explain your answer.

(M4, 1 mark)

38   Calculate the area of this shape:

15 cm

12 cm

8 cm

20 cm
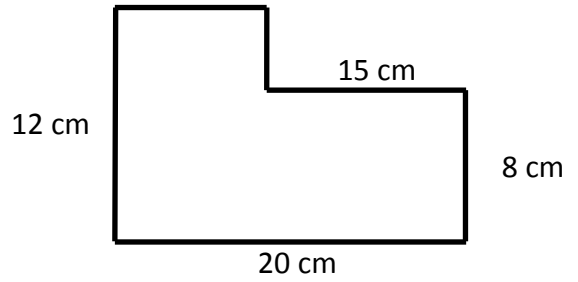
.... cm^2

(M5, 3 marks)

39   Find the area of these shapes

a)

8 cm

4 cm   5 cm

b)

4 cm

13 cm   12 cm

.... cm^2 .... cm^2

c)

12 cm   15 cm

9 cm

d)

5 cm

4 cm

10 cm
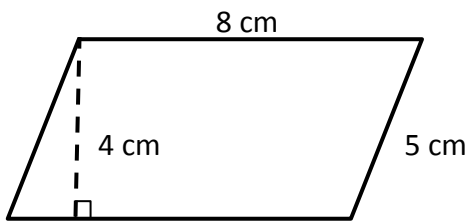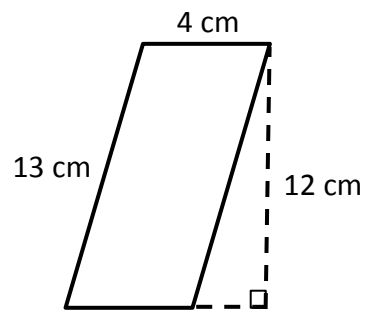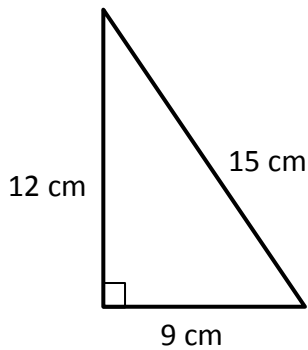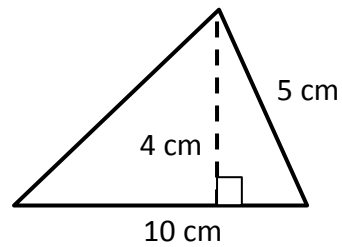
.... cm^2 .... cm^2

(M6, 4 marks)

40   Which has the greatest volume?

Tick the one that does

A
Cube of side 6 m

B
Cuboid
5 m × 6 m × 8 m
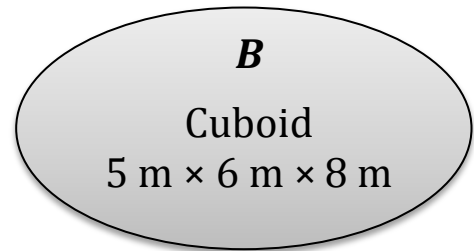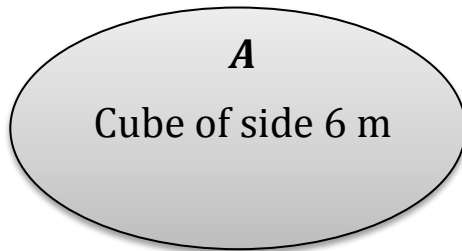
Explain your answer.

(M7, 3 marks)

41   Here is a sketch of a triangle:

Draw an accurate full size diagram of the triangle.

5 cm

50°

8 cm
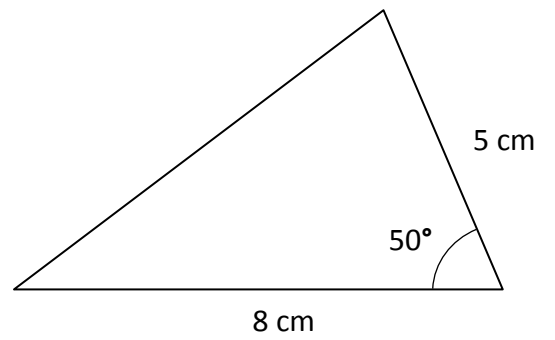
(GPS1, 3 marks)

42   Here are the nets of four 3-D shapes. Name the 3-D shape in each case.

a)
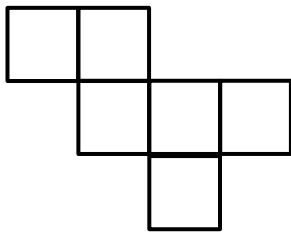
c)

……………………………………………

……………………………………………
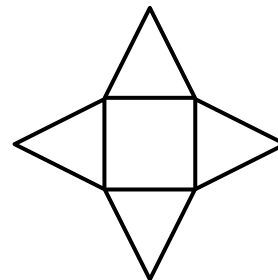
b)
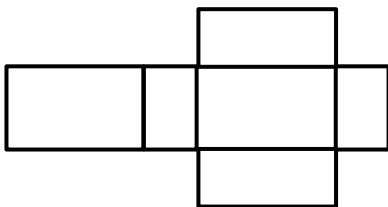
d)

……………………………………………

……………………………………………
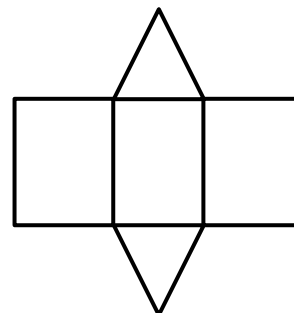
(GPS2, 4 marks)

43   Find the value of the missing angle in each diagram

a)

82°

34°   a

........................°

b)

x

42°

........................°

c)

75°

y

........................°
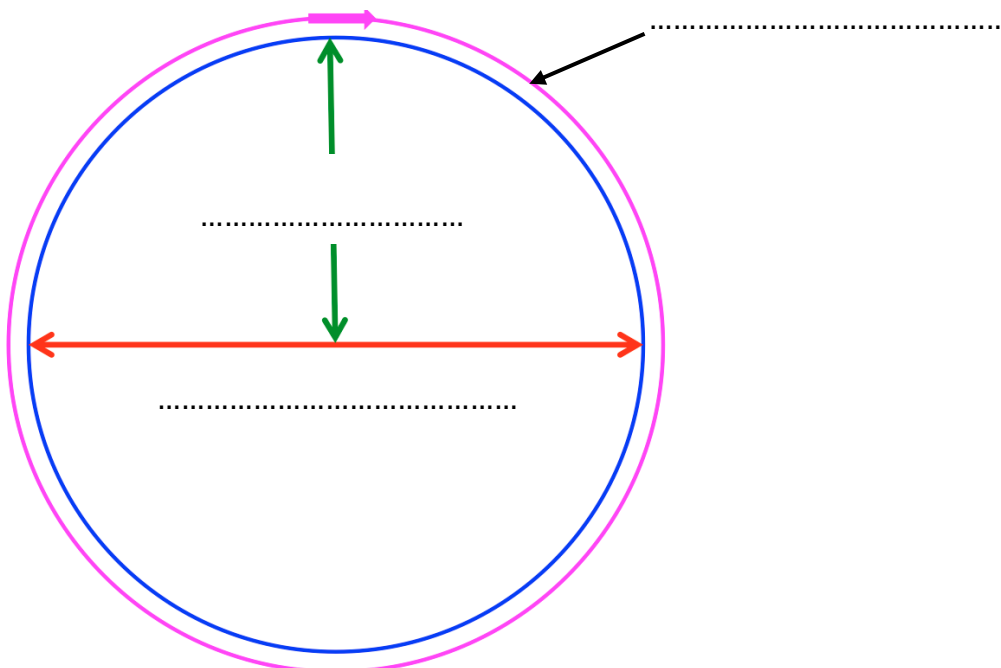
d)

120°

60°   b

........................°
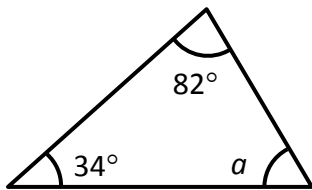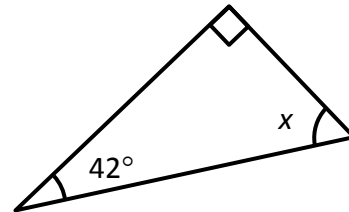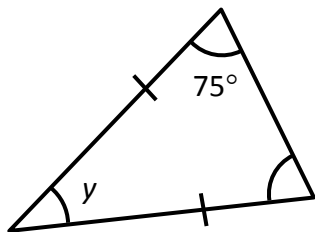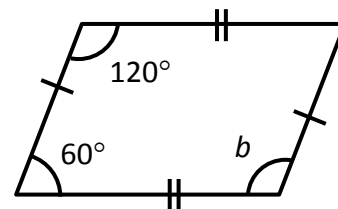
(GPS3, 8 marks)

44 a) Label the parts of the circle.

....

....

....

b) Complete the statement:

The ………………………………… of a circle = 2 × the ………………………………… of a circle
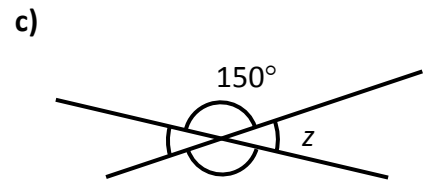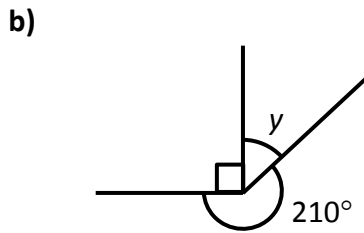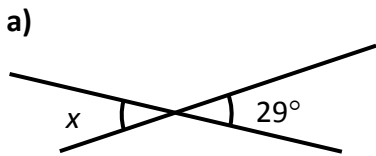
(GPS4, 4 marks)

45   Find the size of the angle labelled angle in these diagrams

a)   **b)**   **c)**

x 29° y 210°   150° z

…………………° 　　　　　　…………………° 　　　　　　…………………°

(GPS5, 5 marks)

46   Find the co-ordinates of all the points.

A(…….. , ……..)   E(…….. , ……..)

B(…….. , ……..)   F(…….. , ……..)

C(…….. , ……..)   G(…….. , ……..)

D(…….. , ……..)
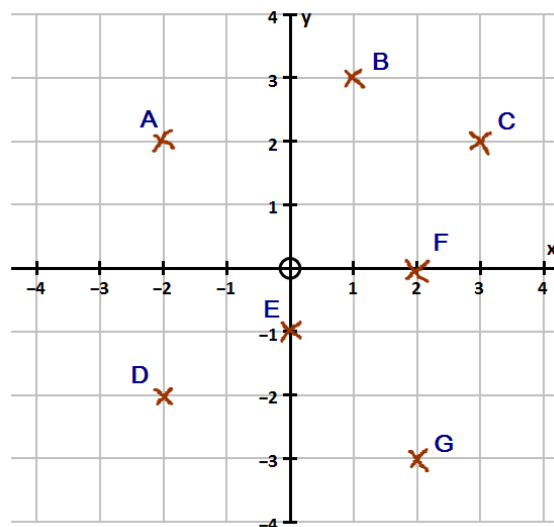
(GPD1, 7 marks)

47   Look at the triangle on the grid

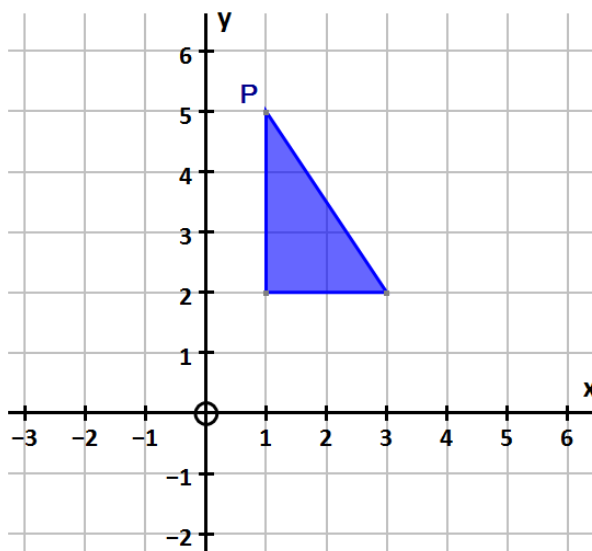**a)**   Ken translates the triangle 3 square to the left
and four squares down.

Find the new co-ordinates of vertex P.

…………………………

b)   Judy reflects the triangle in the x-axis.

Find the new co-ordinates of vertex P.

…………………………

(GPD2, 2 marks)
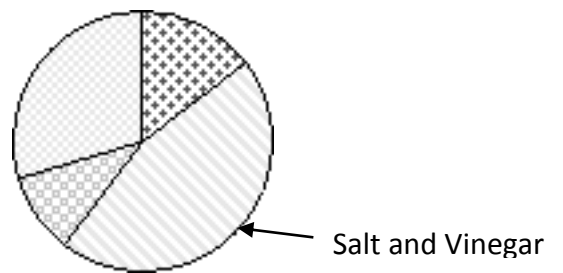
48 **a)** Amanda is drawing a pie chart for this data.

Calculate the angle for each category.

Eye colour	Frequency	Angle
Brown	12	
Blue	3	
Green	6	
Mixed	3	

b) 32 pupils were asked to name their favourite flavor of crisp.

The pie chart represents the results.

Estimate the number of pupils who selected salt and vinegar.

Salt and Vinegar

………………..

(S1, 3 marks)

49 **a)** Calculate the mean of: 1, 5, 3, 5, 6

………………..

b) Find 4 different numbers with a mean of 6.

…………, …………, …………, …………
(S2, 4 marks)

Number and Place Value	+ and − × and ÷	Fractions, Decimals & %s	Ratio and Proportion	Algebra	Measure-ment	Properties of Shapes	Position & Direction	Statistics
NUMBER						GEOMETRY		

NOT GOT IT YET?

Key topics I need to work on: