Indicazione di attività di preparazione al corso di matematica
per le future classi prime sezioni C,F
IGCSE Mathematics

(l'attività non è obbligatoria, ma consigliata per consolidare i prerequisiti utili per affrontare il primo anno di corso del liceo)

Svolgi i seguenti esercizi e ripassa gli argomenti che non ricordi. Non preoccuparti se ci sono alcuni esercizi che non riesci a svolgere

Part A

Courtesy of: *Pixi* M A T H S

Types of Numbers

Things to remember:
- A **factor** is a whole number that divides exactly into another number.
- A **multiple** is a number that may be divided by another a certain number of times without a remainder.
- A **prime number** only has 2 factors – 1 and itself.
- A **power** tells us how many times the base number has been multiplied by itself
- A **root** is the opposite of a power.
- A **square number** is the result of multiplying an integer (whole number) by itself.

Questions:
1. (a) Write down the square of 8

       ……………………..
       (1)

   (b) Write down the value of 10^3

       ……………………..
       (1)

   (c) Estimate the value of $\sqrt{20}$

       ……………………..
       (1)
       (Total for Question is 3 marks)

2. Here is a list of eight numbers: 4   5   4   25   29   30   33   39   40
   From the list, write down
   (i) a factor of 20

       ……………………..

   (ii) a multiple of 10

       ……………………..

   (iii) the prime number that is greater than 15

       ……………………..
       (Total for Question is 3 marks)

3. Express 180 as a product of its prime factors.

       …..
       (Total for Question is 3 marks)

4. (a) Write down the value of $\sqrt{81}$

   (b) Work out the value of $5^2 + 2^3$

……………………..
(2)
(Total for Question is 3 marks)

5. Here is a list of numbers.
   2   3   5   8   10   16   21   24
   From the numbers in the list,

   (a) write down an odd number

……………………..
(1)

   (b) write down the square number

……………………..
(1)

   (c) write down the number which is a multiple of 6

……………………..
(1)
(Total for Question is 3 marks)

6. Here is a list of numbers.
   1   2   4   5   7   11   13   14   15   17
   From the list, write down three different prime numbers that add together to make 20

Place value

Things to remember:

Label columns as below

Thousands	Hundreds	Tens	Units	•	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

Questions:

1. (a) Write the number **seven thousand and twenty five** in figures.

…..

(1)

(b) Write the number 9450 in words.

…………………………………………………………………………………..

(1)

(c) Write the number 28.75 to the nearest whole number.

…..

(1)

(d) Write the number 7380 to the nearest thousand.

…..

(1)

(Total for Question is 4 marks)

2. (a) Work out $90 \div 10$

…..

(1)

(b) Write these numbers in order of size. Start with the smallest number.

2.8   4.71   0.6   13.4

…………………………………………………………………………………..

(1)

(c) Write $\frac{7}{10}$ as a decimal.

…..

3. (a) Write these numbers in order of size. Start with the smallest number.

3007   4435   399   4011   3333

…………………………………………………………………………………..

(1)

(b) Write these numbers in order of size. Start with the smallest number.

3.7   5.62   0.7   14.3

………………………………………………………………………………..

(b) Write $\frac{4}{5}$ as a decimal.

…..

4

4. Here are four cards. There is a number on each card.

| 4 | 5 | 2 | 1 |

(a) Write down the largest 4-digit even number that can be made using each card only once.

....

(2)

(b) Write down all the 2-digit numbers that can be made using these cards.

....

(2)

**(Total for question is 4 marks)**

Directed Numbers

Things to remember:
- Mixed means minus!
- Use a number line – if you're adding you need to move in a positive direction (right), if you're subtracting you need to move in a negative direction (left).
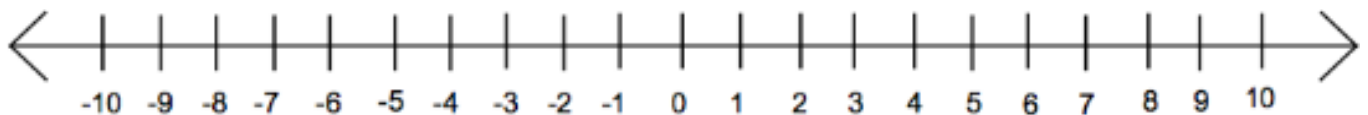
Questions:

1. Here is a map of the British Isles.
The temperatures in some places, one night last winter are shown on the map.

Edinburgh –7 °C

Belfast –4 °C

London 3 °C

Cardiff –6 °C

Plymouth 5 °C
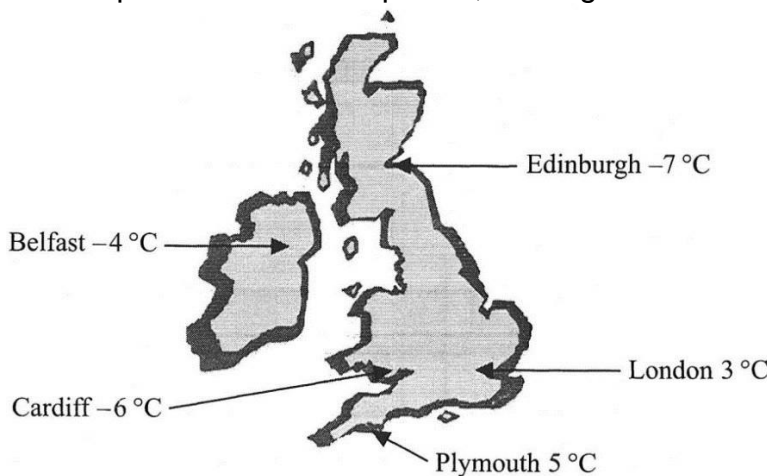
(a) (i) Write down the names of the two places that had the biggest difference in temperature.

....

....

(ii)   Work out the difference in temperature between these two places.

…........................°C

(3)

(b)   Two pairs of places have a difference in temperature of 2 °C.
Write down the names of these places.
(i)   ….......................... and …..............................
(ii)   ….......................... and …..............................

(2)
(Total 5 marks)

2.   The table shows the temperature on the surface of each of five planets.

Planet	Temperature
Venus	480 °C
Mars	– 60 °C
Jupiter	– 150 °C
Saturn	– 180 °C
Uranus	– 210 °C

(a)   Work out the difference in temperature between Mars and Jupiter.

…........................°C

(1)

(b)   Work out the difference in temperature between Venus and Mars.

…........................°C

(1)

(c)   Which planet has a temperature 30 °C higher than the temperature on Saturn?

…...

(1)

The temperature on Pluto is 20 °C lower than the temperature on Uranus.

(d)   Work out the temperature on Pluto.

…........................°C

(1)
(Total 4 marks)

3.   Mr Snow stayed some time at the South Pole.

The highest temperature there was –30 °C.
The lowest temperature there was –57 °C.

(a)   Work out the difference between the highest temperature and the lowest temperature at the South Pole.

…........................°C

(1)

Mr Snow returned to his house in London.
The temperature outside his house was –2 °C.
The temperature inside his house was 12 °C higher.

(b)   Work out the temperature inside his house.

…........................°C

(1)

Coordinates

Things to remember:
Along the corridor, up the stairs → (x,y)

Questions:

1. (a) Write down the coordinates of the point *P*.

(…......... , …........)

(1)

(b) (i) On the grid, plot the point (0, 3). Label the point *Q*.

(ii) On the grid, plot the point (–2, –3).Label the point *R*.
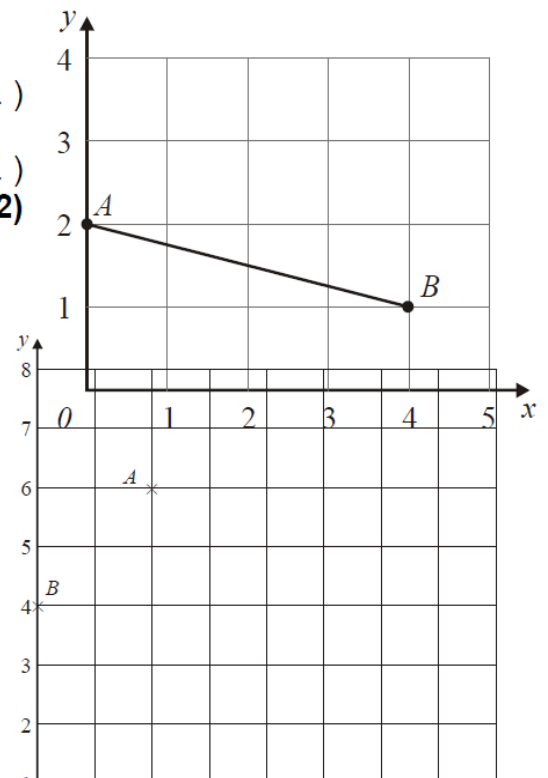
(2)

(Total 3 marks)
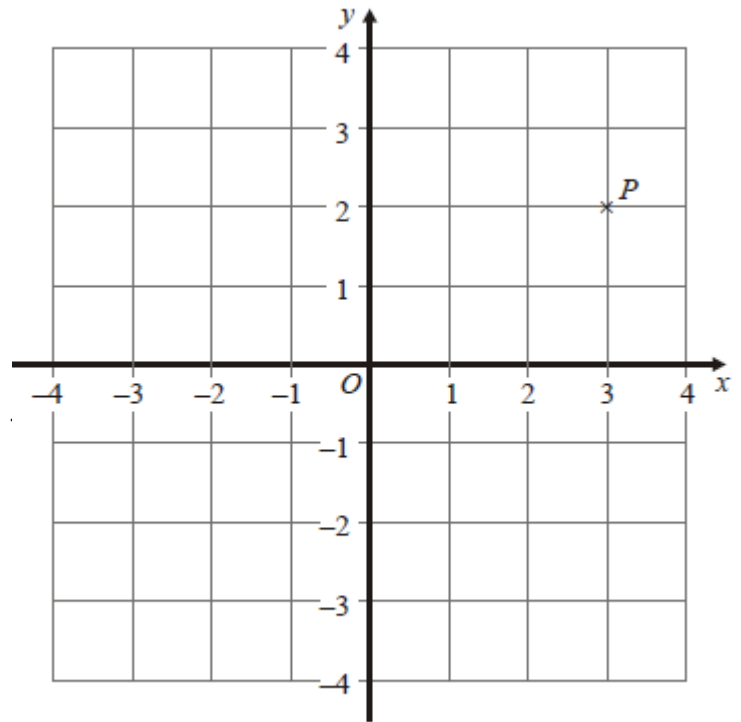
2. (a) Write down the coordinates of the point

(i) *A*,

(…......... , …........)

(ii) *B*.

(…......... , …........)

(2)

(b) On the grid, mark with a cross (×) the midpoint of the line *AB*.

(1)

(Total 3 marks)

3. (a) (i) Write down the coordinates of the point A.

(…...............,…............)

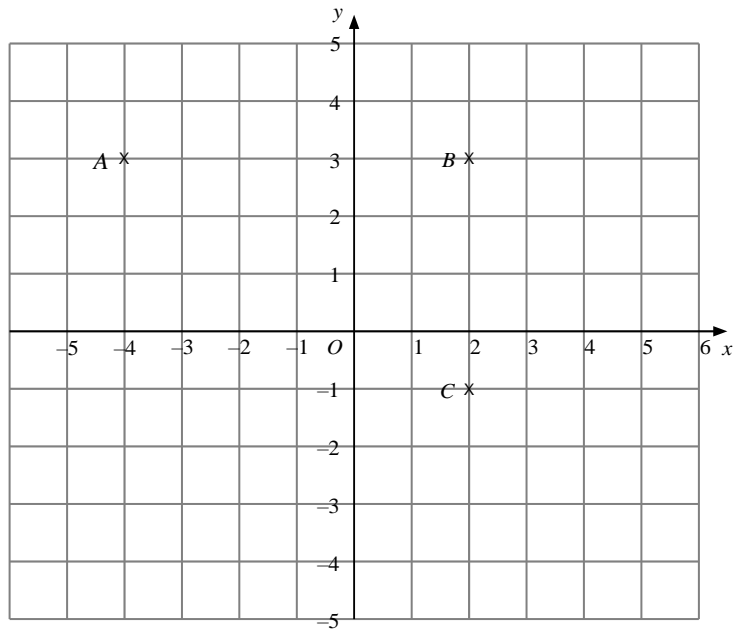(ii) Write down the coordinates of the point *B*.

(…...............,…............)

(2)

(b) (i) On the grid, mark the point (6, 4) with the letter *P*.

(ii) On the grid, mark the point (3, 0) with the letter *Q*.

(2)

(Total 4 marks)

4. (a) Write down the coordinates of the point

   (i)   *A*,

   (............ , ...)

   (ii) *C*.

   (............ , ...)

   (2)

   (b) (i) On the grid, mark the point *D* so that *ABCD* is a rectangle.

   (ii) Write down the coordinates of *D*.

   (............ , ...)

   (2)

   (Total 4 marks)

5. (a) Write down the coordinates of the point *P*.

   (............ , ...)

   (1)

   (b) Write down the coordinates of the point *R*.

   (............ , ...)

   (1)

   P, *Q* and *R* are three vertices of a parallelogram.

   (c) Write down the coordinates of the fourth vertex of this parallelogram.

   (............ , ...)

   (1)

   (Total for Question is 3 marks)
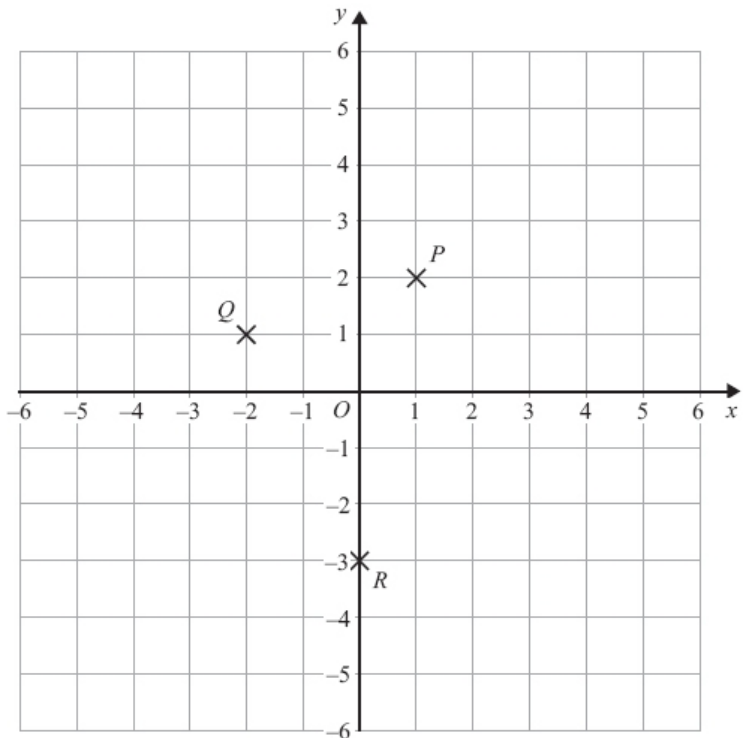
Collecting Like Terms (Simplifying)

Things to remember:

a. 2a means a + a or 2 lots of a

b. a² means a x a

c. The sign (+ or -) belongs to the term following it. You may find it easier to identify like terms using two different highlighters.

Questions:

1. (a) Simplify $a + a + a + a$

…..

(1)

(b) Simplify $3 \times c \times d$

…..

(1)

(c) Simplify $3ef + 5ef - ef$

…..

(1)

(Total for Question is 3 marks)

2. (a) Simplify $b + 2b$

…..

(1)

(b) Simplify $8n - 3n$

…..

(1)

(c) Simplify $3 \times c \times d$

…..

(1)

(d) Simplify $3x + 7y + 2x - y$

…..

(2)

(Total for Question is 5 marks)

3. Simplify $3x + 5y + x + 4y$

…..

(Total for Question is 2 marks)

4. (a) Simplify $a \times c \times 3$

....
(1)

(b) Simplify $p \times p \times p$

....
(1)

(c) Simplify $5x - 4y + 3x - 3y$

....
(2)
(Total for Question is 4 marks)

5. (a) Simplify $5a - 2a$

....
(1)

(b) Simplify $3 \times 4y$

....
(1)

(c) Simplify $3e + 4f + 2e - f$

....
(1)

(d) Simplify $9e - 2e$

....
(1)

(e) Simplify $5 \times 3g$

....
(2)
(Total for Question is 6 marks)

Solving Linear Equations

Things to remember:
- "Solve" means to find the value of the variable (what number the letter represents).
- The inverse of + is – and the inverse of $\times$ is $\div$
- Work one step at a time, keeping you = signs in line on each new row of working.

Questions:

1. (a) Solve $6g = 18$

$g = \dots\dots\dots\dots\dots\dots$

(1)

(b) Solve $5h + 7 = 17$

$h = \dots\dots\dots\dots\dots\dots$

(2)

(Total for Question is 3 marks)

2. (a) Solve $x + 9 = 19$

$x = \dots\dots\dots\dots\dots\dots$

(1)

(b) Solve $2y = 17$

$y = \dots\dots\dots\dots\dots\dots$

(1)

(c) Solve $w/4 = 8$

$w = \dots\dots\dots\dots\dots\dots$

(1)

(Total for Question is 3 marks)

3. (a) Solve $\dfrac{n}{7} = 2$

$n = \dots\dots\dots\dots\dots\dots$

(1)

(b) Solve $3g + 4 = 19$

$g = \dots\dots\dots\dots\dots\dots$

(2)

(Total for Question is 3 marks)

4.   (a)   Solve $4x = 20$

$x =$ . . . .
(1)

(b) Solve $y - 9 = 17$

$y =$ . . . .
(1)
(Total for question = 2 marks)

5.   Solve $3x + 7 = 1$

$x =$ . . . .
(Total for question = 2 marks)

6.   Solve $4x + 5 = x + 26$

$x =$ . . . .
(Total for question = 2 marks)

Types of Shapes and their Properties

Things to remember:
- Sides and vertices belong on 2D shapes.
- Edges, faces and vertices belong on 3D shapes.

Questions:
1.   Here is a triangular prism.
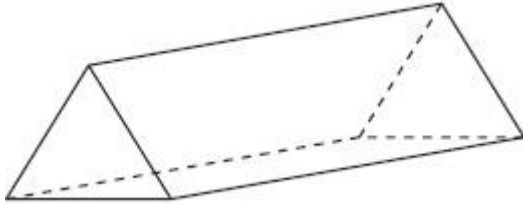
(a)   For this prism, write down
(i)   the number of edges

....

(ii)   the number of faces

....

(2)

Here is a net of the triangular prism.

P
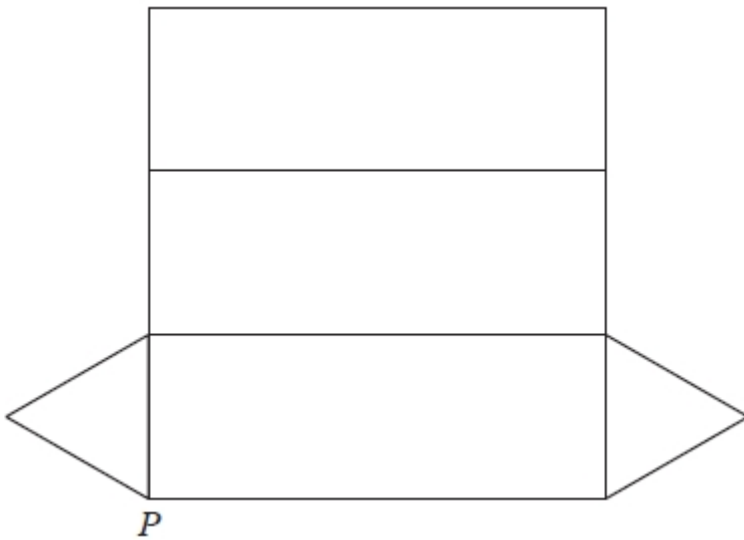
The net is folded to make the prism.
One other point meets at *P*.
(b)   Mark this point on the net with the letter *P*.

(1)
(Total for Question is 3 marks)

2. Here is a cuboid.
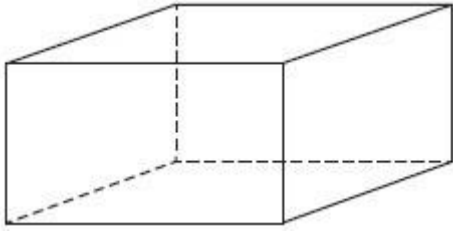
The following sentences are about cuboids.

Complete each sentence by writing the correct number in the gap.

(i)   A cuboid has.................................. faces.

(ii)   A cuboid has.................................. edges.

(iii)   A cuboid has.................................. vertices.

(Total for Question is 3 marks)

3. (b)   Here is a quadrilateral.

Write down the special name of this quadrilateral.

....

(1)

(Total for Question is 2 marks)

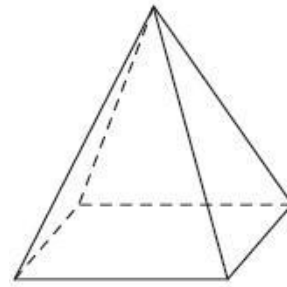**4.** Draw a sketch of a pentagon.

(Total for Question is 1 marks)
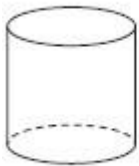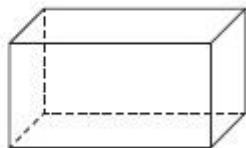
5. Write down the name of each of these 3-D shapes.
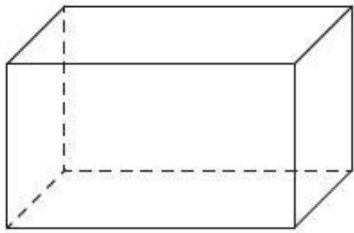
(i) .... (ii) ....
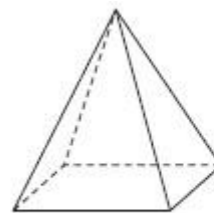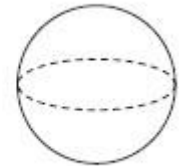**(Total for Question is 2 marks)**

6. Here are some solid 3-D shapes.
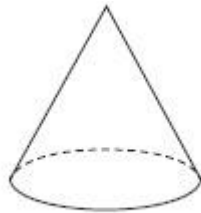
A   B   C   D   E

(a) Write down the letter of the shape that is a sphere.

....
(1)

(b) Write down the mathematical name of shape **A**.

....
(1)

(c) How many faces does shape **B** have?

....
(1)

(d) How many edges does shape **D** have?

....
(1)
(Total for Question is 4 marks)

8. Here is a list of the names of five types of quadrilateral.

Trapezium   Parallelogram   Square   Rhombus   Rectangle

(a) From the list, write down the names of two quadrilaterals which must have all four sides the same length.

.... and ....
(1)

(b) From the list, write down the name of the quadrilateral that has only one pair of parallel sides.

....
(1)

For one of these quadrilaterals: the corners are not right angles,
                                     the quadrilateral has rotational symmetry of order 2
                         and   the diagonals cross at right angles.

(c)   Write down the name of this quadrilateral.

....

(1)

(Total for Question is 3 marks)

Simplifying Fractions and Fractions of Amounts

- Divide both the numerator (top) and denominator (bottom) of the fraction by the same factor until in its simplest form.
- To find a fraction of an amount, divide the amount by the denominator, then multiply by the numerator.

Questions:

1.   Sam has £480
          He spends ¼ of the £480
          Work out how much money Sam has left.

£ ....

(Total for Question is 3 marks)

2.   The normal price of a denim shirt at a shop is £9.60

          On Special Offer Day, there is $\frac{1}{3}$ off the normal price.

Special Offer Day

$\frac{1}{3}$ off normal prices

Billy has £13
Has he enough money to buy two denim shirts on Special Offer Day?
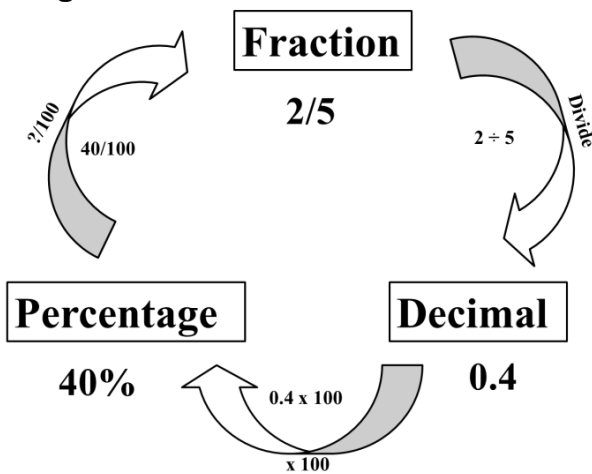You must show all your working.

(Total for Question is 4 marks)

3. Write 35 out of 65 as a fraction.
Give your fraction in its simplest form.

....
(Total for question = 2 marks)

Fractions, Decimals and Percentages

Things to remember:

Questions:

1. (a) Write 0.1 as a fraction.

....
(1)

(b) Write ¼ a decimal.

....
(1)
(Total for Question is 2 marks)

2. (a) Write $\frac{1}{4}$ as a decimal.

....
(1)

(b) Write 0.15 as a fraction.

....
(1)

(c) Write 17 out of 40 as a fraction.

....
(1)
(Total for question = 3 marks)

3. (a) Write $^7/_{10}$ as a decimal.

....

(1)

(b) Write 0.45 as a percentage.

....

(1)

(c) Write 30% as a fraction.
Give your fraction in its simplest form.

....

(2)
(Total for Question is 4 marks)

4. (a) Write 0.7 as a fraction.

....

(1)

(b) Write 0.3 as a percentage.

....

(1)

(c) Write $^8/_{12}$ in its simplest form.

....

(1)
(Total for Question is 3 marks)

5. Write these numbers in order of size. Start with the smallest number.

75% $\dfrac{7}{8}$ 0.25 $\dfrac{1}{2}$ $\dfrac{2}{3}$

....
(Total for question = 2 marks)

6. Write these numbers in order of size. Start with the smallest number.

0.6 $\dfrac{2}{3}$ 65%   0.606

....
(Total for question = 2 marks)

7. Celina and Zoe both sing in a band.
One evening the band plays for 80 minutes.
Celina sings for 65% of the 80 minutes.

Zoe sings for $\dfrac{5}{8}$ of the 80 minutes.

Celina sings for more minutes than Zoe sings.
Work out for how many more minutes.
You must show all your working.

.... minutes

(Total for question = 4 marks)

Part B

HCF and LCM (Massimo Comun Divisore e Minimo Comune Multiplo)

Things to remember:
- A factor is a whole number that divides exactly into another number.
- A multiple is a number that may be divided by another a certain number of times without a remainder.
- A prime number only has 2 factors – 1 and itself.
- HCF is an abbreviation of Highest Common Factor and LCM of Lowest Common Multiple.

Questions:

1. Find the highest common factor (HCF) of 32, 48 and 72

....
(Total for question = 2 marks)

2. Write 504 as a product of powers of its prime factors.

....
(Total for question = 3 marks)

20

3. John buys some boxes of pencils and some packets of pens for people to use at a conference.

There are 40 pencils in a box.

There are 15 pens in a packet.

John gives one pencil and one pen to each person at the conference.

He has no pencils left.

He has no pens left.

How many boxes of pencils and how many packets of pens did John buy?

.... boxes of pencils

.... packets of pens

(Total for question = 3 marks)

Laws of Indices

Things to remember:
- The exam question will use the word "simplify"
- When multiplying, add the indices
- When dividing, subtract the indices
- With brackets, multiply the indices
- If the exam question has the words "work out the value of", or "evaluate" it means the answer is a number.
- Anything to the power zero is 1
- Anything to the power one is itself

Questions:

1. (a) Write down the value of $\sqrt{81}$

....

(1)

(b) Work out the value of $5^2 + 2^3$ ....

(2)

(Total for Question is 3 marks)

2. (a) Simplify $a^4 \times a^5$ ....

(1)

(b) Simplify $5^4 \times 5^6$ .... **(2)**

3. Simplify $7^5 \div 7^2$

....
(1)

4. (a) Work out 3^4

....
(1)

(b) Write down the cube root of 64

....
(1)
(Total for Question is 2 marks)

Rounding

Things to remember:
- If the next number is less than 5, round down.
- If the next number is 5 or more, round up.

Questions:
1. Write the number 2.738 correct to 2 decimal places.

....
(Total for Question is 1 mark)

2. (a) Write the number 28.75 to the nearest whole number.

....
(1)

(b) Write the number 7380 to the nearest thousand.

....
(1)
(Total for Question is 2 marks)

3. Write down 157 correct to the nearest 10

....
(Total for Question is 1 mark)

4. Write 6431 to the nearest thousand.

....
(Total for Question is 1 mark)

5. Write 6718 correct to the nearest hundred.

....
(Total for Question is 1 mark)

Expanding and Factorising (Single Brackets)

Things to remember:
  a. Expand brackets means to multiply what is outside the bracket with everything inside the bracket.

Questions:

1. (a) Expand $5(m + 2)$

....
(1)

  (c) Simplify $a^5 \times a^4$

....
(1)

2. (a) Expand $2m(m + 3)$

....
(1)

3. (a) Expand $3(x + 4)$

....
(1)

  (b) Expand $x(x^2 + 2)$

....
(2)

4. (a) Expand and simplify $5(x + 7) + 3(x - 2)$

....
(2)

Solving Equations

Things to remember:

"Solve" means to find the value of the variable (what number the letter represents).
- The inverse of + is – and the inverse of x is ÷
- Work one step at a time, keeping you = signs in line on each new row of working.

Questions:

1. Solve $4(x-7)=12$

$x =$………………………
(Total 2 marks)

2. (a) Solve $6x - 7 = 38$

$x =$ ....
(2)

(b) Solve $4(5y - 2) = 40$

$y =$ ....
(3)
(Total 5 marks)

3. Solve
$4(y + 1) = 2y + 8$

$y=$………………………
(Total 2 marks)

4. Solve $4y + 2 = 2(y + 5)$

$y=$ ....
(Total 2 marks)

Circles

Things to remember:

    a. πr² sounds like area to me, when I need the circumference I'll just use πD.
    b. Read the question carefully and check if you are being asked to find circumference or area and whether they have given you the radius or the diameter.
   c. Remember the diameter is twice the radius.

Questions:

1. The diameter of a wheel on Harry's bicycle is 0.65 m.
Calculate the circumference of the wheel.
Give your answer correct to 2 decimal places.
Diagram NOT accurately drawn

0.65 m
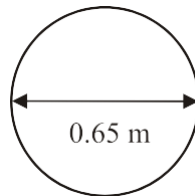
.... m
(Total 2 marks)

2. Diagram NOT accurately drawn
The radius of this circle is 8 cm.
Work out the circumference of the circle.
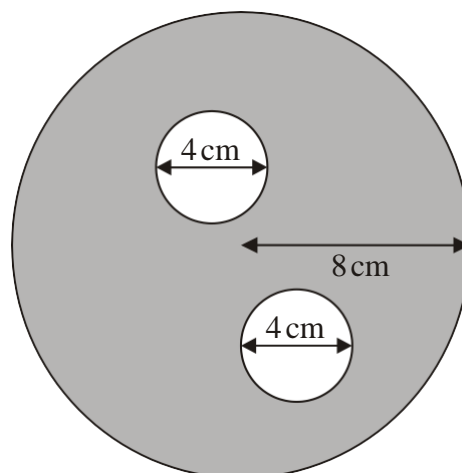Give your answer correct to 2 decimal places.

8 cm
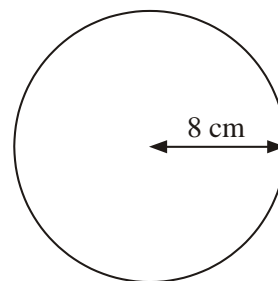
……………………………… cm²
(Total 2 marks)

4. A circle has a radius of 6.1 cm.
Work out the area of the circle.

6.1 cm
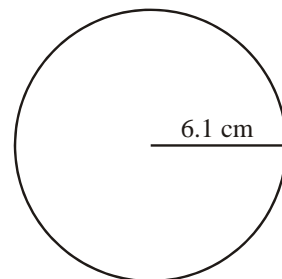
....
(Total 3 marks)

6. The diagram shows two small circles inside a large circle.
The large circle has a radius of 8 cm.
Each of the two small circles has a diameter of 4 cm.
(a) Write down the radius of each of the small circles.

4 cm

8 cm

4 cm

.... cm
(1)

(b) Work out the area of the region shown shaded in the diagram.
Give your answer correct to one decimal place.

.... cm²
(4)
(Total 5 marks)

Area Problems

Things to remember:
- Area of a rectangle = base x height
- Area of a triangle = ½ x base x height
- Area of a parallelogram = base x height
- Area of a trapezium = ½ (a + b) x h, where a and b are the parallel sides and h is the height
- The perimeter is the distance around the edge of the shape

Questions:
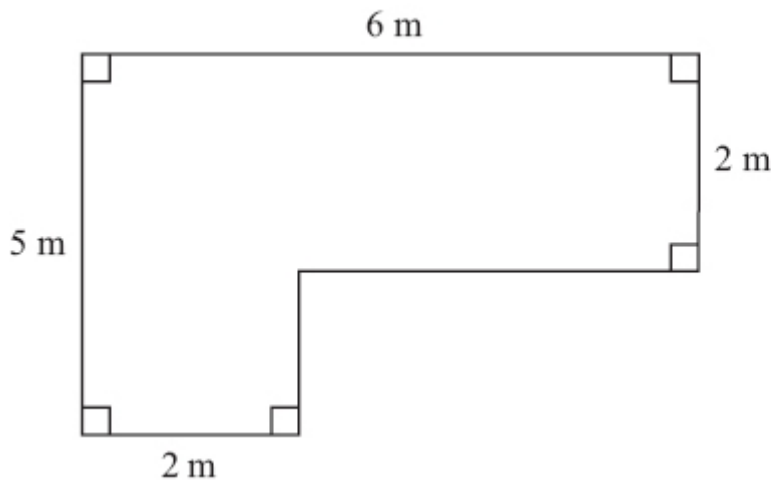**1.** The diagram shows the plan of Mrs Phillips' living room.

Diagram **NOT**
accurately drawn

6 m

2 m

5 m

2 m

Mrs Phillips is going to cover the floor with floor boards.
One pack of floor boards will cover 2.5 m².
How many packs of floor boards does she need?
You must show your working.

(Total for Question is 4 marks)

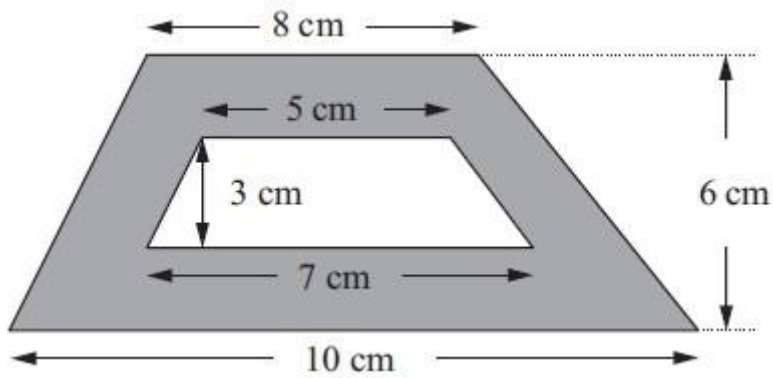**2.** A piece of card is in the shape of a trapezium.

Diagram **NOT** accurately drawn

A hole is cut in the card.
The hole is in the shape of a trapezium.
Work out the area of the shaded region.

. . . . cm^2
(Total for Question is 3 marks)

Recipes

Questions:

1. This is a list of ingredients for making a pear & almond crumble for 4 people.

Ingredients for **4** people.
80 g plain flour
60 g ground almonds
90 g soft brown sugar
60 g butter
4 ripe pears

Work out the amount of each ingredient needed to make a pear & almond crumble for **10** people.

.... g plain flour

.... g ground almonds

.... g soft brown sugar

.... g butter

.... ripe pears

(Total 3 marks)

2. Here are the ingredients needed to make 500 ml of custard.

Custard
makes 500 ml
400 ml of milk
3 large egg yolks
50 g sugar
2 teaspoons of cornflour

(a) Work out the amount of sugar needed to make 2000 ml of custard.

……………………g

(2)

(b) Work out the amount of milk needed to make 750 ml of custard.

…………………ml

(2)

(Total 4 marks)

Percentages of Amounts, Increasing and Decreasing

Things to remember:
- "Per cent" means "out of 100".
- Increase means the value will go up, decrease means the value will go down.

Questions:

1. David is going to buy a cooker.
The cooker has a price of £320
David pays a deposit of 15% of the price of the cooker.
How much money does David pay as a deposit?

£ ....

(Total for Question is 2 marks)

2. Work out 65% of 300

....

(Total for question = 2 marks)

3. Barak is going to buy 550 nails from one of these companies.

Nail Company	Hammer Company
50 nails	25 nails
£4.15 plus VAT at 20%	£2.95
	Special offer Buy 100 get 25 free

He wants to buy the nails at the cheaper cost.
Where should he buy the nails, from the Nail Company or the Hammer Company?

(Total for question = 5 marks)

4. Jim's pay is £180 each week.
Jim asks his boss for an increase of £20 a week.
Jim's boss offers him a 10% increase.
Is the offer from Jim's boss more than Jim asked for?
You must show your working.

(Total for Question is 3 marks)

Remember: Do your best, it is all you can do ☺