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73

**Year 10 Higher End of Year Assessment**

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

**1** Find the Lowest Common Multiple (LCM) of 120 and 144

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**(Total for Question 1 is 3 marks)**

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**2** There are 90 people at a party.

Half of the people at the party are women.

The number of women at the party is 3 times the number of men at the party.

The rest of the people at the party are children.

 the number of children at the party : the number of men at the party = *n* : 1

Work out the value of *n*.

You must show how you get your answer.

*n* = .......................................................

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

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**3** Work out 1 × 1

Give your answer as a mixed number.

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**(Total for Question 3 is 3 marks)**

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**4** The diagram shows triangle *ABC*.

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53°

*ADB* is a straight line.

the size of angle *DCB* : the size of angle *ACD* = 3 : 1

Work out the size of angle *BDC*.

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

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**5** 6 red bricks have a mean weight of 7 kg.

4 blue bricks have a mean weight of 8 kg.

2 green bricks have a mean weight of 5 kg.

Elisa says,

 “The mean weight of the 12 bricks is less than 7 kg.”

Is Elisa correct?

You must show how you get your answer.

**(Total for Question 5 is 3 marks)**

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**6** (*a*)Simplify (*p*3)4

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**(1)**

(*b*)Simplify 16*x*8*y*5 ÷ 4*x*5*y*

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**(2)**

**(Total for Question 6 is 3 marks)**

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**7** A van travels for 25 minutes at an average speed of 84 km/h.

(*a*)How far will the van travel in these 25 minutes?

....................................................... km

**(2)**

Kevin says,

“84 kilometres per hour is faster than 25 metres per second.”

(*b*)Is Kevin correct?

 You must show how you get your answer.

**(2)**

**(Total for Question 7 is 4 marks)**

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**8** The cumulative frequency table shows information about the times, in minutes, taken by

40 people to complete a puzzle.

|  |  |
| --- | --- |
| **Time (*m* minutes)** | **Cumulative frequency** |
| 20 < *m* ≤ 40 | 5 |
| 20 < *m* ≤ 60 | 25 |
| 20 < *m* ≤ 80 | 35 |
| 20 < *m* ≤ 100 | 38 |
| 20 < *m* ≤ 120 | 40 |

(*a*)On the grid below, draw a cumulative frequency graph for this information.



**(2)**

(*b*)Use your graph to find an estimate for the interquartile range.

....................................................... minutes

**(2)**

One of the 40 people is chosen at random.

(*c*)Use your graph to find an estimate for the probability that this person took between

 50 minutes and 90 minutes to complete the puzzle.

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**(2)**

**(Total for Question 8 is 6 marks)**

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**9** There are *p* marbles in a bag.

18 of the marbles are red.

Mary takes at random 40 marbles from the bag.

6 of these 40 marbles are red.

Work out an estimate for the value of *p*.

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**(Total for Question 9 is 2 marks)**

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**10** *P* =  × 5

Here is Olivia’s method to make *v* the subject of the formula.

5 × *P* = 

*v* = 2(*P* × 5)

What mistake did Olivia make in the first line of her method?

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**(Total for Question 10 is 1 mark)**

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**11** (*a*)Write  +  as a single fraction in its simplest form.

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**(2)**

(*b*)Factorise (*x* + *y*)2 + 5(*x* + *y*)

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**(1)**

**(Total for Question 11 is 3 marks)**

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**12** The diagram shows a right-angled triangle.



 *x* – 3

 *x* + 6

All the measurements are in centimetres.

The area of the triangle is 35 cm2

Work out the length of the shortest side of the triangle.

You must show all your working.

....................................................... cm

**(Total for Question 12 is 4 marks)**

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**13** Express  as a fraction.

You must show all your working.

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**(Total for Question 13 is 3 marks)**

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**14** (*a*)Rationalise the denominator of 

 Give your answer in its simplest form.

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**(2)**

(*b*)Show that  can be written in the form  where *a*, *b* and *c* are integers.

**(3)**

**(Total for Question 14 is 5 marks)**

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**15 A** and **B** are two similar cylindrical containers.



the surface area of container **A** : the surface area of container **B** = 9 : 25

Rhyley fills container **A** with water.

She then pours all the water into container **B**.

Rhyley repeats this and stops when container **B** is full of water.

Work out the number of times that Rhyley fills container **A** with water.

You must show all your working.

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**(Total for Question 15 is 4 marks)**

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**16** The function f is given by

f(*x*) = 3*x*2 + 5

(*a*)Show that f –1(32) = 3

**(2)**

The functions g and h are given by

g(*x*) = *x* + 3 and h(*x*) = *x*2

Find the values of *x* for which

hg(*x*) = 4*x*2 + 8*x* + 1

*x* = ..........................................................................

**(4)**

**(Total for Question 16 is 6 marks)**

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**17** Given that =  ÷ 4*x* + 2

find the exact value of *x*.

*x* = .......................................................

**(Total for Question 17 is 3 marks)**

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**18** The graph of *y* = f(*x*) is shown on the grid.



(*a*)On the grid, draw the graph with equation *y* = f(*x* + 2) ̶ 5

**(2)**

Point *A*(–2, 1) lies on the graph of *y* = f(*x*).

When the graph of *y* = f(*x*) is transformed to the graph with equation *y* = f(–*x*), point *A* is

mapped to point *B*.

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

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

**(1)**

**(Total for Question 18 is 3 marks)**

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**19** Sketch the graph of

*y* = 3*x*2 – 12*x* – 5

showing the coordinates of the turning point and the exact coordinates of any intercepts

with the coordinate axes.

**(Total for Question 19 is 5 marks)**

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**20** *A*, *B*, *C* and *D* are four points on a circle.

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*AEC* and *DEB* are straight lines.

Triangle *AED* is an equilateral triangle.

Prove that triangle *ABC* is congruent to triangle *DCB*.

**(Total for Question 20 is 4 marks)**

**TOTAL FOR PAPER: 73 MARKS**