Maths Predicted Paper

Foundation Paper 3 Calculator

**Q1.**

Circle the value of the digit 7 in 9.17



**(Total 1 mark)**

**Q2.**

Which of these numbers has **exactly four** factors?

Circle your answer.

4       8       12       16

**(Total 1 mark)**

**Q3.**

A competition

took place in 1983

takes place every six years.

Circle the year in which it will also take place.

2083       2036       2049       2023

**(Total 1 mark)**

**Q4.**

(a)     Work out the highest common factor (HCF) of 15 and 20

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Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(1)**

(b)     Work out the lowest common multiple (LCM) of 6 and 8

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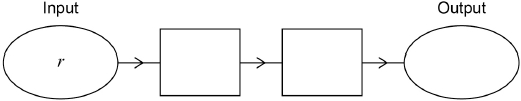
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Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(2)(Total 3 marks)**

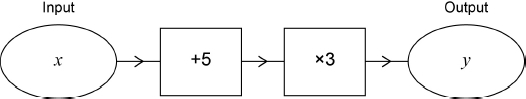
**Q5.**

(a)  Complete the number machine so that  *q* = 7*r* − 2



**(2)**

(b)  Write down the output *y* in terms of *x*.



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Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(1)**

**(Total 3 marks)**

**Q6.**

Simplify  8*x* − 3 + 6*x*

Circle your answer.

2*x* − 3       11*x*       5 + 6*x*       14*x* − 3

**(Total 1 mark)**

**Q7.**

(a)  Simplify  *a* × *a* × *a* + *b* + *b*

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Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(2)**

(b)  Simplify  5(*x* + 3) − *x* + 2

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Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**(3)(Total 5 marks)**

**Q8.**

Jody’s pay is £315 per week.

She works for 37 hours per week.



(a)     Work out her **hourly** rate of pay.

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Answer £ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(2)**

(b)     Jody wants to work out her **yearly** pay.

She says,

“There are 4 weeks in a month, so I will multiply £315 by 4

 There are 12 months in a year, so I will multiply the answer by 12

 £315 × 4 × 12 = £15 120”

Does her method give the correct amount for her yearly pay?

Tick a box

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | No, her yearly pay is more |  | Yes |  | No, her yearly pay is less |

Show working to support your answer.

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**(2)**

**(Total 4 marks)**

**Q9.**

(a)  Divide 120 in the ratio 1 : 4

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Answer \_\_\_\_\_\_\_\_\_\_\_ : \_\_\_\_\_\_\_\_\_\_\_

**(2)**

(b)  Write the ratio  7 : 4  in the form  *n* : 1

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Answer \_\_\_\_\_\_\_\_\_\_\_ : \_\_\_\_\_\_\_\_\_\_\_**(1)(Total 3 marks)**

**Q10.**

Rana sells 192 cakes in the ratio  small : medium : large  =  7 : 6 : 11

The profit for one medium cake is twice the profit for one small cake.

The profit for one large cake is three times the profit for one small cake.

Her total profit is £532.48

Work out the profit for one small cake.

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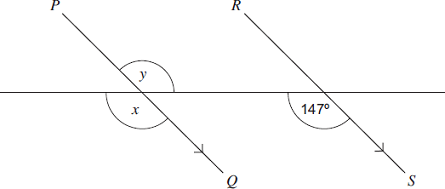
Answer £ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(Total 5 marks)**

**Q11.**

*PQ* and *RS* are parallel.

Not drawn  
accurately



(a)     Write down the value of *x*.  
Give a reason for your answer.

Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_degrees

Reason \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(2)**

(b)     Write down the value of *y*.  
Give a reason for your answer.

Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_degrees

Reason \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(2)**

**(Total 4 marks)**

**Q12.**

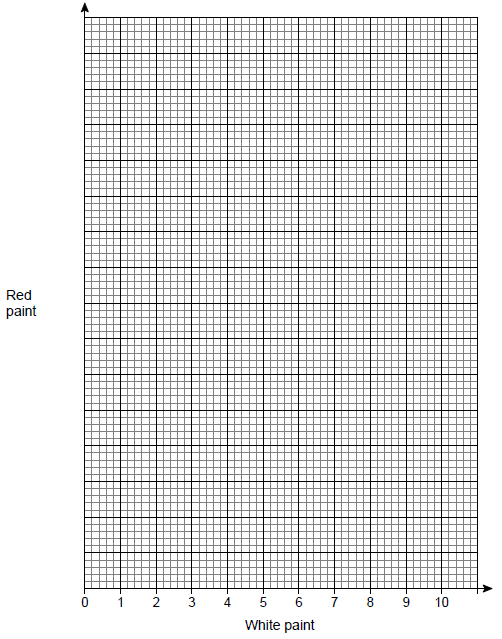
White paint and red paint are mixed together in the ratio 2 : 3

(a)     Draw a graph that can be used to work out the amount of red paint needed given the amount of white paint.

Your graph **must** show up to 10 litres of white paint.

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(b)     How much red paint needs to be mixed with 9 litres of white paint?

Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ litres**(1)  
(Total 4 marks)**

**Q13.**

The direct route between two airports A and B is 450 km

          An aircraft leaves *A* at 09.15

          It arrives at *B* at 10.55

(a)     Work out the average speed of the aircraft.

Assume the aircraft travelled the direct route.

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Answer .................................................... km/h

**(3)**

(b)     In fact the aircraft did **not** travel the direct route.

How does this affect the average speed?

Tick a box.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Faster |  | Slower |  | The same |

Give a reason for your answer.

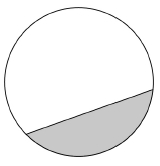
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**Q14.**

Here is a circle.



Circle the word that describes the shaded part.

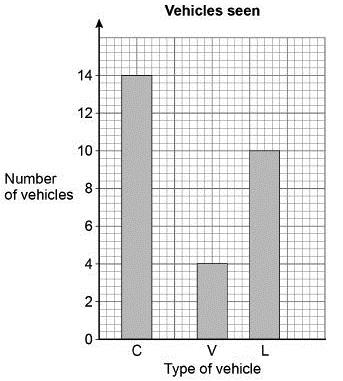
segment       chord       sector       arc **(Total 1 mark)**

**Q15.**

On a journey, Laura sees 30 vehicles.

Each vehicle is a car, a van or a lorry.

She draws this bar chart.



Make **two** criticisms of her bar chart.

Criticism 1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Criticism 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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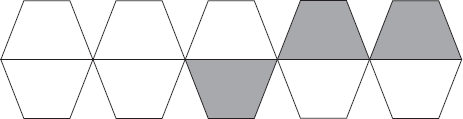
**(Total 2 marks)**

**Q16.**

This shape is an isosceles trapezium.



Ten of these shapes are put together.

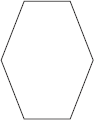


(a)     What percentage of the ten shapes is shaded?

Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_%

**(1)**

(b)     What is the mathematical name of the shape below?  
Circle your answer



|  |  |  |  |
| --- | --- | --- | --- |
| Octagon | Pentagon | Hexagon | Decagon |

**(1)**

**(Total 2 marks)**

**Q17.**

Which shape **must** have rotational symmetry?

Circle your answer.

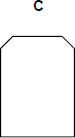
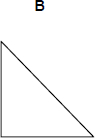
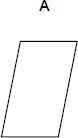
isosceles triangle       trapezium       kite       parallelogram

**(Total 1 mark)**

**Q18.**

Which of these shapes has **no** lines of symmetry?

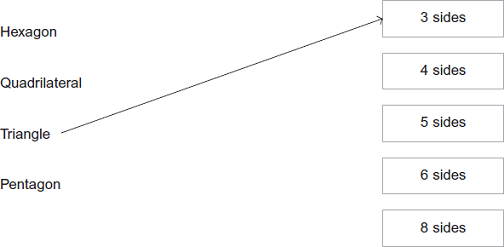
Circle the correct letter.



**(Total 1 mark)**

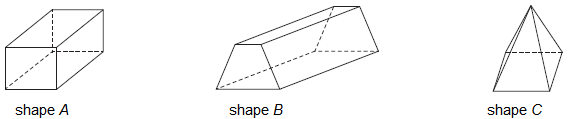
**Q19.**

(a)     Match each shape to its number of sides.  
One has been done for you.

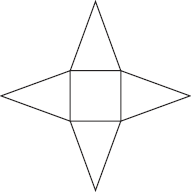


**(3)**

(b)    



Here is a net for one of these shapes.



Which shape is it?

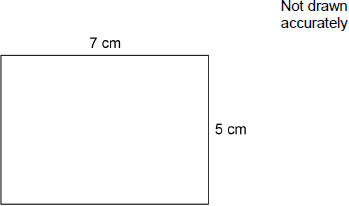
Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(1)**

**(Total 4 marks)**

**Q20.**

Here is a rectangle.



Work out the perimeter.

Circle your answer.

12 cm       24 cm       35 cm       70 cm

**(Total 1 mark)**

**Q21.**

The table shows the number of desktop computers and laptops in 50 households.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Desktop computers | | | | | |
| Laptops |  | **0** | **1** | **2** | **3** |
| **0** | 0 | 6 | 1 | 0 |
| **1** | 5 | 10 | 4 | 4 |
| **2** | 1 | 8 | 5 | 0 |
| **3** | 3 | 2 | 1 | 0 |

(a)     How many households have two laptops?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(1)**

(b)     How many households have more laptops than desktop computers?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

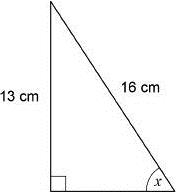
**(2)**

**(Total 3 marks)**

**Q22.**

Here is a right-angled triangle.

Not drawn accurately



Use trigonometry to work out the size of angle *x*.

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Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ degrees

**(Total 2 marks)**

**Q23.**

50 people took a test.

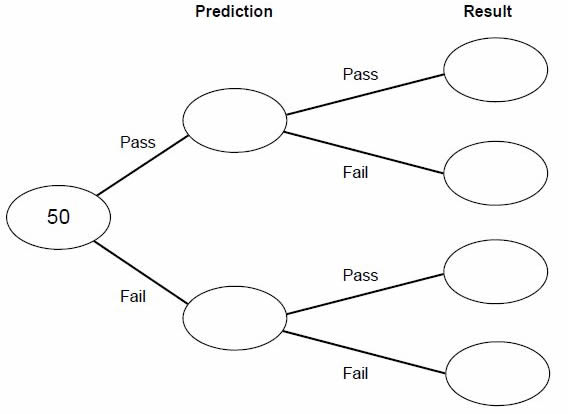
Before the test, they predicted whether they would pass or fail.

30 people predicted they would pass.

26 of the people who predicted they would pass did pass.

37 people passed altogether.

Complete the frequency tree.

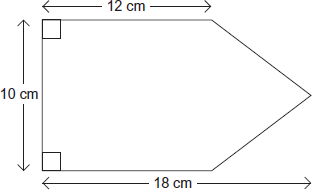


**(Total 2 marks)**

**Q24.**

Work out the area of this pentagon.

Not drawn accurately



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Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm2

**(Total 3 marks)**

**Q25.**

A linear sequence starts

11       21       31       41       ...

Work out an expression for the *n*th term of the sequence.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(Total 2 marks)**

**Q26.**

Which of these is a geometric progression?

Circle your answer.

|  |  |
| --- | --- |
| 1 3 5 7 9 | 1 3 6 10 15 |
|  | |
| 1 4 9 16 25 | 1 3 9 27 81 |

**(Total 1 mark)**

**Q27.**

Here are some numbers.

10  13  15  20  27  39

10  15  20  is an arithmetic progression.

Use **three** of the numbers to make a different arithmetic progression.

Describe the rule

Answer \_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_

Rule \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**(Total 2 marks)**

**Q28.**

The length of each side of a regular pentagon is 8.4 cm to 1 decimal place.

(a)  Complete the error interval for the length of one side.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm ≤ length < \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

**(2)**

(b)  Complete the error interval for the perimeter.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

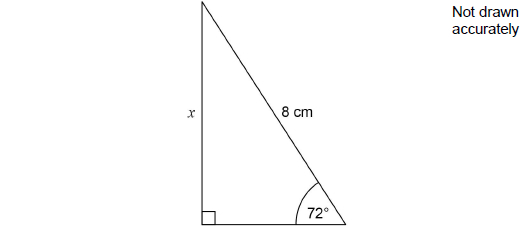
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm ≤ perimeter < \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

**(1)**

**(Total 3 marks)**

**Q29.**

Use trigonometry to work out the length *x*.



\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Answer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cm

**(Total 2 marks)**

**Q30.**

The height of a tree is 12 metres, correct to the nearest metre.

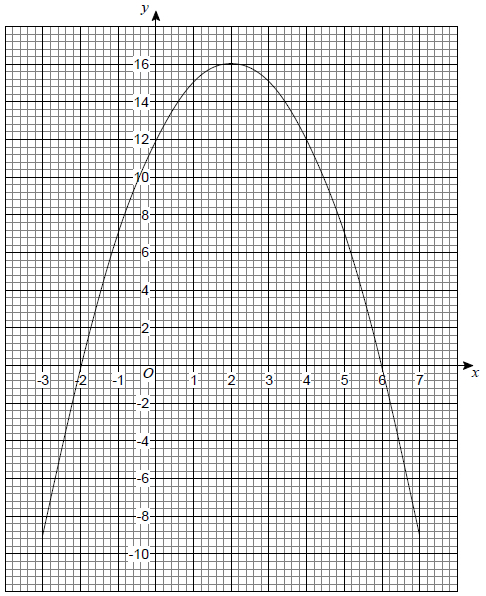
Circle the error interval.

11.5 m ≤ height < 12.5 m              11.5 m ≤ height ≤ 12.5 m

11.5 m < height ≤ 12.5 m              11.5 m < height < 12.5 m

**(Total 1 mark)**

**Q31.**  The graph *y* = *a* + *bx* − *x2* is shown.



(a)     Circle the coordinates of the turning point of the curve.

(−2, 0)                  (0, 12)                  (2, 16)                  (6, 0)

**(1)**

(b)     Circle the value of *a*.

−2                      12                      16                      6

**(1)**

(c)     Circle the two roots of     *a* + *bx* − *x2* = 0

−2 and 6                  2 and −6                  2 and 6                  −2 and −6 **(1)(Total 3 marks)**

**Q32.**



(a)  Work out **a + b + c**

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Answer



**(2)**

(b)  Show that **a** + 2**c** = k**b**, where k is an integer.

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**(2)**

**(Total 4 marks)**