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**Instructions**

* Use **black** ink or ball-point pen.
* **Fill in the boxes** at the top of this page with your name,
* centre number and candidate number.
* Answer **all** questions.
* Without sufficient working, correct answers may be awarded no marks.
* Answer the questions in the spaces provided
	+ *there may be more space than you need*.
* **Calculators may be used.**
* You must **NOT** write anything on the formulae page.
* Anything you write on the formulae page will gain NO credit.

**Information**

* The total mark for this paper is 100.
* The marks for **each** question are shown in brackets
	+ *use this as a guide as to how much time to spend on each question.*

**Advice**

* Read each question carefully before you start to answer it.
* Check your answers if you have time at the end.

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**Practice for Summer Examination (Part two)**

**1** (*a*) Expand and simplify (*y* + 4)(2 − *y*)

.......................................................

**(2)**

(*b*)Factorise fully 15*b*5*c* − 35*b*3*c*9

.......................................................

**(2)**

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

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**2** Show that 

**(Total for Question 2 is 3 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**3**



Triangle *ABC* is similar to triangle *PQR*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *AB* = 4 cm | *PQ* = 12 cm | *RQ* = 16.5 cm | *AC* = *x* cm | *PR* = *y* cm |

(*a*)Calculate the length of *BC*

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

**(2)**

(*b*)Write down an expression for *y* in terms of *x*

*y* = .......................................................

**(1)**

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

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**4** Each side of a regular octagon has a length of 18 mm, correct to the nearest 0.5 mm



(*a*)Write down the lower bound of the length of each side of the octagon.

....................................................... mm

**(1)**

(*b*)Write down the upper bound of the length of each side of the octagon.

....................................................... mm

**(1)**

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

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**5** The scale diagram shows the position on a map of a house, *A*

**

House *C* is on a bearing of 110° from *A*

The distance from *A* to *C* is 700 m

(*a*)Mark the position of *C* on the diagram with a cross (×)

Label your cross *C*

**(3)**

(*b*)Write the scale of the map in the form 1 : *n*

1 : ............................

**(1)**

**(Total for Question 5 is 4 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**6** A bag contains only pink sweets, white sweets, green sweets and red sweets.

The table gives each of the probabilities that, when a sweet is taken at random from

the bag, the sweet will be green or the sweet will be red.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sweet** | pink | white | green | red |
| **Probability** |  |  | 0.2 | 0.35 |

The ratio

number of pink sweets : number of white sweets = 2 : 1

There are 28 red sweets in the bag.

Work out the number of white sweets in the bag.

.......................................................

**(Total for Question 6 is 5 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**7** Find the lowest common multiple (LCM) of 28, 42 and 63

Show your working clearly.

.......................................................

**(Total for Question 7 is 3 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**8** The table gives information about the average house price in England in 2018 and

in 2019

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **2017** | **2018** | **2019** |
| **Average house price (£)** |  | 228 314 | 231 776 |

(*a*)Work out the percentage increase in the average house price from 2018 to 2019

Give your answer correct to one decimal place.

....................................................... %

**(2)**

The average house price in 2019 was 7.7% greater than the average house price in 2017

(*b*)Work out the average house price in 2017

Give your answer correct to 3 significant figures.

£ .......................................................

**(3)**

**(Total for Question 8 is 5 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**9** The frequency table gives information about the number of points scored by a player.

|  |  |
| --- | --- |
| **Number of points** | **Frequency** |
| 0 | 13 |
| 1 | 17 |
| 2 | 8 |
| 3 | *x* |
| 4 | 11 |

The mean number of points scored is 2

Work out the value of *x*

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

**(Total for Question 9 is 4 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**10** Solve the simultaneous equations

3*x* + 5*y* = 3.1

6*x* + 3*y* = 3.75

Show clear algebraic working.

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

*y* = .......................................................

**(Total for Question 10 is 3 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**11** The diagram shows a regular 10-sided polygon, *ABCDEFGHIJ*

**

Show that *x* = *y*

**(Total for Question 11 is 4 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**12** *a* = 6 × 1040

Work out the value of *a*3

Give your answer in standard form.

.......................................................

**(Total for Question 12 is 3 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**13** A zip wire is shown as the dashed line *AC* in the diagram.

**

The zip wire is supported by two vertical posts *AB* and *CD* standing on

horizontal ground.

*CD* = 2.6 m *BD* = 12 m

The zip wire makes an angle *x* with the horizontal, as shown in the diagram.

The design of the zip wire requires the angle *x* to be at least 5°

Work out the least possible height of the post *AB*

Give your answer correct to 3 significant figures.

....................................................... m

**(Total for Question 14 is 3 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**14** Diyar recorded the distance, in kilometres, that he cycled each day for 11 days.

Here are his results.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 10 | 12 | 13 | 5 | 23 | 21 | 7 | 5 | 16 | 14 |

Find the interquartile range of his results.

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

**(Total for Question 15 is 3 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**15** *D*, *E*, *F* and *G* are points on a circle, centre *O*



*EOG* is a diameter of the circle.

Angle *EGD* = 42°

Calculate the size of angle *DFG*

Give a reason for each stage of your working.

Angle *DFG* = ....................................................... °

**(Total for Question 16 is 4 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**16** Show that 

can be written in the form where *a* and *b* are integers.

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

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**17**

**

*PTQ* is a diameter of a circle.

*RTS* is a chord of the circle.

*TQ* = 3 cm *ST* = 4 cm *TR* = 12 cm

Calculate the radius of the circle.

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

**(Total for Question 19 is 3 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**18** The histogram gives information about the heights, *h* cm, of some tomato plants.



There are 12 tomato plants for which 75 < *h* ≤ 85

One of the tomato plants is selected at random.

Find an estimate for the probability that this tomato plant has a height greater than

82.5 cm

.......................................................

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

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**19** An arithmetic series has first term *a* and common difference *d*, where *d* is a

prime number.

The sum of the first *n* terms of the series is *Sn* and

*Sm* = 39

*S*2*m* = 320

Find the value of *d* and the value of *m*

Show clear algebraic working.

*d* = .......................................................

*m* = .......................................................

**(Total for Question 26 is 5 marks)**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**TOTAL FOR PAPER IS 68 MARKS**