**IGCSE HIGHER-TIER ASSESSMENT 1**

**Time: 1hour 30minutes**

**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 formula 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.

****

**Answer ALL TWENTY THREE questions.**

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

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

**1** Yoko flew on a plane from Tokyo to Sydney.

The plane flew a distance of 7800 km.

The flight time was 9 hours 45 minutes.

Work out the average speed of the plane in kilometres per hour.

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

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

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**2** Penny, Amjit and James share some money in the ratio 3 : 6 : 4

Amjit gets $28 more than James.

Work out the amount of money that Penny gets.

$.......................................................

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

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**3** A factory has 60 workers.

The table shows information about the distances, in km, the workers travel to the factory

each day.

|  |  |
| --- | --- |
| **Distance (*d* km)** | **Frequency** |
| 0 < *d* ≤ 5 | 12 |
| 5 < *d* ≤ 10 | 6 |
| 10 < *d* ≤ 15 | 4 |
| 15 < *d* ≤ 20 | 6 |
| 20 < *d* ≤ 25 | 14 |
| 25 < *d* ≤ 30 | 18 |

(*a*)Write down the modal class.

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

**(1)**

(*b*)Work out an estimate for the mean distance travelled to the factory each day.

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

**(4)**

One of these workers is chosen at random.

(*c*)Write down the probability that this worker travels more than 20 km to the factory

 each day.

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

**(2)**

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

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**4** Nigel bought 12 boxes of melons.

He paid $15 for each box.

There were 12 melons in each box.

Nigel sold  of the melons for $1.60 each.

He sold all the other melons at a reduced price.

He made an overall profit of 15%

Work out how much Nigel sold each reduced price melon for.

$.......................................................

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

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**5** Use ruler and compasses to construct the bisector of angle *ABC*.

You must show all your construction lines.



**(Total for Question 5 is 2 marks)**

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**6** (*a*)Factorise fully 18*e*3*f* + 45*e*2*f* 4

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**(2)**

(*b*)Solve *x*2 – 4*x* – 12 = 0

 Show clear algebraic working.

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

**(3)**

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

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**7**

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Calculate the length of *PR*.

Give your answer correct to 3 significant figures.

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

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

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**8** In a sale, all normal prices are reduced by 15%

The normal price of a mixer is reduced by 22.50 dollars.

Work out the normal price of the mixer.

.......................................................dollars

**(Total for Question 8 is 3 marks)**

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**9** The table shows the diameters, in kilometres, of five planets.

|  |  |
| --- | --- |
| **Planet** | **Diameter (km)** |
| Venus | 1.2 × 104 |
| Jupiter | 1.4 × 105 |
| Neptune | 5.0 × 104 |
| Mars | 6.8 × 103 |
| Saturn | 1.2 × 105 |

(*a*)Write 1.4 × 105 as an ordinary number.

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

**(1)**

(*b*)Which of these planets has the smallest diameter?

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

**(1)**

(*c*)Calculate the difference, in kilometres, between the diameter of Saturn and the

 diameter of Neptune.

 Give your answer in standard form.

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

**(2)**

The diameter of the Moon is 3.5 × 103 km.

The diameter of the Sun is 1.4 × 106 km.

(*d*) Calculate the ratio of the diameter of the Moon to the diameter of the Sun.

 Give your ratio in the form 1 : *n*

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

**(2)**

**(Total for Question 9 is 6 marks)**

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**10**

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The diagram shows a shape made from triangle *ABC* and a semicircle with diameter *BC*.

Triangle *ABC* is right-angled at *B*.

*AB* = 7.6 cm and *AC* = 9.5 cm.

Calculate the area of the shape.

Give your answer correct to 3 significant figures.

.......................................................cm2

**(Total for Question 10 is 5 marks)**

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**11** Expand and simplify (*x* + 5) (*x* – 3) (*x* + 3)

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

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**12** Here are the points that Carmelo scored in his last 11 basketball games.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23 | 20 | 14 | 23 | 17 | 24 | 24 | 18 | 16 | 22 | 21 |

(*a*)Find the interquartile range of these points.

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

**(3)**

Kobe also plays basketball.

The median number of points Kobe has scored in his last 11 games is 18.5.

The interquartile range of Kobe’s points is 10.

(*b*)Which of Carmelo or Kobe is the more consistent points scorer?

 Give a reason for your answer.

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**(1)**

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

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**13** (*a*)Find an equation of the line that passes through the points (−3, 5) and (1, 2)

 Give your answer in the form *ax* + *by* = *c* where *a*, *b* and *c* are integers.

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

**(4)**

Line **L1** has equation *y* = 3*x* + 5

Line **L2** has equation 6*y* + 2*x* = 1

(*b*)Show that **L1** is perpendicular to **L2**

**(2)**

**(Total for Question 13 is 6 marks)**

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**14** The histogram shows information about the heights of some tomato plants.



26 plants have a height of less than 20 cm.

Work out the total number of plants.

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

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**15** A rectangular lawn has a length of 3*x* metres and a width of 2*x* metres.

The lawn has a path of width 1 metre on three of its sides as shown in the diagram.



The total area of the lawn and the path is 100 m2

(*a*)Show that 6*x*2 + 7*x* – 98 = 0

**(2)**

(*b*)Calculate the area of the lawn.

 Show clear algebraic working.

.......................................................m2

**(5)**

**(Total for Question 15 is 7 marks)**

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**16**

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

*PA* is a tangent to the circle.

Angle *PAD* = 39°

Angle *BCD* = 103°

Calculate the size of angle *ADB*.

Give a reason for each stage of your working.

.......................................................°

**(Total for Question 16 is 5 marks)**

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**17 **

*a* = 42 correct to 2 significant figures.

*b* = 24 correct to 2 significant figures.

*c* = 14 correct to 2 significant figures.

Work out the lower bound for the value of *y*.

Give your answer correct to 2 significant figures.

Show your working clearly.

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

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

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**18** Show that ** can be written as  where *a* and *b* are integers.

**(Total for Question 18 is 4 marks)**

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**19**



The diagram shows a solid cone.

The base of the cone is a horizontal circle, centre *O*, with radius 4.5 cm.

*AB* is a diameter of the base and *OV* is the vertical height of the cone.

The curved surface area of the cone is 130 cm2

Calculate the size of the angle *AVB*.

Give your answer correct to 1 decimal place.

.......................................................°

**(Total for Question 19 is 4 marks)**

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**20**



The diagram shows part of the curve with equation *y* = f(*x*)

The coordinates of the maximum point of the curve are (3, 5)

(*a*)Write down the coordinates of the maximum point of the curve with equation

 (i) *y* = f(*x* + 3)

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

**(1)**

 (ii) *y* = 2f(*x*)

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

**(1)**

 (iii) *y* = f(3*x*)

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

**(1)**

The curve with equation *y* = f(*x*) is transformed to give the curve with

equation *y* = f(*x*) – 4

(*b*)Describe the transformation.

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**(1)**

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

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**21** The curve with equation  has one stationary point.

Find the co-ordinates of this stationary point.

Show your working clearly.

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

**(Total for Question 21 is 5 marks)**

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**22**

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*ABCD* is a trapezium.

*AB* is parallel to *DC*.







*E* is the point on the line *DB* such that *DE* : *EB* = 1 : 2

Show by a vector method that *BC* is parallel to *AE*.

**(Total for Question 22 is 5 marks)**

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**23** The 4th term of an arithmetic series is 17.

The 10th term of the same arithmetic series is 35.

Find the sum of the first 50 terms of this arithmetic series.

**(Total for Question 23 is 5 marks)**

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**TOTAL FOR PAPER IS 100 MARKS**