|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AQA-logo-black | General Certificate of Secondary Education

|  |
| --- |
| For Examiner’s Use |
| Pages | Mark |
| 3 |  |
| 4 – 5 |  |
| 6 – 7 |  |
| 8 – 9 |  |
| 10 – 11 |  |
| 12 – 13 |  |
| 14 – 15 |  |
| 16 – 17 |  |
| 18 – 19 |  |
| 20 – 21  |  |
| 22 – 23 |  |
| 24 |  |
| TOTAL |  |

Higher Tier |

**Mathematics (Linear) B**

**4365/2H**

**Paper 2 Calculator**

**HF**

**Practice Paper 2012 Specification (Set 2)**

**For this paper you must have:**

* a calculator
* mathematical instruments.
* mathematical instruments.

You may use a calculator.

You may use a calculator.



Time allowed

* 2 hours

Instructions

* Use black ink or black ball-point pen. Draw diagrams in pencil.
* Fill in the boxes at the top of this page.
* Answer **all** questions.
* You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
* Do all rough work in this book. Cross through any work that you do not want to be marked.
* If your calculator does not have a π button, take the value of π to be
3.14 unless another value is given in the question.

Information

* The marks for questions are shown in brackets.
* The maximum mark for this paper is 105.
* The quality of your written communication is specifically assessed

in questions 3, 4(a),18(c) and 20.

These questions are indicated with an asterisk (🟎).

* You may ask for more answer paper, graph paper and tracing paper.
These must be tagged securely to this answer booklet.
* Use a calculator where appropriate.

Advice

* In all calculations, show clearly how you work out your answer.

**4365/2H**

|  |
| --- |
| lengthcross-section*h**a**b**r**r**h**l***In any triangle** *ABC***Area of triangle** = *ab* sin *C***Sine rule**  =  = **Cosine rule** *a* 2 = *b* 2 + *c* 2 – 2*bc* cos *A***The Quadratic Equation**The solutions of *ax* 2 + *bx* + *c* = 0, where *a* ≠ 0, are given by *x* = *A**B**C**a**b**c***Volume of cone** = π*r* 2 *h***Curved surface area of cone** = π*r* *l* **Volume of sphere** = π*r* 3 **Surface area of sphere** = 4π*r* 2 **Volume of prism** = area of cross-section × length**Area of trapezium** = (*a* + *b*)*h***Formulae Sheet: Higher Tier** |

|  |
| --- |
| Answer **all** questions in the spaces provided |
| **1** Work out the value of Do not writeoutside thebox **6** Give your answer to one decimal place. ............................................................................................................................................... ...............................................................................................................................................Answer ................................................................ (*2 marks*)**2** Danielle tosses a coin and rolls a dice. If the coin shows heads, the score is three times the number on the dice. If the coin shows tails, the score is the square of the number on the dice. Show that there is a 50% chance of a score more than 10. ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... (*4 marks*) **Turn over for the next question** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 🟎**3** *ABC* is a triangle. Do not writeoutside thebox2*x*5*x**x*80°110°Not drawn accurately*A**C**B**x*   Show that *ABC* is an isosceles triangle. ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... (*5 marks*) 🟎**4 (a)** Mark wants to book a holiday for two adults and one child.Do not writeoutside thebox He sees this advert.Adult price £340Child price £250**Special offer** 15% off   Mark has £800. Can he afford to book this holiday? Tick a box.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Yes |  |  | No |  |

 You **must** show your working. ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... (*5 marks*)**4 (b)** Mark changes £400 to Euros. The exchange rate in the UK is £1 = 1.15 Euro He comes back to the UK with 105.80 Euros What percentage of the £400 did he spend? ...............................................................................................................................................  ............................................................................................................................................... ...............................................................................................................................................  ...............................................................................................................................................Answer ....................................................% (*4 marks*) **14** |
| **5** The diagram shows a regular pentagon.Do not writeoutside theboxNot drawnaccurately**5 (a)** Work out the size of angle *x*. ............................................................................................................................................... ...............................................................................................................................................Answer ........................................... degrees (*2 marks*) **5 (b)** Work out the size of angle *y*. ............................................................................................................................................... ...............................................................................................................................................Answer ........................................... degrees (*2 marks*) |
| **6**  Amy wants to know how often people in her village go out for a meal.How many times do you go out for a meal? Never 1 or 2 3 More than 4    Do not writeoutside thebox She writes this question and response section.**6 (a)** Give **one** criticism of Amy’s question. ............................................................................................................................................... ...............................................................................................................................................(*1 mark*) **6 (b)**  Give **one** criticism of Amy’s response section. ............................................................................................................................................... ............................................................................................................................................... (*1 mark*) **Turn over for the next question** **6** |
| **7**  Here are the results of a survey about how much money 60 people pay for their meal.Do not writeoutside thebox

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Cost of a meal, *C*, (£)** | 0 < *C* < 10 | 10 < *C* < 20 | 20 < *C* < 30 | 30 < *C* < 40 |
| **Frequency** | 7 | 19 | 24 | 10 |

**7 (a)**  Draw a frequency polygon to represent the results.FrequencyCost, *C* (£)(*2 marks*) **7 (b)**  What proportion of the 60 people spend more than £20 on the meal? ............................................................................................................................................... ...............................................................................................................................................Answer .................................................... (*2 marks*) |
| **8 (a)** Reflect shape *A* in the line *y* = 5Do not writeoutside thebox*y**A**x* (*2 marks*) **6****Question 8 continues on the next page** |
| **8 (b)** Describe fully the **single** transformation that takes shape *B* to shape *C*.Do not writeoutside thebox*y**B**C*  *x* ............................................................................................................................................... ............................................................................................................................................... ...............................................................................................................................................(*3 marks*)  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **9** Dan runs 15 marathons.Do not writeoutside thebox Here is a summary of his times.

|  |  |  |  |
| --- | --- | --- | --- |
| **Time, *t* , (minutes)** | **Frequency** |  |  |
| 200 < *t* < 220 | 1 |  |  |
| 220 < *t* < 240 | 5 |  |  |
| 240 < *t* < 260 | 6 |  |  |
| 260 < *t* < 280 | 2 |  |  |
| 280 < *t* < 300 | 1 |  |  |

 Ella also runs 15 marathons. Her mean time is 4 hours 17 minutes. Dan says that on average he is faster. Show that he is correct. ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... (*5 marks*) **10** *A* and *B* are on the line *y* = *x*  The midpoint of *AB* has coordinates (4, 4). The *x*-coordinate of *B* is three times the *x*-coordinate of *A*. Work out the coordinates of *A* and *B*. ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... *A* (……………., …………….)*B* (……………., …………….) (*2 marks*) **10****8** |
| **11** Here is a formula to convert Fahrenheit (oF) to Celsius (oC). Do not writeoutside theboxF = C + 32 **11 (a)** Maria telephones her friend Jenny in Spain. Maria says, “The temperature here is 78 oF.” Jenny says, “It is warmer here because the temperature is 25 oC.” Is Jenny correct? Tick a box.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Yes |  |  | No |  |

  You **must** show your working. ............................................................................................................................................... ...............................................................................................................................................(*2 marks*) **11 (b)** The graph shows the temperature of a water bottle in a freezer.  Temperature (oF)Time (minutes) Water starts to freeze at 0 oC. How long does it take for the water to start freezing? ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... Answer ............................................... minutes (*2 marks*) **11** |
| **12 (a)**  Solve 0.7*a –* 2 = 0.2*a* + 3Do not writeoutside thebox ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... Answer *a* = .................................................... (*3 marks*)**12 (b)**  Expand 4(*b –* 2)  ...............................................................................................................................................Answer .......................................................... *(1 mark)* **12 (c)**  Simplify 2*c*2*d* 3 × *c*4*d* 2  ............................................................................................................................................... ...............................................................................................................................................Answer ........................................................ (*2 marks*) **12 (d)**  Factorise fully 4*x*2 + 6*xy*  ............................................................................................................................................... ...............................................................................................................................................Answer ........................................................ (*2 marks*) **12 (e)**  Simplify   ...............................................................................................................................................Answer ........................................................ (*1 mark*) **13** |

|  |
| --- |
| **13** *ABC* and *DEF* are similar triangles.Do not writeoutside thebox50 cm20 cm16 cmNot drawn accurately  Work out the value of *x*. ................................................................................................................................... ................................................................................................................................... ...................................................................................................................................Answer ............................................. cm (*3 marks*) **14** A light is fixed on horizontal ground, 25 metres away from a vertical wall.Do not writeoutside thebox The height of the wall is 20 metres. When the light is switched on, the beam just clears the top of the wall.Not drawnaccurately20 m*x* 25 m  Work out the size of the angle *x*. ................................................................................................................................... ................................................................................................................................... ...................................................................................................................................Answer ........................................... degrees (*3 marks*) **Turn over for the next question** **6** |
| **15** Solve the inequality 5*n* – 7 < 3*n* + 16 Do not writeoutside thebox ............................................................................................................................................... ............................................................................................................................................... ...............................................................................................................................................Answer ................................................ (*3 marks*) **16** A football crowd has 27 000 adults and 5000 children. A stratified sample of adults and children of size 40 is to be taken. Work out the number of adults and the number of children in the sample. ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... Answer Adults............................................... Children............................................ (*3 marks*) |
| **17 (a)** Complete the table of values for *y* = 4 – *x*3 Do not writeoutside thebox

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***x*** | – 2 | – 1 | 0 | 1 | 2 |
| ***y*** | 12 |  | 4 | 3 |  |

 (*2 marks)***17 (b)** On this grid, plot the graph of *y* = 4 – *x*3 for –2 < *x* <2*y**y**x* *x*(*2 marks*) **17 (c)** Use your graph or an algebraic method to solve 4 – *x*3 = 0 ...............................................................................................................................................  ...............................................................................................................................................(*1 mark*)  **11** |
| **18 (a)** Work out the size of angle *x.*Do not writeoutside theboxNot drawnaccurately   ............................................................................................................................................... ...............................................................................................................................................Answer ........................................ degrees (*1 mark*) **18 (b)** In the diagram, *BA* and *BC* are two tangents to the circle, centre *O*.Not drawnaccurately   Work out the size of angle *y*. ............................................................................................................................................... ............................................................................................................................................... ...............................................................................................................................................Answer ..................................... degrees (*3 marks*)  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 🟎**18 (c)** The diagram shows a circle with centre *O* and a tangent at *T*.Do not writeoutside thebox Not drawnaccurately  Write down the value of angle *x*. Give a reason for your answer. Answer .......................................degrees  Reason..................................................................................................................................(*2 marks*) **Turn over for the next question** **6****19** Connor has three oak trees in his garden.Do not writeoutside thebox He measures the height and diameter of the shortest tree. The results are shown in this table.

|  |  |
| --- | --- |
| Height, *H* (metres) | 1.65 |
| Diameter, *d* (metres) | 0.1 |

**19 (a)** Connor knows that the height of a tree is directly proportional to the square of its diameter. Work out an equation connecting *H* and *d*. ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ...............................................................................................................................................Answer ............................................................. (*3 marks*) **19 (b)** Connor wants to know the height of the tallest tree. He measures the diameter and gets 0.25 metres. Work out the height of the tree. ...............................................................................................................................................  ...............................................................................................................................................Answer ......................................................... m (*2 marks*) |
| 🟎**20** The diagrams show how guttering is joined together.Do not writeoutside thebox Joints are exactly 25 cm long. Gutter and joints overlap by exactly 8 cm on each side as shown.  25 cmNot drawnaccurately              25 cm    A roof measures 18 metres to the nearest 10 centimetres.Pieces of guttering measure 6 metres to the nearest 10 centimetres. Will three pieces of guttering and two joints be enough to make a piece to fit the length of the roof?   Tick a box.Yes No Cannot tell  You **must** show your working. ............................................................................................................................................................... ............................................................................................................................................................... ............................................................................................................................................................... ............................................................................................................................................................... ............................................................................................................................................................... ............................................................................................................................................................... ............................................................................................................................................................... **11** ............................................................................................................................................................... (*6* *marks*) |

|  |
| --- |
| **21** *OAB* is a triangle.Do not writeoutside thebox *OA* = 2**a** *OB* = 3**b** *M* is a point on *AB* such that *OM* =  + **b***A* **a***M***+ b***B**O***b**23Not drawnaccurately Compare the lengths of *AM* and *MB*. ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... (*5 marks*) **22** The histogram shows information about the age of 73 snooker players.Do not writeoutside theboxFrequency densityAge (years)  Estimate the number of players who are older than 32 years. ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ...............................................................................................................................................Answer .................................................. (*3 marks*)**Turn over for the next question** **8** |

|  |
| --- |
| **23 (a)** Expand and simplify (*x* + 1)(*x* – 3)Do not writeoutside theboxNot drawn accurately*x +* 1 ............................................................................................................................................... ...............................................................................................................................................Answer ....................................................... (*2 marks*)**23 (b)** The diagram shows a rectangle and a square.*x –* 1Not drawn accurately  Their perimeters are equal. The area of the rectangle is 12 square centimetres. Use an algebraic method to work out the value of *x.* ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ............................................................................................................................................... ...............................................................................................................................................Answer ................................................ cm (*6 marks*) **8****END OF QUESTIONS**Copyright © 2011 AQA and its licensors. All rights reserved. |