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| 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 |  | | TOTAL |  |   Higher Tier |

**Mathematics (Linear) B**

**4365/2H**

**Paper 2 Calculator**

**HF**

**Practice Paper 2012 Specification (Set 1)**

**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 4, 6, 7 and 24.

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**

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| length  cross-  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** |

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| Answer **all** questions in the spaces provided |
| **1** A bank has these exchange rates for buying and selling Euros.  **9**  Do not write outside the box  Buying Euros £1 = 1.15 Euros  Selling Euros £1 = 1.29 Euros  Ben buys Euros for £600.  He spends 570 Euros on his holiday.  He sells the remaining Euros back to the bank.  How much does he get back from the bank?  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer £ .................................................................. *(5 marks)*    **2 (a)**  Factorise 8*w* – 10  ...................................…………...….…….....…………………………………………….….  Answer ….................................................................... *(1 mark)*  **2 (b)**  Solve 7*x* + 2 = 6 – 3*x*  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer *x =* ................................................................ *(3 marks)* |

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| **3** Here is a map of Jordan.  Do not write outside the box    N  Safawi  Irbid  Amman  N  Dead Sea  Karak  Petra  **3 (a)**  Ezraq is on a bearing of 110 ° from Amman.  Ezraq also lies on the straight road between Karak and Safawi.  Mark the position of Ezraq on the map.  *(2 marks)*  **3 (b)**  The distance from Amman to Irbid is 70 km.  Calculate the distance from Amman to Petra.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer .................................................................. km *(3 marks)* |
| 🟎**4** A shop sells washing powder in three different sizes.  Do not write outside the box  **Washing Powder**  **500 g**  **£ 1.49**  **Washing Powder**  **1.5 kg**  **£ 4.45**  **Washing Powder**  **3 kg**  **£ 8.99**  Amanda wants to buy 6 kg of washing powder in the cheapest possible way.  What should she buy?  You **must** show your working.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  *(4 marks)*  **Turn over for the next question**  **9** |
| **5** Fifty people are asked how many holidays they took last year.  Do not write outside the box  Do not write outside the box     |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Number of holidays** | 0 | 1 | 2 | 3 | | **Number of people** | 22 | 18 | 8 | 2 |   Work out the mean number of holidays per person.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ….................................................................... *(3 marks)*  🟎**6**  In 2009, Jeff ran the London Marathon for charity and raised £825  In 2010, the amount he raised was 18% more than the total raised in 2009.  His target was to raise £1000  Did he reach his target?  You **must** show your working.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  *(4 marks)* |
| 🟎**7** In January 2011, Value Added Tax (VAT) increased from 17.5% to 20%.  Do not write outside the box  Here is a formula for working out the price after the increase.  *A* =  *B*  *A* is the price after the increase.  *B* is the price before the increase.  **7 (a)**  The price of an item before the increase was £98.70    Work out the price after the increase.  .................................…………...….…….....…………………………………………….…..  Answer £ ...................................................................... *(1 mark)*  **7 (b)**  The table shows the prices of some clothes in a shop.   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | Shirt | Trousers | Dress | Jumper | | **Price before VAT increase** | £ 23.50 | £ 39.95 | £ 95 | £ 35.25 | | **Shop price** | £ 24 | £ 40.99 | £ 97.50 | £ 36 |   The shop price of some clothes is higher than the price should be after the VAT increase.  Which clothes are these?  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ............................…………...….…….....……………………………… *(2 marks)*  **7 (c)**  For the VAT increase from 17.5% to 20%, show how the formula  *A* =  *B* was formed.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  **12**  *(2 marks)* |
| **8**  The table shows the marks for 10 students in Art and French examinations.  Do not write outside the box  Do not write outside the box   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Student** | A | B | C | D | E | F | G | H | I | J | | **Art mark** | 32 | 41 | 62 | 84 | 90 | 20 | 30 | 45 | 20 | 30 | | **French mark** | 84 | 75 | 30 | 60 | 20 | 60 | 50 | 35 | 40 | 20 |   **8 (a)** Show this information on a suitable diagram on the grid below.    French  mark  *(3 marks)*  Art mark  **8 (b)** Describe the correlation between the marks in Art and French.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  *(1 mark)* |
| **8 (c)** One of these students is chosen at random.  Do not write outside the box  Work out the probability that this student has a mark of over 50 in at least one of  the examinations.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ........................................................................ *(2 marks)*  **9 (a)** Simplify *x*2 × *x*5  .................................…………...….…….....…………………………………………….…..  Answer ........................................................................ *(1 mark)*  **9 (b)** Simplify *w*10 ÷ *w*5  .................................…………...….…….....…………………………………………….…..  Answer ........................................................................ *(1 mark)*  **9 (c)** Expand and simplify 2( *y* + 3) + 3(2*y –* 1)  **5**  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ........................................................................ *(2 marks)*  **10**  **9** |

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| **10 (a)** Complete the table of values for *y* = *x*2 − 6*x* + 7  Do not write outside the box   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | 0 | 1 | 2 | 3 | 4 | 5 | 6 | | *y* | 7 |  | −1 | −2 |  | 2 | 7 |   *(2 marks)*  **10 (b)** Complete the graph of *y* = *x*2 − 6*x* + 7 for values of *x* from 0 to 6    −  −  0  *y*  *x*  *(3 marks)*  **10 (c)** Does the graph pass through the point (10, 51)?  Show how you decide.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  *(1 mark)*  **8** |
| **11**  The diagram shows four identical touching circles with centres *P*, *Q*, *R* and *S.*  Do not write outside the box  The radius of each circle is 5 cm.  Not drawn accurately  *R*  *Q*  *P*  *S*  Calculate the shaded area.  Give your answer to two significant figures.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ......................................................................cm2 *(5 marks)*  **Turn over for the next question**  **11** |
| **12**  Triangle *A* is shown on the grid.    *x*  *y*  *A*  Translate triangle *A* by the vector  *(2 marks)* |

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| **13 (a)** Solve 6*x*2 = 1734 where *x* is positive.  Do not write outside the box  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer *x* = .................................................................... *(2 marks)*  **13 (b)** The diagram shows a cube.  The total surface area of the cube is 1734 cm2.  Work out the volume of the cube.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ......................................................................cm3 *(2 marks)*    **14** The diagram shows two similar rectangles.  Not drawn accurately  *y*  4 cm    10 cm  8 cm  Work out the value of *y.*  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ..................................................................... cm *(3 marks)*  **9** |
| **15** The diagram shows a tank containing water.  Do not write outside the box  The tank is one-third full.  The tank measures 25 cmby 10 cm by 45 cm.  45 cm    10 cm  25 cm    The tank is now filled at the rate of 250 cm3 per minute.  How long will it take to fill the rest of the tank?  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ...................................................................... minutes *(4 marks)* |
| **16 (a)** Factorise (*c* + 3*)*2 – 2(*c* + 3*)*  Do not write outside the box  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ...................................................................... *(2 marks)*  **16 (b)** Make *x*  the subject of 4(*x* + *y)* = 7*y* − 5  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ...................................................................... *(3 marks)*  **16 (c)** Given that 0 < *x <* 1 tick the correct box for each statement.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  **Always true Sometimes true Never true**    > 2  *x*2 > *x*  *(2 marks)*  **11** |
| **17** The diagram shows a right-angled triangle.  Do not write outside the box  Not drawn accurately  35 cm  3*x* cm  4*x* cm  Show that the perimeter of the triangle is 84 cm.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  *(4 marks)*  **18**  The mass of the Sun is 1.99 × 1030 kg.  The mass of the Earth is 5.98 × 1024 kg.  How many times heavier is the Sun than the Earth?  Give your answer to an appropriate degree of accuracy.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ........................................................................ *(3 marks)* |

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| **19**  Solve 5*x*2 – 6*x* – 2 = 0  Do not write outside the box  Give your answers to two decimal places.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer .......................................................................... *(3 marks)*  **20** Simon runs 800 metres in 1 minute 52 seconds.  The distance is correct to the nearest 10 metres.  The time is correct to the nearest second.  Calculate Simon’s maximum possible speed.  State the units of your answer.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ...................................................................... *(5 marks)*  **15** |
| **21**  The diagram shows a trapezium *ABCD.*  Do not write outside the box  9.6 cm  *B*  Not drawn accurately  *A*  7.1 cm  122 °  *D*  *C*  6.4 cm  Work out the area of the trapezium.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ....................................................................... cm2 *(5 marks)* |

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| **22**  In a bag there are 45 counters.  Do not write outside the box  28 of the counters are white.  Two counters are chosen at random without replacement.  What is the probability that both are white?  Give your answer as a fraction in its simplest form.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ....................................................................... *(3 marks)*  **Turn over for the next question**  **8** |
| **23**  The times that some teachers take travelling to school are shown in the histogram.  Do not write outside the box    Time, (minutes)  Frequency  density  42 teachers take between 10 minutes and 20 minutes travelling to work.  What is the probability that a teacher chosen at random takes more than 30 minutes?  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ........................................................................ *(5 marks)* |

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| **🟎24** A bag contains only red, blue and white counters.  Do not write outside the box  A counter is chosen at random.  The probability it is a blue counter is  The probability it is a white counter is  The probability it is a red counter is  Work out the value of *x*.  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  .................................…………...….…….....…………………………………………….…..  Answer ........................................................................ *(6 marks)*  **END OF QUESTIONS**  **11** |

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