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| **Solutions**  **Yearly Examination** | |
| **2013**  **Year 10**  **Advanced Mathematics Course** | |
| **Short Answer Questions** | |
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|  | OR |
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|  | Using Pythagoras Theorem. |
|  | Rectangular prism whose dimensions are 9cm × 3 cm × 2 cm. |
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|  |  |
|  | D is 6 units right and 1 unit down from *A*  D is |
|  |  |
|  | Probability of selecting a red marble is  so there are 6 red marbles and since there are 6 blue marbles this leaves 4 white marbles. |
|  | There are 20 divisions on the bar chart, so each is 5%.  Labour costs are 45%, so 9 divisions. |
|  | 9:15 to 12:15 is three hours.  12:15 to 4:25 is four hours and 10 min.  Total time is 7 hours and 10 minutes.  Cost = $40.00 |
|  | Scores 4, 5, 5, 6, 7, 8  Median =  Mode = 5  Mean =  Highest is the mean. |
|  | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  |  |  | O |  |  |  | |  |  | ~~O~~ | ~~O~~ | O |  | ~~O~~ | |  |  | ~~O~~ | ~~O~~ | ~~O~~ | ~~O~~ | ~~O~~ | |  | ~~O~~ | ~~O~~ | ~~O~~ | ~~O~~ | ~~O~~ | ~~O~~ | |  | 0 | 1 | 2 | 3 | 4 | 5 |     Median = 2.5  LQ = 1.5 UQ = 4  Interquartile range = 4 – 1.5 = 2.5 |

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| **Multiple Choice Questions** | | |
|  | 12 hour shift = 8 hrs at normal plus four hrs at time ½  = 8 + 6 = 14 hours  Pay = | B |
|  | Deposit =  Repayments =  Extra paid = | A |
|  |  | C |
|  |  | D |
|  |  | D |
|  | Angle A is between 0 and 90  Angle B is between 90 and 180  Angle C is between 90 and 270  So it can be obtuse, straight or reflex, but not a revolution. | C |
|  |  | B |
|  | Triangle X and Triangle Z both have a two sides and an included angle respectively equal. (SAS) | A |
|  | In  and  there is a common angle A and two angles which are equal (corresponding angles on parallel lines), so they are equiangular, and hence similar. | D |
|  |  | B |
|  |  | A |
|  |  | C |
|  |  | C |
|  |  | B |
|  |  | B |
|  |  | A |
|  |  | D |
|  | Parabola is concave down, so of form  *y* intercept is 16, so equation is | D |
|  |  | C |
|  |  | A |
|  | The outcomes with at least 3 tails are underlined.  HHH, HHT, HTH, HTT, THT, THH, TTH, TTT | C |
|  |  | D |
|  |  | B |
|  | As the scores are in classes, we don’t know enough to exactly find the median, mode or range, but the frequency does give the exact number of players. | C |
|  | |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Denise | | | | | Stem | Alistair | | | | | |  |  |  | 4 | 2 | 0 | 9 |  |  |  |  | |  |  | 4 | 3 | 0 | 1 | 5 | 8 |  |  |  | | 8 | 5 | 3 | 1 | 1 | 2 | 2 | 3 | 4 | 5 |  | |  |  | 5 | 3 | 2 | 3 | 3 | 5 | 5 | 5 | 8 | |  |  |  | 5 | 1 | 4 | 1 | 3 | 4 |  |  |   Lower Quartiles =13 and 22  Median = 23 and 33  Upper Quartile = 33 and 38  Interquartile ranges  Denise =33 – 13 = 20  Alistair = 38 – 22 = 16  IQR are 20 and 16. | A |
|  | Amount =  Interest = $405.07 - $400 = $5.07 | B |
|  |  | C |
|  |  | B |
|  |  | C |
|  |  | A |
|  | Since trying to prove that  we can’t use that information in the proof, so the only equal angles are the right angles at J. So there is insufficient information to prove using *AAS*. | A |
|  |  | D |
|  |  | C |
|  |  | B |
|  |  | B |
|  |  | D |
|  |  | D |
|  |  | A |
|  |  | C |
|  | The graphs are a straight line and a parabola.  They could have no intersection, be a tangent (1 intersection) or have 2 points of intersection. | A |
|  | All quantities for A decrease over time except the Amount in an account when deposits are made, which would increase. | D |
|  |  | B |
|  |  | D |
|  |  | A |
|  | Driving time = 4.5 hrs – 2 hrs(stops)  = 2.5 hrs | C |
|  | There are 52 females, of whom 20 are left handed. | B |
|  | There are 15 tea drinkers of whom 3 are footy fans who don’t play an instrument. | C |
|  | A,C and D are symmetrical, only B is skewed (positively). | B |
|  | Erina has a large standard deviation, so there is a big spread of scores, so, though the mean is in the late forties, most are spread quite widely, with many not in their forties at all, so Mary was incorrect.  Tuncurry has a high mean, and a relatively small SD, so many are older.(66% between 52 and 65)  Jesmond has a low mean and a higher SD, suggesting a mix of younger people, which could be because of young families. (66% between 19 and 40)  Kayla and Lois statements are possible based on the mean and SD, given. (There could also be other reasons for the statistics given, which we don’t know) | A |
|  | Only B and D appear to have linear relationships and B would have a positive gradient, while D would have a negative gradient. | D |

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| **Longer Answer Questions** | | |
| 76. (a) |  | 1 |
| (b) |  | 1 mark for  by wrong exp or error on way.  **2**  (accept either of the last two lines for 2 marks) |
| 77. |  |  |
| (a) |  | 1 mark for partial proof  2 marks for full proof |
| (b) |  | 1 |
| 78. (a) |  | 1 for CD  1 for SA |
| (b) |  | 1 |
| 79. |  | 1 if a simple error made in factoring or simplify  2 for fully simplified answer |
| 80. |  | 2 marks for correct proof  1 mark if a partial attempt made |
| 81. (a) |  | 1 |
| (b) |  | 2 marks for correct answer.  1 mark for attempt with minor error |
| 82. | So triangle is right.  Or by using sides (see below): | 1 mark for showing perpendicular  2 marks for showing isosceles  (1 if error made on way) |
| 83. (a) |  | 1 |
| (b) |  | 1 |
| 84. (a) |  | 1 |
| (b) | There are 12 possible outcomes.  There are 2 outcomes with Carl and Dainelle marked above. | 1 |
| 85. | |  |  | | --- | --- | | Size of group | Frequency | | 1 | 6 | | 2 | 25 | | 3 | 12 | | 4 | 30 | | 5 | 16 | | 6 | 12 | | 7 | 5 | | 8 | 10 | |  |
| (a) |  | 1 |
| (b) |  | 1 |