Western Mathematics Exams

School Name

Yearly Examination

2015

Year 10

Advanced Mathematics Course

Solutions

|  |  |  |  |
| --- | --- | --- | --- |
| Year 10 | | *WME Yearly Advanced Maths* | Non Calculator |
| **Section 1** Short Answer Section | | | |
| ANSWERS | | | |
| No. | WORKING | | ANSWER |
|  |  | | 0.65 |
|  |  | | $40 |
|  |  | | $960 |
|  |  | |  |
|  |  | |  |
|  |  | | 6.6 kg |
|  |  | | 15 000 cm2 |
|  |  | | 18 000 cm3 |
|  |  | |  |
|  |  | |  |
|  |  | | Gradient = 2 |
|  |  | |  |
|  |  | |  |
|  | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  | ⃝ |  |  | |  |  |  |  |  | ⃝ | ⃝ |  | |  |  |  | ⃝ | ⃝ | ⃝ | ⃝ |  | |  |  | ⃝ | ⃝ | ⃝ | ⃝ | ⃝ |  | | ⃝ | ⃝ | ⃝ | ⃝ | ⃝ | ⃝ | ⃝ | ⃝ | | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | | | 35% |
|  |  | | 50.5 |
|  | 12.5 : 50 = 125 : 500  = 5 : 20  = 1 : 4 | | 1 : 4 |
|  |  | |  |
|  |  | |  |
|  |  | | 1300 cm2 |
|  |  | | 120 cm3 |
|  | The points *A’* and *B’* need to be located by any reasonable construction method and the triangle drawn and labelled. | | |
|  | There are 5 black counters, 5 patterned counters and 4 white counters, so both black and patterned have a  chance of being picked up. | | Black and Patterned |
|  |  | |  |
|  |  | | |
|  | **Can also be done by ratio of areas.**  Ratios of Length A : Length B = 4:3  So ratio Area A : Area B = 16:9 | | 180 cm2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year 10 | | *WME Yearly Advanced Maths* | Calculator Allowed | |
| **Section 2 Part A** Multiple Choice Section | | | | |
| ANSWERS | | | | |
| No. | WORKING | | | ANSWER |
|  |  | | | C |
|  |  | | | B |
|  |  | | | B |
|  |  | | | A |
|  |  | | | D |
|  |  | | | C |
|  |  | | | A |
|  |  | | | B |
|  |  | | | D |
|  |  | | | C |
|  |  | | | C |
|  | The data is numerical and since there are points, it is discrete. | | | C |
|  | |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 2 | 2 | 8 |  |  |  |  |  |  |  |  | Q1 | | 3 | 7 | 9 |  |  |  |  |  |  |  |  |  | | 4 | 5 | 7 | 8 | 8 | 8 | 8 |  |  |  |  | Q2 | | 5 | 2 | 4 | 5 | 5 | 7 | 7 | 8 | 8 | 9 |  | Q3 | | 6 | 0 |  |  |  |  |  |  |  |  |  |  |   Q2 (median) =  Q1 (1st quartile ) =  Q3 (3rd quartile) =  Interquartile range = 57 – 46 = 11 | | | B |
|  | P (56 or greater) =  P (less than 56) = | | | D |
|  |  | | | D |
|  |  | | | D |
|  |  | | | A |
|  |  | | | A |
|  |  | | | A |
|  |  | | | B |
|  | 24 is the bottom of the box, so the lower quartile (25% mark).  44 is the top extreme (100% mark)  There are 75% of scores between these. | | | D |
|  | Both have a gradient of 2, so are parallel. | | | C |
|  | It is a concave down parabola, so the equation could be | | | C |
|  | The triangles are similar, one pair of equal angles given, and a pair of vertically opposite angles equal, so triangles are equiangular and hence similar. | | | B |
|  | A strong positive relationship indicates the points group around a straight line which has a positive gradient, so A meets this criteria. | | | A |
|  | Gradient is  Perpendicular line has gradient  .  Required line | | | D |
|  |  | | | B |
|  |  | | | A |
|  | From calculator, correct to 1 dp.  Mean = 8.3 SD = 0.9 | | | A |
|  |  | | | C |
|  |  | | | D |
|  |  | | | B |
|  |  | | | B |
|  | Begins increasing at a decreasing rate due to gradual widening.  Then increases at a constant rate due to constant width.  Then increases at a faster constant rate due to sudden narrowing.  Lastly increases at an increasing rate due to gradual narrowing. | | | A |
|  |  | | | C |
|  |  | | | C |
|  |  | | | D |
|  |  | | | A |
|  |  | | | C |
|  | Ben’s Physics mark is over 3 SD above the mean, where the best of the others is just over 2 SD above the mean, so it is the best in comparison. | | | B |
|  |  | | | B |
|  |  | | | C |
|  | There are 8 colours on each, so there are  pairs of colours possible. | | | C |
|  | Line with gradient of  through the point (12, 5). | | | A |
|  |  | | | A |
|  |  | | | D |
|  |  | | | D |
|  |  | | | C |
|  |  | | | B |
|  | The graph is an exponential so the equation could be | | | D |

School Name

Year 10 Yearly Examination

**WME Yearly Advanced Maths Course 2015**

Multiple Choice Section Answer Sheet

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Teacher \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Completely fill the response oval representing the most correct answer.

Use a black or blue pen or 2B pencil.

26. A B C D

27. A B C D

28. A B C D

29. A B C D

30. A B C D

31. A B C D

32. A B C D

33. A B C D

34. A B C D

35. A B C D

36. A B C D

37. A B C D

38. A B C D

39. A B C D

40. A B C D

41. A B C D

42. A B C D

43. A B C D

44. A B C D

45. A B C D

46. A B C D

47. A B C D

48. A B C D

49. A B C D

50. A B C D

51. A B C D

52. A B C D

53. A B C D

54. A B C D

55. A B C D

56. A B C D

57. A B C D

58. A B C D

59. A B C D

60. A B C D

61. A B C D

62. A B C D

63. A B C D

64. A B C D

65. A B C D

66. A B C D

67. A B C D

68. A B C D

69. A B C D

70. A B C D

71. A B C D

72. A B C D

73. A B C D

74. A B C D

75. A B C D

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
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| **Section 2 Part B** Longer Answer Section | | | | |
| ANSWERS | | | | |
|  | | | | **Marks** | |
| 76. | 1. The data is positively skewed. | | | 1 mark for correct answer |
|  | Or using Stats function on calculator. | | | 1 mark for correct answer |
|  | 1. Interquartile range = 8.75 – 3.00 = 5.75 | | | 1 mark for correct answer  Allow within 0.25 of the upper and lower quartiles and hence error in the consequent answer. |
|  | 1. Standard deviation = 4.07 ( to 2 decimal places)   From Stats function on calculator. | | | 1 mark for correct answer |
| 77. | (a) | | | 2 marks for correct answer  1 mark for answer with working that shows some correct factorisations and simplifications. |
|  | (b) | | | 2 marks for correct answer  1 mark for answer with working that shows some correct algebraic manipulation toward answer |
| 78. |  | | | 2 marks for a complete proof that includes all necessary steps and reasons where required.  1 mark for a proof that is incomplete, or has a minor error in reasoning or has reasons missing. |
| 79. | (a) | | | 1 mark for correct answer |
|  | (b) | | | 1 mark for correct answer |
|  | (c) | | | 1 mark for correct answer |
| 80. | (a) | | | 1 mark for correct diagram with outcomes |
|  | (b)  Those with a blue included are marked | | | 1 mark for correct answer |
|  | (c)  Those with a blue or red included but not both are marked | | | 1 mark for correct answer |
| 81. | Sides which appear equal are *AC* and *BC*, so test these first.  OR | | | 2 marks for solution which shows two sides are equal and hence that the triangle is isosceles.  Use of distance formula is preferred, but not essential.  1 mark for attempt to show sides equal using coordinate methods, with an error in calculation, or reasoning; for example if student finds gradients and uses this to show equal sides, whereas in fact it would show perpendicular sides. |
| 82. | (a) | | | 1 mark for correct answer of    Simplest surd form is not needed for the mark, just supplied to compare with those who do go this far. |
|  | (b) | | | 2 marks for both correct answers  1 mark for answer(s) with working that shows some correct algebraic manipulation toward answer. |
| 83. |  | | | (a)  2 marks for correct shaped parabola, including the *x* and *y* intercepts, exact vertex not required.  1 mark if factorised incorrectly to obtain intercepts, or otherwise a minor error in calculation or drawing.  (b) 1 mark for the correct circle with centre and radius correct.  (c) 1 mark for (3.0, 1.0) (-1.5, -11.5) and (-4, -1.5) [also accept (-3.5, -1.5)] |