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| MC900229237[1] ACE Examinations  2016  **YEAR 10**  **HALF YEARLY EXAMINATION** | | Student Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Mathematics | | |
| **General Instructions**   * Reading time - 5 minutes * Working time - 90 minutes * Write using black or blue pen * You may use a pencil to draw or complete diagrams * Calculators may be used | **Total marks - 60**  **Section 1**  **25 marks**  Attempt Questions 1-25  Allow 35 minutes for this section  **Section 2**  **35 marks**  This section has two parts  Part A - Questions 26-30 25 marks  Part B - Questions 31-32 (advanced) 10 marks  Allow 55 minutes for this section | |

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| Section 1 |
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| 25 marks |
| Attempt Questions 1 - 25 |
| Allow about 35 minutes for this section |
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| Use the multiple-choice answer sheet for Questions 1-25 |
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| 1. Which of these expressions is equivalent to ? | | |
|  | (A) | |
|  | (B) | |
|  | (C) | |
|  | (D) | |
|  | | |
| 1. Which of the following four numbers is the largest? | | |
|  | | (A) 0.3 |
|  | | (B) |
|  | | (C) |
|  | | (D) |
|  | | |
| 1. The admission fee to a concert is $18 for an adult and $8 for a child.   A family of five people paid $60 admission fee.  How many children and adults were there? | | |
|  | | (A) 2 adults and 2 children |
|  | | (B) 2 adults and 3 children |
|  | | (C) 3 adults and 2 children |
|  | | (D) 3 adults and 3 children |
|  | | |
| 1. What is the total surface area of this rectangular prism? | | |
|  | | |
|  | | (A) 30 m2 |
|  | | (B) 36 m2 |
|  | | (C) 60 m2 |
|  | | (D) 72 m2 |

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| 1. Three biased coins are tossed 100 times and the results shown below. | | |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | Number of heads | 0 | 1 | 2 | 3 | | Frequency | 17 | 21 | 29 | 33 | | | |
| What is the experimental probability of obtaining two heads? | | |
|  | | (A) |
|  | | (B) |
|  | | (C) |
|  | | (D) |
|  | | |
| 1. Owen is a tiler whose normal rate of pay is $28.50 per hour.   He is paid an additional $5.25 per hour for working on hot days.  How much will he earn for working on a hot day for eight hours? | | |
|  | (A) $42.00 | |
|  | (B) $70.50 | |
|  | (C) $233.25 | |
|  | | (D) $270.00 |
|  | | |
| 1. The cost *c* (in dollars) of hiring a bicycle for *h* (hours) is given by the formula .   What is the cost of hiring a bicycle for 4 hours? | | |
|  | | (A) $12 |
|  | | (B) $17 |
|  | | (C) $32 |
|  | | (D) $39 |
|  | | |
| 1. What is the interquartile range of the data displayed in the boxplot below? | | |
|  | | |
|  | | (A) 15 |
|  | | (B) 20 |
|  | | (C) 21 |
|  | | (D) 25 |

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| 1. What is the median of this set of scores? | |
| |  |  | | --- | --- | | **Score** | **Frequency** | | 7 | 3 | | 8 | 4 | | 9 | 2 | | 10 | 11 | | |
|  | (A) 8.5 |
|  | (B) 9.0 |
|  | (C) 9.5 |
|  | (D) 10.0 |
|  | |
| 1. Two fair dice are rolled in a game.   The score is the sum of the digits that are ‘face-up’.  What score is most likely? | |
|  | (A) 6 |
|  | (B) 7 |
|  | (C) 8 |
|  | (D) 9 |
|  | |
| 1. The area of the following square is 196 cm2. | |
|  | |
| The circumference of the circle touches each side of the square.  What is the approximate area of the circle? | |
|  | (A) 44 cm2 |
|  | (B) 88 cm2 |
|  | (C) 154 cm2 |
|  | (D) 616 cm2 |
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| 1. Ten letters of the word CALCULATOR are written on separate cards.   The cards are placed face down on a table. One card is chosen at random.  What is the probability of choosing A or an L? | |
|  | (A) |
|  | (B) |
|  | (C) |
|  | (D) |
|  | |
| 1. The result of a survey was 2, 5, 5, 4, 5, 6, 6, 4, 7, 5, 6, 6, 7, 3 and 6.   Which of the following statements is correct? | |
|  | (A) 6 is the mean. |
|  | (B) 6 is the mode. |
|  | (C) 6 is the median. |
|  | (D) 6 is the range. |
|  | |
| 1. Charles receives $2,200 per month, plus a 6% commission on his monthly sales.   What is his monthly earnings if he makes $56 400 worth of sales in a month? | |
|  | (A) $1,184 |
|  | (B) $3,384 |
|  | (C) $4,164 |
|  | (D) $5,584 |
|  | |
| 1. How many 4 cm cubes can be packed in a box measuring 8 cm by 8cm by 8cm? | |
|  | |
|  | (A) 4 |
|  | (B) 8 |
|  | (C) 10 |
|  | (D) 16 |
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| 1. A small business made an average profit of $16 000 per month last year.   It made a loss of $9,600 in the first month this year.  How much profit does the small business need to make in the second month to achieve the same average profit as last year? | | | |
|  | | (A) $6400 | |
|  | | (B) $22 400 | |
|  | | (C) $25 600 | |
|  | | (D) $41 600 | |
|  | | | |
| 1. Expand and simplify | | | |
|  | | (A) | |
|  | | (B) | |
|  | | (C) | |
|  | | (D) | |
|  | | | |
| 1. Which of the following would pay the most? | | | |
|  | | (A) 4 hours at triple rate. | |
|  | | (B) 5 hours at the normal rate and 6 hours at time-and-a-half. | |
|  | | (C) 6 hours at the normal rate and 3 hours at double time. | |
|  | | (D) It cannot be determined unless the normal rate is known. | |
|  | | | |
| 1. Factorise completely | | | |
|  | | (A) | |
|  | | (B) | |
|  | | (C) | |
|  | | (D) | |
|  | | | |
| 1. One card is selected from cards labelled 1, 2, 3, 4 and 5.   What is the probability of an odd number or a number divisible by 4? | | |
|  | (A) 40% | |
|  | (B) 60% | |
|  | (C) 80% | |
|  | (D) 100% | |
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| 1. Box A contains two red and two blue counters and box B contains three red counters and one blue counter. A counter is selected for each box.   What is the probability of selecting two red counters? | | |
|  | (A) | (B) |
|  | (C) | (D) |
|  | | |
| 1. Which operations are needed to find the value of *x*, if ? | | |
|  | (A) Add 49 then divide by 2. | |
|  | (B) Add 49 then find the square root. | |
|  | (C) Subtract 49 then divide by 2. | |
|  | (D) Subtract 49 then find the square root. | |
|  | | |
| 1. What is  simplified? | | |
|  | (A) 1 | |
|  | (B) 2 | |
|  | (C) 3 | |
|  | (D) 4 | |
|  | | |
| 1. The volume of the right-angled triangular prism shown below is 80 cm3. | | |
|  | | |
| What is the value of *y*? | | |
|  | (A) 2 | |
|  | (B) 4 | |
|  | (C) 8 | |
|  | (D) 8.5 | |
|  | | |
| 1. Stephanie invested $4,800 four years ago, and now has $5,952 ready to withdraw.   What was the annual flat rate of interest Stephanie earned on her investment? | | |
|  | (A) 3.1% | |
|  | (B) 6% | |
|  | (C) 7.68% | |
|  | (D) 19.2% | |
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| Section 2 Part A |
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| 25 marks |
| Attempt Questions 26 ‒ 30 |
| Allow about 40 minutes for this section |
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| Answer the questions in the spaces provided. |
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| All necessary working should be shown in every question. |
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| **Question 26** | | | (5 marks) |  | **Marks** |
|  |  |  | | |  |
| (a) | Evaluate  correct to four decimal places. | | | | **1** |
|  |  | | | |  |
| (b) | Simplify the following. | | | |  |
|  | (i) |  | | | **1** |
|  |  | | | |  |
|  | (ii) |  | | | **1** |
|  |  | | | |  |
|  | (iii) |  | | | **1** |
|  |  | | | |  |
|  | (iv) |  | | | **1** |
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| **Question 27** | | | | (5 marks) | | |  | | | | | | | | | | **Marks** |
|  |  |  | | | | | | | | | | | | | | |  |
| (a) | Two retail stores make the following offers to their customers. | | | | | | | | | | | | | | | |  |
|  | **Store 1**  20% DISCOUNT  off all Blu-rays  **Store 2**  Buy 5 Blu-rays and  get an extra one free | | | | | | | | | | | | | | | |  |
|  | Louis and Rose are shopping for Blu-rays with a retail price of $23.25. | | | | | | | | | | | | | | | |  |
|  | (i) | Louis buys 12 Blu-rays from Store 1. How much does he pay? | | | | | | | | | | | | | | | **1** |
|  |  | | | | | | | | | | | | | | | |  |
|  | (ii) | Rose wants 6 Blu-rays from Store 2. What is the cost? | | | | | | | | | | | | | | | **1** |
|  |  | | | | | | | | | | | | | | | |  |
|  | (iii) | Which store gives better value for money? Give a reason. | | | | | | | | | | | | | | | **1** |
|  |  | | | | | | | | | | | | | | | |  |
| (b) | The number of students absent in the past 13 days is shown below. | | | | | | | | | | | | | | | |  |
|  | 11 | | 5 | | 13 | 8 | | 24 | 12 | 10 | 13 | 4 | 8 | 17 | 9 | 6 |  |
|  | (i) | | | Find the median number of students. | | | | | | | | | | | | | **1** |
|  |  | | | | | | | | | | | | | | | |  |
|  | (ii) | | | Find the mean number of students. | | | | | | | | | | | | | **1** |
|  |  | | | | | | | | | | | | | | | |  |

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| **Question 28** | | | (5 marks) |  | **Marks** |
|  |  |  | | |  |
| (a) | A spa is the shape of a cylinder with a radius of 0.9 metres. | | | |  |
|  |  | | | |  |
|  | (i) | What is the diameter of the spa? | | | **1** |
|  |  | | | |  |
|  | (ii) | Find the cross-sectional area of the spa, correct to 2 decimal places. | | | **1** |
|  |  | | | |  |
|  | (iii) | What is the volume of water in the spa if it is filled to a depth of 90 cm? Answer correct to the nearest cubic metre. | | | **1** |
|  |  | | | |  |
|  | (iv) | What is the capacity of water in the spa? Answer to the nearest litre. | | | **1** |
|  |  | | | |  |
|  | (v) | The spa loses 2.4% of the water each week due to evaporation.  How much water will be left in the spa after one week?  Answer correct to the nearest litre. | | | **1** |
|  |  | | | |  |

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| **Question 29** | | | (5 marks) |  | **Marks** |
|  |  |  | | |  |
| (a) | Christopher earns $16.50 per hour. He receives a 12% pay increase.  How much will Christopher earn if he works for 40 hours? | | | | **1** |
|  |  | | | |  |
| (b) | What is the basic numeral for ? | | | | **1** |
|  |  | | | |  |
| (c) | A bank offers a compound interest rate of 5% p.a. | | | |  |
|  | (i) | How much interest will Aaron receive if he invests $10 000 for  4 years with the bank? | | | **2** |
|  |  | | | |  |
|  | (ii) | How much money did Bonnie invest with the bank if she received a cheque for $8,389 at the end of 6 years? | | | **1** |
|  |  | | | |  |

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| **Question 30** | | | (5 marks) |  | **Marks** |
|  |  |  | | |  |
| (a) | A bag contains three red (R) and two black (B) pens.  Two pens are selected without replacement. | | | |  |
|  | (i) | Draw a tree diagram showing all outcomes and probabilities. | | | **2** |
|  |  | | | |  |
|  | (ii) | Find the probability of selecting a black pen followed by a red pen. | | | **1** |
|  |  | | | |  |
|  | (iii) | Find the probability of selecting exactly two red pens. | | | **1** |
|  |  | | | |  |
|  | (iv) | Find the probability of selecting exactly one red pen. | | | **1** |
|  |  | | | |  |

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| Section 2 Part B: Advanced |
|  |
| 10 marks |
| Attempt Questions 31 ‒ 32 |
| Allow about 15 minutes for this section |
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| Answer the questions in the spaces provided. |
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| All necessary working should be shown in every question. |
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| **Question 31** | | | (5 marks) |  | **Marks** |
|  |  |  | | |  |
| (a) | Chase decides to buy a car for $23 000. He has saved $9,000 for the deposit and takes out a flat-rate loan over two years for the balance. The interest charged is 13% per annum. | | | |  |
|  | (i) | What is the balance? | | | **1** |
|  |  | | | |  |
|  | (ii) | What is the total amount of interest to be paid? | | | **1** |
|  |  | | | |  |
|  | (iii) | What will be his monthly repayment? Answer to the nearest cent. | | | **1** |
|  |  | | | |  |
| (b) | Simplify | | | | **2** |
|  |  | | | |  |

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| **Question 32** | | | (5 marks) |  | **Marks** |
|  |  |  | | |  |
| (a) | Simplify | | | | **1** |
|  |  | | | |  |
| (b) | Solve | | | | **1** |
|  |  | | | |  |
| (c) | Find the values of *x* if the distance between (*x*, 2) and (5, -1) is . | | | | **1** |
|  |  | | | |  |
| (d) | Consider the following composite shape. | | | |  |
|  |  | | | |  |
|  | (i) | What is the value of *x*, correct to 2 decimal places? | | | **1** |
|  |  | | | |  |
|  | (ii) | What is the area of the composite shape, correct to 1 decimal place? | | | **1** |
|  |  | | | |  |

**End of test**