|  |  |  |
| --- | --- | --- |
| MC900229237[1] ACE Examinations  2016  **YEAR 9**  **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 | |

|  |
| --- |
| Section 1 |
|  |
| 25 marks |
| Attempt Questions 1 - 25 |
| Allow about 35 minutes for this section |
|  |
| Use the multiple-choice answer sheet for Questions 1-25 |
|  |

|  |  |  |  |
| --- | --- | --- | --- |
| 1. Simplify . | | | |
|  | | (A) | |
|  | | (B) | |
|  | | (C) | |
|  | | (D) | |
|  | | | |
| 1. Which of the following has the same value as ? | | | |
|  | | | (A) |
|  | | | (B) |
|  | | | (C) |
|  | | | (D) |
|  | | | |
| 1. Which one is the largest? | | | |
|  | (A) | | |
|  | (B) | | |
|  | (C) 70% | | |
|  | (D) 0.095 | | |
|  | | | |
| 1. Which of the following expressions would correctly increase $15.40 by 30%? | | | |
|  | | | (A) |
|  | | | (B) |
|  | | | (C) |
|  | | | (D) |
|  | | | |

|  |  |
| --- | --- |
| 1. $1,400 is invested at 6% per annum.   How much simple interest is earned between 30 September and 1 January? | |
|  | (A) $15 |
|  | (B) $21 |
|  | (C) $28 |
|  | (D) $84 |
|  | |
| 1. A crowd of approximately 78 000 attended the final.   What is this number in scientific notation? | |
|  | (A) |
|  | (B) |
|  | (C) |
|  | (D) |
|  | |
| 1. What is the value of  if ? | |
|  | (A) |
|  | (B) |
|  | (C) 4 |
|  | (D) 16 |
|  | |
| 1. Connor earns $8,812 gross a month and has annual deductions of $26,448 tax and $3,120 for health insurance. What is his net monthly income? | |
|  | (A) $6,348 |
|  | (B) $6,608 |
|  | (C) $38,380 |
|  | (D) $76,176 |
|  | |
| 1. Which number is three less than the number ? | |
|  | (A) |
|  | (B) |
|  | (C) |
|  | (D) |
|  | |

|  |  |
| --- | --- |
| 1. Eve earns $16.80 per hour for the first 4 hours she works each day. For any additional hours she receives an extra 30%. Last week Eve worked 4 hours on Monday, 6 hours on Tuesday and Wednesday, 8 hours on Thursday and just 2 hours on Friday.   How much did Eve earn last week? | |
|  | (A) $342.72 |
|  | (B) $436.80 |
|  | (C) $477.12 |
|  | (D) $567.84 |
|  | |
| 1. Which of the following is an irrational number? | |
|  | (A) |
|  | (B) 3.5 |
|  | (C) |
|  | (D) |
|  | |
| 1. Lily earns $700 per week plus 5% commission on her total weekly sales over $60 000.   What is the value of her sales in a week when she earns $1200? | |
|  | (A) $10 000 |
|  | (B) $24 000 |
|  | (C) $70 000 |
|  | (D) $84 000 |
|  | |
| 1. Which of the following trigonometry ratios is correct for the triangle below? | |
|  | |
|  | (A) |
|  | (B) |
|  | (C) |
|  | (D) |
|  | |

|  |  |
| --- | --- |
| 1. What is the solution to the equation ? | |
|  | (A) |
|  | (B) |
|  | (C) |
|  | (D) |
|  | |
| 1. Hayden’s home repayments increased from $972.22 to $994.24 per fortnight.   How much extra will Hayden repay each year? | |
|  | (A) $22.02 |
|  | (B) $154.14 |
|  | (C) $572.52 |
|  | (D) $1145.04 |
|  | |
| 1. What is the midpoint of the line segment joining the points  and (5, 4)? | |
|  | (A) |
|  | (B) |
|  | (C) |
|  | (D) |
|  | |
| 1. Which of the following is the best price for a litre of petrol? | |
|  | (A) $1.36 for 1 L |
|  | (B) $2 for 1.75 L |
|  | (C) $1.50 for  L |
|  | (D) $1 for 750 mL |
|  | |
| 1. What is Pythagoras theorem for this right-angled triangle? | |
|  | |
|  | (A) |
|  | (B) |
|  | (C) |
|  | (D) |
|  | |

|  |  |  |
| --- | --- | --- |
| 1. What is the value of ? | | |
|  | | |
|  | (A) | |
|  | (B) | |
|  | (C) | |
|  | (D) | |
|  | | |
| 1. What is the solution to the equation ? | | |
|  | | (A) |
|  | | (B) |
|  | | (C) |
|  | | (D) |
|  | | |
| 1. Ashton and Bailey receive 72 text messages in the ratio 5:4.   How many text messages does Bailey receive? | | |
|  | | (A) 8 |
|  | | (B) 32 |
|  | | (C) 40 |
|  | | (D) 56 |
|  | | |

|  |  |  |
| --- | --- | --- |
| 1. What is the gradient of the following line? | | |
|  | | |
|  | (A) | (B) |
|  | (C) | (D) |
|  | | |
| 1. The sum of two numbers is 8. One of the numbers is *x*.   What is the product of the two numbers? | | |
|  | (A) | |
|  | (B) | |
|  | (C) | |
|  | (D) | |
|  | | |
| 1. What is the speed of a car in m/s given that it travels 140 km in 4 hours? | | |
|  | (A) 9.7 | |
|  | (B) 583 | |
|  | (C) 35 000 | |
|  | (D) 126 000 000 | |
|  | | |
| 1. If , then | | |
|  | (A) | |
|  | (B) | |
|  | (C) | |
|  | (D) | |

|  |
| --- |
| Section 2 Part A |
|  |
| 25 marks |
| Attempt Questions 26 ‒ 30 |
| Allow about 40 minutes for this section |
|  |
| Answer the questions in the spaces provided. |
|  |
| All necessary working should be shown in every question. |
|  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question 26** | | | (5 marks) |  | **Marks** |
|  |  |  | | |  |
| (a) | Find the value of , correct to two decimal places. | | | |  |
|  |  | | | |  |
| (b) | Jett bought a second-hand car for $9600. He then sold it for $12 600. Find: | | | |  |
|  | (i) | Profit on the sale. | | | **1** |
|  |  | | | |  |
|  | (ii) | Profit as a percentage of the cost price. | | | **1** |
|  |  | | | |  |
| (c) | What is the solution to the equation ? | | | | **1** |
|  |  | | | |  |
| (d) | Find the coordinates of the *x*-intercept for the linear relation *y* = 2*x* + 14. | | | | **1** |
|  |  | | | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question 27** | | | (5 marks) |  | **Marks** |
|  |  |  | | |  |
| (a) | Find George’s net pay for the week if he earns $1254 but pays 24% income tax, 9% superannuation and has other deductions of $204.60 per week. | | | | **1** |
|  |  | | | |  |
| (b) | John drives from Sydney to Melbourne. He travels the 870 km trip in 12 h. | | | | **1** |
|  | (i) | Find John’s average speed in km/h. | | |  |
|  |  | | | |  |
|  | (ii) | How long would it take for John to travel 29 km when travelling at this speed? Answer correct to the nearest minute. | | | **1** |
|  |  | | | |  |
| (c) | Find the value of *x* if | | | | **1** |
|  |  | | | |  |
| (d) | A piece of software was originally marked at $120 is reduced in price by 50%. In a clearance sale the software is reduced by a further 25% off the discounted price. What price does the customer pay for the software? | | | | **1** |
|  |  | | | |  |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Question 28** | | | (5 marks) |  | | | **Marks** |
|  |  |  | | | | |  |
| (a) | Expand each of the following, simplifying when possible. | | | | | |  |
|  | (i) |  | | | | | **1** |
|  |  | | | | | |  |
|  | (ii) |  | | | | | **1** |
|  |  | | | | | |  |
| (b) | Sketch the graph of the following linear relations. | | | | | |  |
|  | (i) | *y* = 2 | | | (ii) |  | **2** |
|  |  | | | |  | |  |
|  |  | | | |  | |  |
| (c) | Given  and , evaluate . | | | | | | **1** |
|  |  | | | | | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question 29** | | | (5 marks) |  | **Marks** |
|  |  |  | | |  |
| (a) | Find the value of *θ*  to the nearest degree. | | | | **1** |
|  |  | | | |  |
|  |  | | | |  |
| (b) | Three less than the square of a number is 118. What is the number? | | | | **1** |
|  |  | | | |  |
| (c) | Joe works 38 hours at a normal rate of $20.80. He also works 6 hours at time-and-a-half and 2 hours at double time. Find his total pay for the week. | | | | **1** |
|  |  | | | |  |
| (d) | A pair of shoes is marked at $84 after being reduced by 30% in a stock-take sale. What was the original price of the pair of shoes? | | | | **1** |
|  |  | | | |  |
| (e) | Simplify | | | | **1** |
|  |  | | | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question 30** | | | (5 marks) |  | **Marks** |
|  |  |  | | |  |
| (a) | What is Keira’s holiday loading if she is paid 17.5% on four weeks pay, given that she earns $1872.60 per fortnight? | | | | **1** |
|  |  | | | |  |
| (b) | The formula  gives the volume of water (*V* litres) in a tank after a time of *t* seconds. | | | |  |
|  | (i) | Find the volume after 5 minutes. | | | **1** |
|  |  | | | |  |
|  | (ii) | What is the time taken for the volume to reach 3,200 litres?  Answer correct to the nearest minute. | | | **1** |
|  |  | | | |  |
| (c) | Use Pythagoras’ theorem to find *x* and then find the area of the triangle. | | | | **2** |
|  |  | | | |  |
|  |  | | | |  |

|  |
| --- |
| Section 2 Part B: Advanced |
|  |
| 10 marks |
| Attempt Questions 31 ‒ 32 |
| Allow about 15 minutes for this section |
|  |
| Answer the questions in the spaces provided. |
|  |
| All necessary working should be shown in every question. |
|  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question 31** | | | (5 marks) |  | **Marks** |
|  |  |  | | |  |
| (a) | A rectangular lawn has a length 6 m longer than its breadth. | | | |  |
|  | (i) | What is the breadth if the side length is *x*? | | | **1** |
|  |  | | | |  |
|  | (ii) | What is the perimeter of the lawn? | | | **1** |
|  |  | | | |  |
| (b) | A shirt and tie together cost $80.  What is the cost of the tie if the shirt cost $32 more than the tie? | | | | **1** |
|  |  | | | |  |
| (c) | How long will it take for an investment of $20 000 to double if it is invested at 8% p.a. simple interest? | | | | **1** |
|  |  | | | |  |
| (d) | Convert  to fraction. | | | | **1** |
|  |  | | | |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Question 32** | | | (5 marks) |  | **Marks** |
|  |  |  | | |  |
| (a) | The area of a trapezium is given by . Make *b* the subject. | | | | **1** |
|  |  | | | |  |
| (b) | Solve | | | |  |
|  | (i) |  | | | **1** |
|  |  | | | |  |
|  | (ii) |  | | | **1** |
|  |  | | | |  |
| (c) | Find the exact value of *x* in the following right-angled triangle. | | | | **1** |
|  |  | | | |  |
|  |  | | | |  |
| (d) | Find the equation of the line with a gradient of 2 that passes through (4, 6). | | | | **1** |
|  |  | | | |  |

**End of test**