|  |  |
| --- | --- |
| **High School** | |
| **Yearly Examination 2012** | |
| **Year 10**  **Mathematics A Course** | |
| **General Instructions**   * Reading time: 5 minutes * Working time: 2 hours * There will be a short break between Section 1 and Section 2 * Write using black or blue pen * You may use a pencil to draw or complete diagrams * Attempt ALL questions * Approved calculators may be used in Section 2. * Write your Name and Teacher’s Name in the spaces provided. * A formula Sheet is on the reverse of this page and can be detached and used in all sections of the test. | **Total Marks – 100**  **Section 1**  Non Calculator Section.  **25 marks**  Time allowed for this section is 30 minutes.  Write all answers in the spaces provided.  **Section 2**  Time allowed for this section is 1 hour and 30 minutes.  **Part A**  Multiple Choice Section.  Mark your answers on the separate answer sheet at the end of the examination.  **50 marks**  **Part B**  Longer Answer Section.  Write all answers in the spaces provided.  **25 marks** |

Formula Sheet

**Pythagoras’ Theorem**



*c* = hypotenuse

*a* and *b* are the shorter sides

**Circumference of a circle**



*d* = diameter

**Area of a circle**



*r* = radius

**Area of a parallelogram**



*b* = base

*h* = perpendicular height

**Area of a rhombus or kite**



*x* and *y* are the diagonals

**Area of a trapezium**



*h* = perpendicular height

*a* and *b* are the parallel sides

**Volume of a prism**



*A* = area of base

*h* = perpendicular height

**Volume of a pyramid**



*A* = area of base

*h* = perpendicular height

**Volume of a cylinder**



*r* = radius

*h* = perpendicular height

**Volume of a cone**



**Volume of a sphere**



**Surface Area of a Cylinder**



**Surface Area of Cone**



*r* = radius

*l* = slant height

**Surface Area of a sphere**



**Trigonometric formulae for a triangle ABC.**

**Sine Rule**



**Cosine Rule**



or



**Area of a triangle**



**Simple interest**



*P* = Principal

*R* = interest rate per time period as a decimal

*T* = number of time periods

**Compound Interest**



*A =* Final amount to which the investment grows

*P* = Principal

*r* = interest rate per compounding period as a decimal

*n* = number of compounding periods

**Depreciation**



*SV =* Salvage Value to which the initial value falls

*IV* = Initial Value

*r* = depreciation rate per compounding period as a decimal

*n* = number of compounding periods

**Gradient of a line**



 and  are points on the line

*m* = gradient

**Midpoint of a line segment**



**Length of a line segment**



**Equation of a line**



or



*b* = *y* intercept

Yearly Examination 2012

**Mathematics A**

Class/Teacher \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Section 1**

**25 marks**

Time allowed for this section is 30 minutes

Answer Questions 1–25 in the spaces provided.

Calculators are **NOT** to be used in this section.

There will be a short break between Section 1 and Section 2.

|  |  |
| --- | --- |
| **Section 1** Non Calculator Section | |
|  | Write all working and answers in the spaces provided on this test paper. |
| 1. | ……………………………………………………………………………………………………..  …………………………………………………………………………………………………….. |
| 2. | Write the next two lines in this pattern:    ……………………………………………………………………………………………………..  …………………………………………………………………………………………………….. |
| 3. | Add  ……………………………………………………………………………………………………..  …………………………………………………………………………………………………….. |
| 4. | Write 78 500 000 in Standard Notation (Scientific Notation).  ……………………………………………………………………………………………………..  …………………………………………………………………………………………………….. |
| 5. | Mickey worked a 7½ hour day on Sunday and was paid double time rates. If his normal hourly rate is $23.40, what did he earn on Sunday?  ……………………………………………………………………………………………………..  …………………………………………………………………………………………………….. |
| 6. | Write  as a recurring decimal.  ……………………………………………………………………………………………………..  …………………………………………………………………………………………………….. |
| 7. | There were 240 cars in the Minex staff carpark last Wednesday.  The ratio of cars to bikes in the carpark on Wednesday was 12: 5.  How many bikes were in the carpark?  ……………………………………………………………………………………………………..  …………………………………………………………………………………………………….. |
| 8. | An overnight bag, originally priced at $105 is offered at a discount of 40%. What is the selling price after the discount is applied?  ……………………………………………………………………………………………………..  …………………………………………………………………………………………………….. |
| 9. | Saskia makes 40 muffins for a birthday party and she ices 16 of them.  What percentage of her muffins are iced?  ……………………………………………………………………………………………………..  …………………………………………………………………………………………………….. |
|  | Questions 10 and 11 refer to the diagram below where matchsticks have been used to make the first 3 steps in a pattern.        *Step 1 Step 2* *Step 3*  5 matches 12 matches 19 matches |
| 10. | How many matches would be needed to make step 6 of the pattern?  ……………………………………………………………………………………………………..  …………………………………………………………………………………………………….. |
| 11. | Write a formula for **N**, the number of matches that would be needed to make step ***s*** of the pattern.  ……………………………………………………………………………………………………..  ……………………………………………………………………………………………………. |
| 12. | Expand and simplify the expression  ……………………………………………………………………………………………………..  ……………………………………………………………………………………………………. |
| 13. | Find the value of *x*, if .  ……………………………………………………………………………………………………..  …………………………………………………………………………………………………….  ……………………………………………………………………………………………………..  ……………………………………………………………………………………………………. |
| 14. | Draw the graph of the relation  on the number plane provided.  ……………………………………  ……………………………………  ……………………………………  ……………………………………  …………………………………… |
| 15. | Simplify  .  ……………………………………………………………………………………………………..  ……………………………………………………………………………………………………. |
| 16. | What is the gradient of the line joining the points A(-2, 8) and B(1, 2) on the number plane?  ……………………………………  ……………………………………  ……………………………………  ……………………………………  …………………………………… |
|  | Questions 17 and 18 refer to the table and the incomplete sector graph shown below, which give the results of a music magazine poll on favourite heavy metal bands. Two bands are still to be added to the graph.  Chrome Attack   |  |  | | --- | --- | | Name | Number  of Votes | | Chrome Attack | 12 | | Deaf Metal | 30 | | Kings of the Iron Age | 40 | | Metal as Anything | 18 | | Thrash and Trash | 20 | | Ferrica | 45 | | Led Butterfly | 15 |   Deaf Metal  Kings of the Iron Age  Metal as Anything  Thrash and Trash |
| 17. | Name a band which has a sector which measures 36o.  ……………………………………………………………………………………………………. |
| 18. | Complete the graph above to include the two missing bands. |
|  | Questions 19 and 20 refer to the following information.  A car dealership records the numbers of cars it sells each day for the month of January.  The results are shown on the dot plot.   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  | O |  |  |  |  | |  |  | O |  | O |  |  |  |  | |  |  | O |  | O | O |  |  |  | |  | O | O |  | O | O | O |  |  | |  | O | O | O | O | O | O |  |  | | O | O | O | O | O | O | O |  | O | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |   Number of Cars Sold per Day |
| 19. | What was the mean number of cars sold per day (correct to one decimal place)?  ……………………………………………………………………………………………………..  ……………………………………………………………………………………………………. |
| 20. | What was the interquartile range for the number of cars sold per day?  ……………………………………………………………………………………………………..  ……………………………………………………………………………………………………. |
| 21. | A train is scheduled to leave Gosnels at 3:20 pm.  It normally takes 2 hours and 45 minutes to get to Glenelg.  Last Tuesday it was a quarter of an hour late leaving Gosnels and the trip to Glenelg took 12 minutes longer than normal due to track-work.  What time did it arrive at Gosnels last Tuesday?  ……………………………………………………………………………………………………..  ……………………………………………………………………………………………………. |
| 22. | A wall in a restaurant is in the shape of a trapezium with a square window cut into it as shown.  The diagonals of the square window measure 1 metre.  The wall is to be painted. What area requires painting?    ……………………………………………………………………………………………………..  ……………………………………………………………………………………………………. |
| 23. | Find the surface area of the triangular prism shown below.    ……………………………………………………………………………………………………..  ……………………………………………………………………………………………………. |
| 24. | A, B and C are three points on a map.  D is a point which is equidistant from points A and B and is due west of point C.  Use a ruler and compass to show the position of point D. |
| 25. | ABCD is a parallelogram. E is a point on the side BC of the parallelogram.    Find the value of *x*.    ……………………………………………………………………………………………………..  ……………………………………………………………………………………………………. |

Yearly Examination 2012

**Mathematics A**

**Section 2**

**75 marks**

Time allowed for this section is

1 hour and 30 minutes

This section has TWO parts

Part A – Fifty multiple-choice questions worth 1 mark each.

Mark your answers on the separate answer sheet provided at the end of the examination.

Part B – Six longer answer questions worth a total of 25 marks.

Write all answers and working in the spaces provided on this examination paper.

Calculators may be used in this section.

Do not commence Section 2 until you are instructed to do so.

|  |  |
| --- | --- |
|  | Matty is paid normal rates of $32.00 per hour for an 8 hour day, time and a half for the first 4 hours overtime and double time after that. What would he be paid for a 14 hour day?  A. $448 B. $544 C. $560 D. $576 |
|  | The ratio 900 mL : 1.2 L in simplest form is;   1. 3 : 4 B. 3 : 400 C. 3 : 40 D. 30 : 4 |
|  | A car uses fuel at a rate of 12 L/100 km. What is the rate in mL/km?   1. 1.2 mL/km B. 12 mL/km C. 120 mL/km D. 1 200 mL/km |
|  | Which calculation would you use to find the interest on $11 000 invested at 8% p.a. interest compounding quarterly for two years.  A.  B.  C.  D. |
|  | 8.7481 when rounded correct to 3 significant figures is:  A. 8.7 B. 8.74 C. 8.75 D. 8.748 |
|  | Marta buys a laptop for $3 200.00. It depreciates at a rate of 12% pa compounding annually. What is the value of the laptop after four years?  A. $1 536.00 B. $1 919.03 C. $2 180.71 D. $2 816.00 |
|  | A game show has four teams which compete each week, with one team winning the weekly prize. Their results over the last 25 weeks are shown.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Team | Crocs | Skinks | Goannas | Frillnecks | | Number of Wins | 4 | 8 | 7 | 6 |   Based on the previous results, what is the probability that the Crocs will win the 26th game?  A.  B.  C.  D. |
|  | In a game Marcus draws a marble from a bag containing twenty red, fifteen white, ten green and five blue marbles.  What is the probability that the marble is neither blue nor green?  A.  B.  C.  D. |
|  | A.  B.  C.  D. |
|  | If  then:  A.  B.  C.  D. |
|  | The points *P* (-2, -8) and *Q* (1, 1) lie on the line l shown.  The equation of the line l, is:  A.  B.  C.  D. |
|  | Which equation could describe the graph shown?  A.  B.  C.  D. |
|  | As liquid is poured into a container at a constant rate, the level of liquid in the container rises. The graph at right shows the rise in the level over time.  Which container was being filled?  A. B.    C. D. |
|  | The grouped frequency distribution gives the hours spent on completing a class project.   |  |  |  |  | | --- | --- | --- | --- | | Class | Class Centre *x* | Frequency *f* | *fx* | | 1 – 6 | 3.5 | 4 |  | | 7 – 12 | 9.5 | 6 |  | | 13 – 18 | 15.5 | 8 |  | | 19 – 24 | 21.5 | 2 |  | |  |  |  |  |   What was the approximate mean time spent on completing the project?  A. 4 B. 5 C. 11.5 D. 11.9 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Questions 15 - 17 refer to the following.**  Angela collects data on the number of hours spent training by the members of an athletics squad. The results are shown on the stem and leaf plot.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Stem | Leaf | | | | | | 2 | 9 |  |  |  |  | | 3 | 5 | 8 |  |  |  | | 4 | 2 | 3 | 3 | 5 |  | | 5 | 3 | 5 | 5 | 5 | 8 | | 6 | 1 | 3 | 4 |  |  | |  |  |  |  |  |  | | |
|  | What is the modal time spent on training?  A. 35 B. 42 C. 49 D. 55 |
|  | What is the interquartile range of the times spent?  A. 16 B. 42 C. 53 D. 58 |
|  | What is the standard deviation of the training times?  A. 10.4 B. 11 C. 35 D. 53 |
|  | What is the area of the sector of a circle shown, (correct to the nearest cm2)?  A. 101 cm2  B. 134 cm2  C. 268 cm2  D. 804 cm2 |
|  | What is the volume of the sphere?  A. 1 810 cm3  B. 7 238 cm3  C. 57 906 cm3  D. 463 247 cm3 |
|  | A plane flies due north from Georgetown (G) for 450km to Harrow (H). It then turns and flies due east for a distance of 240 km to Indira (I). What is the bearing of Georgetown from Indira?  A. 062o  B. 152o  C. 208o  D. 242o |
|  | A cylindrical pipe is installed as part of a skate park.  The outside curved surface only is to be painted.  The chosen paint covers 20 m2 per can.  What is the least number of cans that are needed to paint the outside of the pipe?  A. 3 B. 4 C. 5 D. 6 |
|  | Which is true?    A. *m* = 24o  B. *m* = 80o  C. *m* = 100o  *D. m* = 128o |
|  | In , *WX =YX* and *M* is the midpoint of *WY*.  Which of the congruence tests could be used to show that .  A. AAS B. RHS C. SAS D. SSS |
|  | The figure shows a regular octagon with an exterior angle drawn.  What is the size of the exterior angle?  A. 35o  B. 45o  C. 55o  D. 60o |
|  | AC = 16 cm, CE = 2 cm and CB = 8 cm.  What is the length of ED?  A. 1 cm.  B. 9 cm.  C. 10 cm.  D. 12 cm. |
|  | A credit card charges interest on outstanding balances at a rate of 0.05% per day. Lesley has an outstanding balance on her credit card of $360.00 for 21 days. How much interest will she be charged on the card?  A. $3.78 B. $12.60 C. $31.50 D. $378.00 | |
|  | Jay completes the calculations below to convert  to a fraction.    There is a mistake in one line of the working. Which line has the mistake?  A. Line 1 B. Line 2 C. Line 3 D. Line 4 | |
|  | can be written as:  A.  B.  C.  D. | |
|  | A.  B.  C.  D. | |
|  | A.  B.  C.  D. | |
|  | Express  as a fraction with a rational denominator.  A.  B.  C.  D. | |
|  | The Venn diagram at right shows whether the students in the class 10S liked History or Maths.  Some liked both subjects and some liked neither.  A student is chosen at random from the class 10S. | |
|  | What is the probability that the student likes Maths?  A.  B.  C.  D. | |
|  | In a game Mario draws two marbles from a bag containing two red, one white and one blue marble.  The tree diagram shows the possible combinations he could draw. | |
|  | What is the probability that neither marble is red?  A.  B.  C.  D. | |
|  | A.  B.  C.  D. | |
|  | What is the value of *y* when the equations below are solved simultaneously?    A.  B.  C.  D. | |
|  | Which statement is not true about the line whose equation is  A. It has a gradient of  .  B. It crosses the *y* axis at *y* = –2.  C. It passes through the point (3, 3)  D. It’s equation can also be written as | |
|  | Which equation could describe the graph shown?  A.  B.  C.  D. | |
|  | A garden bed is to have an area of 120 m2.  Marcia draws a graph to show the possible combinations of length (*l*) and width (*w*) of the bed?  Which graph could be the one that Marcia drew?   1. B.   C. D. | |
|  | **Questions 39 – 40 refer to the following:**  Kevin collects information on the number of weeks that construction projects take to complete.  The box plot below is drawn from the data. | |
|  | What is the interquartile range of the data?  A. 7 B. 9 C. 11 D. 16 | |
|  | Which statement is true?  A. 25% of projects took less than 31 weeks. B. 75% of projects took more than 31 weeks.  C. 25% of projects took more than 22 weeks. D. 75% of projects took more than 22 weeks. | |
|  | Molly is the singer in a band.  Last month she rated each of her performances on a scale from 1 – 12.  The ratings were : 8, 5, 6, 9, 1, 8, 6, 11, 7, 9, 8, 3.  What were the mean and standard deviation of her ratings? (Correct to one decimal place.)  A. Mean = 6.8 and standard deviation = 4.5 B. Mean = 6.8 and standard deviation = 2.6  C. Mean = 7.5 and standard deviation = 4.5 D. Mean = 7.5 and standard deviation = 2.6 | |
|  | What is the approximate value of the mean of the data below?   |  |  |  |  | | --- | --- | --- | --- | | Class |  |  |  | | 0 – 19 | 9.5 | 2 | 19 | | 20 – 39 | 29.5 | 8 | 236 | | 40 – 59 | 49.5 | 6 | 297 | | 60 – 79 | 69.5 | 4 | 278 |  1. 39.5 B. 41.5 C. 79.0 D. 207.5 | |
|  | An Egyptian pyramid has the dimensions shown. What is its volume?  A. 3 584 m3  B. 5 376 m3  C. 7 168 m3  D. 10 752 m3 | |
|  | Find the value of, to the nearest degree.  A. 40  B. 44  C. 51  D. 73 | |
|  | The observatory was built with cylindrical walls and a hemispherical roof. What is the area of the external walls and roof that need to be painted?  A. 175 m2  B. 242 m2  C. 417 m2  D. 1 043 m2 | |
|  | Find the value of *x*, correct to one decimal place.  A. 6.6  B. 9.4  C. 12.8  D. 54.4 | |
|  | *ABCD* and *EFCG* are congruent kites.  Which statement is not true?  A.  B.  C.  D. | |
|  | A quadrilateral has two pairs of opposite sides equal, and diagonals which are unequal. The quadrilateral must be:  A. a parallelogram. B. a rectangle.  C. a rhombus. D. a square. | |
|  | In the diagram, *AB= BC,*  and *DE* || *CA*.  What is the value of *x*?    A. 32 B. 56  C. 92 D. 124 | |
|  | Which triangle is congruent to  A. B.  C. D. | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Section 2**  **Part B**  Longer Answer Section | | | Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| Class/Teacher\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
|  | Write all working and answers in the spaces provided on this examination paper.  Calculators are allowed for this section. | | | |
|  |  |  | | **Marks** |
| 1. | (a) | Arrange the numbers below in ascending order.    ..............................................................................................................................................    ............................................................................................................................................. | | **1** |
| (b) | Express with a rational denominator.  ..............................................................................................................................................    ............................................................................................................................................. | | **1** |
| 2. |  | The Venn diagram at right shows three characteristics of the 80 students in year 10 at a school. | |  |
| (a) | A student is chosen at random from the year 10 students. What is the probability that the student listens to music and plays sport?  .......................................................................................................................................  ....................................................................................................................................... | | **1** |
| (b) | A student is chosen at random from the students who read science fiction. What is the probability that the student also listens to music and plays sport?  .......................................................................................................................................  ....................................................................................................................................... | | **2** |
| 3. | (a) | On the axes provided draw neat sketches of  and .  Clearly mark the *x* and *y* intercepts (if they exist) of each graph. | | **3** |
| (b) | Simplify  by first factorising the terms.  .............................................................................................................................................    .............................................................................................................................................  ............................................................................................................................................. | | **2** |
| (c) | Make *k* the subject of the equation  .............................................................................................................................................    .............................................................................................................................................  ............................................................................................................................................. | | **1** |
| 4. | a) | The grouped frequency distribution table gives the hours spent on completing a class project.     |  |  |  |  |  | | --- | --- | --- | --- | --- | | Class | Class Centre *x* | Frequency *f* | *fx* | Cumulative *f* | | 1 – 5 | 3 | 4 |  |  | | 6 – 10 | 8 | 6 |  |  | | 11 – 15 |  | 8 |  |  | | 16 – 20 |  | 2 |  |  | |  |  |  |  |  |   Complete the table and calculate the mean. | | **2** |
| b) | Draw the cumulative frequency polygon (ogive) for the data. | | **2** |
| (c) | Estimate the interquartile range using the ogive.  .............................................................................................................................................. | | **1** |

|  |  |  |  |
| --- | --- | --- | --- |
| 5. | (a) | Show that the exact value of .  .............................................................................................................................................    .............................................................................................................................................  ............................................................................................................................................. | **1** |
|  | (b) | An equilateral triangle with sides 2 *m*, is divided into three congruent isosceles triangles as shown.  Use trigonometry to show that the length (*x*) of the equal sides of the isosceles triangles is .    .............................................................................................................................................  .............................................................................................................................................    .............................................................................................................................................  ............................................................................................................................................. | **2** |
|  | (c) | Four of the 2 *m* equilateral triangles are used to form the tetrahedron shown. Show that the perpendicular height of the tetrahedron h is  .............................................................................................................................................  .............................................................................................................................................    .............................................................................................................................................  ............................................................................................................................................. | **1** |
|  | (d) | Find the exact volume of the tetrahedron.  .............................................................................................................................................    .............................................................................................................................................  .............................................................................................................................................  ............................................................................................................................................. | **2** |

|  |  |  |  |
| --- | --- | --- | --- |
| 6. | In ∆ *ABC* and ∆ *DEC,* , *AC* = 14 cm, *CD* = 6 cm and *DE* = 9 cm. | |  |
|  | (a) | Prove that ∆ *ABC* ||| ∆ *DEC*.  …………………………………………………………………………………  …………………………………………………………………………………  …………………………………………………………………………………  ………………………………………………………………………………… | **2** |
|  | (b) | Calculate the length of *AB*.  …………………………………………………………………………………  …………………………………………………………………………………  …………………………………………………………………………………  ………………………………………………………………………………… | **1** |
|  |  | **End of Examination** |  |

Unused Page

High School

Year 10 Yearly Exam 2012

Mathematics A Course

Multiple Choice Section Answer Sheet

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

Completely fill the response oval representing the most correct answer.

1. A B C D

2. A B C D

3. A B C D

4. A B C D

5. A B C D

6. A B C D

7. A B C D

8. A B C D

9. A B C D

10. A B C D

11. A B C D

12. A B C D

13. A B C D

14. A B C D

15. A B C D

16. A B C D

17. A B C D

18. A B C D

19. A B C D

20. A B C D

21. A B C D

22. A B C D

23. A B C D

24. A B C D

25. A B C D

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