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| Year  10A | | Mathematics Test  Non-Linear Equations | | Calculator Allowed |
| Short Answer Section | Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
|  | Write all working and answers in the spaces provided on this test paper. | | | |
| 1. | Solve  .......................................................................................................................................................... | | | |
| 2. | Solve  .......................................................................................................................................................... | | | |
| 3. | Solve  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 4. | Solve  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 5. | Solve  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 6. | Solve  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 7. | Solve  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 8. | Solve  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 9. | Solve  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 10. | Solve  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 11. | Give the exact solutions to .  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 12. | Give the solutions to , correct to one decimal place.  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 13. | Use the table below for the equation  to estimate the solution to , correct to one decimal place.     |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | 3.0 | 3.1 | 3.2 | 3.3 | 3.4 | 3.5 | 3.6 | 3.7 | 3.8 | 3.9 | 4.0 | |  |  |  |  |  |  |  |  |  |  |  |  |   ..........................................................................................................................................................    .......................................................................................................................................................... | | | |
| 14. | The diagram below shows the graphs of  Use the diagram to estimate the solution to the equation  .  ..........................................................................................................................................................    .......................................................................................................................................................... | | | |

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| Year  10A | | Mathematics Test  Non-Linear Equations | | Calculator Allowed |
| Multiple Choice Section | Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
|  | Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section. | | | |
| 1. | The solutions to  are:  A.  B.  C.  D. | | | |
| 2. | The solutions to  are:  A.  B.  C.  D. | | | |
| 3. | The solutions to  are:  A.  B.  C.  D. | | | |
| 4. | The solutions to  are:  A.  B.  C.  D. | | | |
| 5. | The solutions to  are:  A.  B.  C.  D. | | | |
| 6. | The solutions to  are:  A.  B.  C.  D. | | | |
| 7. | The solutions to  are:  A.  B.  C.  D. | | | |
| 8. | The solutions to  are:  A.  B.  C.  D. | | | |
| 9. | The solutions to  are:  A.  B.  C.  D. | | | |
| 10. | has solutions:  A.  B.  C.  D. | | | |
| 11. | has solutions:  A.  B.  C.  D. | | | |
| 12. | The graphs of  are shown.  What are the solutions to  ?  A.  B.  C.  D. | | | |
| 13. | The graph of is shown. The solution to (correct to 1 decimal place) is:   1. *x* = 3.0 2. *x* = 3.1 3. *x* = 3.2 4. *x* = 3.5 | | | |

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| Year  10 | | | Mathematics Test  Non-Linear Equations | | Calculator Allowed |
| Longer Questions | Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
|  | Write all working and answers in the spaces provided on this test paper.  Calculators are allowed for this section. | | | | |
| 1. | Write a quadratic equation to represent the information in the questions below and solve the equation to find the solution to the problem posed. | | | | |
|  | (a)  3 marks | A rectangle is 6 metres longer than it is wide. Its area is 135 metres.   1. If its width is *x* metres, write an expression for its length.   ..........................................................................................................................................................   1. Write an expression for its area and form a quadratic equation from this.   ..........................................................................................................................................................   1. Solve the equation and find the width and the length.   ..........................................................................................................................................................  ..........................................................................................................................................................  .......................................................................................................................................................... | | | |
| (b)  2 marks | The number of diagonals (*d*) in a polygon with n sides is  .   1. Write an equation that could be used to find the number of sides in a polygon with 945 diagonals.   ..........................................................................................................................................................   1. Solve the equation and find the number of sides to the polygon.   ..........................................................................................................................................................  ..........................................................................................................................................................  .......................................................................................................................................................... | | | |

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| --- | --- | --- |
| 2. | 2 marks  2 marks | Solve the quadratic equations below by completing the square.      ..........................................................................................................................................................  ..........................................................................................................................................................  ..........................................................................................................................................................      ..........................................................................................................................................................  ..........................................................................................................................................................  .......................................................................................................................................................... |

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| Year  10 | Mathematics Test  Non-Linear Equations | |  |
| Multiple Choice Section  Answer Sheet | Name : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |

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

|  |  |
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| Year  10 | Mathematics Test  Non-Linear Equations |
| Answer Sheet |

|  |  |
| --- | --- |
| Short Answer | |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| 10 |  |
| 11 |  |
| 12 |  |
| 13 |  |
| 14 |  |

|  |  |
| --- | --- |
| Multiple Choice | |
| 1 | C |
| 2 | A |
| 3 | D |
| 4 | D |
| 5 | A |
| 6 | B |
| 7 | B |
| 8 | D |
| 9 | A |
| 10 | D |
| 11 | C |
| 12 | A |
| 13 | C |

|  |  |  |
| --- | --- | --- |
| Longer Answer | | |
| 1 | a i |  |
|  | ii |  |
|  | iii |  |
|  | b i |  |
|  | ii |  |
| 2 | a |  |
|  | b |  |