**Mathematics 20-1: Final Exam**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

This exam consists of 24 multiple choice questions worth 2 marks each and 8 written response questions worth a total of 26 marks. There is a tear-off formula sheet at the back of the exam.

**Multiple Choice Answer Section** *(48 marks)*

Place the letter corresponding to the best answer on the line.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ | 1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ | 1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ | | 1. \_\_\_\_\_ 2. \_\_\_\_\_ | 1. \_\_\_\_\_ 2. \_\_\_\_\_ | | | 1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ | | 1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ | | 1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ | |
| **Scoring Guide: To Be Filled Out By Teacher** | | | | | | | | | | | | | | | |
| **Unit** | | | | **Multiple Choice Questions** | | | **MC Score** | **Written  Questions** | | **Written  Score** | | **Total Mark** | | **Score on Final Exam** | |
| 1: Sequences & Series | | | | 1 – 3 | | | /6 | 1 | | /4 | | /10 | |  | |
| 2: Trigonometry | | | | 4 – 6 | | | /6 | 2 | | /3 | | /9 | |  | |
| 3: Quadratic Functions | | | | 7 – 10 | | | /8 | 3 | | /3 | | /11 | |  | |
| 4: Quadratic Equations | | | | 11 – 12 | | | /4 | 4 | | /3 | | /7 | |  | |
| 5: Radical Expressions & Equations | | | | 13 – 14 | | | /4 | 5 | | /3 | | /7 | |  | |
| 6: Rational Expressions & Equations | | | | 15 – 17 | | | /6 | 6 | | /3 | | /9 | |  | |
| 7: Absolute Value & Reciprocal Functions | | | | 18 – 21 | | | /8 | 7 | | /4 | | /12 | |  | |
| 8: Systems of Equations | | | | n/a | | | n/a | 8 | | /3 | | /3 | |  | |
| 9: Linear & Quadratic Inequalities | | | | 22 – 24 | | | /6 | n/a | | n/a | | /6 | |  | |
| Totals: | | | |  | | | /48 |  | | /26 | | /74 | |  | |

**Mathematics 20-1 Final Exam**

**Multiple Choice Questions** *(2 marks each)*

Record your answers on the front cover of the exam.

1. What are the missing terms of the **arithmetic** sequence: \_\_, 3, 9, \_\_, \_\_?
   1. 1, 27, 81
   2. 9, 3, 9
   3. -6, 12, 17
   4. -3, 15, 21
2. What is the sum of the first five terms of the geometric series 16 807 – 2401 + 343 – ...?
   1. 19 607
   2. 14 707
   3. 16 807.29
   4. 14 706.25
3. The 20th term of a geometric sequence is 524 288 and the 14th term is 8192. The value of the third term could be
   1. 4 only
   2. 8 only
   3. +4 and -4
   4. +8 and -8
4. Which angle in standard position has a different reference angle than all the others?
   1. 125°
   2. 155°
   3. 205°
   4. 335°
5. Which is the exact value of cos 150°?
6. The expression that could be used to determine the measure of angle in the diagram is:

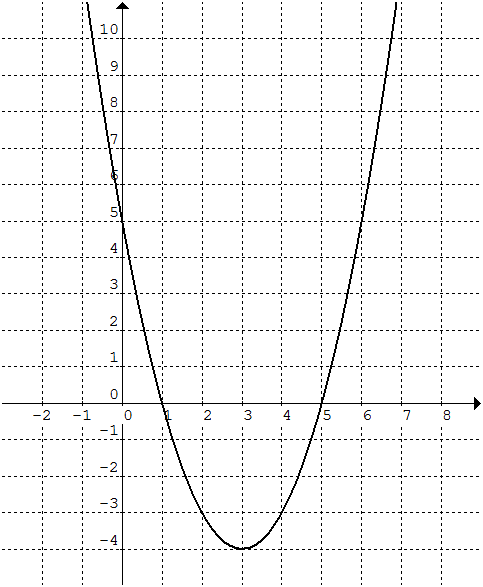
28°

34 cm

70 cm

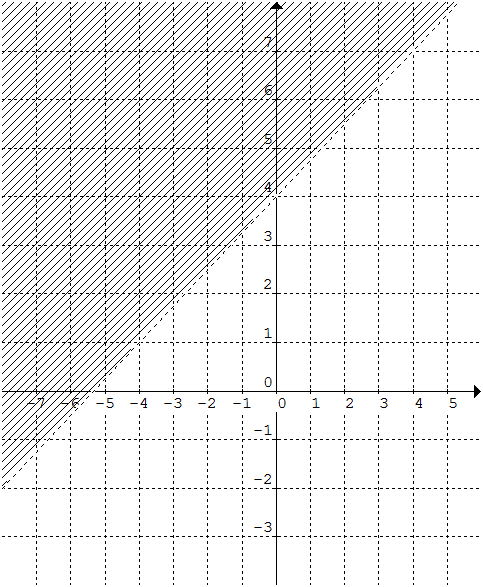


1. What points on the graph of this quadratic function  
    represent the locations of the zeros of the function?



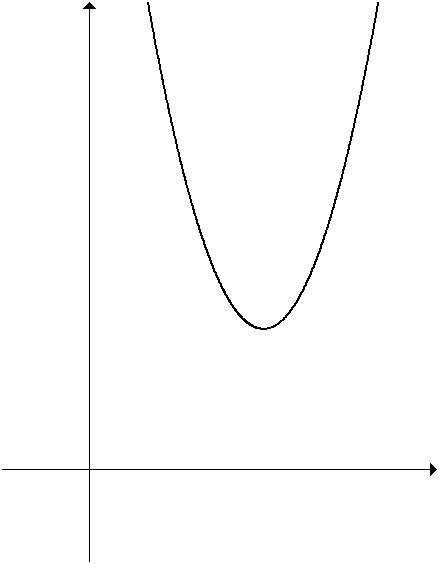
* 1. (0, 5) and (1, 0)
  2. (0, 1) and (0, 5)
  3. (1, 0) and (5, 0)
  4. (5, 0) and (0, 1)

1. Which function is NOT a quadratic function?
2. Identify the range for the function .
3. What conditions on *a* and *q* will give the function have no *x*-intercepts?
   1. and
   2. and
   3. and
   4. and
4. What is one of the factors of ?
5. The roots, to the nearest hundredth, of are
   1. 1.83 and 3.83
   2. -1.83 and 3.83
   3. 1.83 and -3.83
   4. -1.83 and -3.83
6. What is the entire radical form of ?
7. What is the simplest form of the expression ?
8. Simplify the rational expression for all permissible values of *x*.
9. Simplify for all permissible values of *y*.
10. Determine the solution(s) of the equation .
11. The value of the expression is
    1. 13
    2. 19
    3. 21
    4. 25
12. The range of the function is
13. The absolute value equation has solution(s):
    1. *x* = -4
    2. *x* = 5
    3. *x* = -5 and *x* = 4
    4. *x* = -4 and *x* = 5
14. One of the vertical asymptotes of the graph of the reciprocal function is:
    1. *x* = 0
    2. *x* = 4
    3. *x* = 8
    4. *x* = 16
15. What linear inequality does the graph show?





1. What is the solution set for the quadratic inequality ?



1. For the quadratic function *q*(*x*) shown in the graph,   
   which of the following is true?
   1. There are no solutions to .
   2. All real numbers are solutions to .
   3. All real numbers are solutions to .
   4. All positive real numbers are solutions to .

**Written Response** *(marks as indicated)*

Record your answers below. Remember to show all your work.

1. Consider the sequence 5, \_\_, \_\_, \_\_, \_\_, 160.
   1. Assume the sequence is **arithmetic**. Determine the unknown terms of the sequence.
   2. What is the general term of the arithmetic sequence?
   3. Assume the sequence is **geometric**. Determine the unknown terms of the sequence.
   4. What is the general term of the geometric sequence?

/4

1. In ΔPQR, ∠P = 56°, *p* = 10 cm, and *q* = 12 cm.
   1. Sketch a diagram of the triangle.
   2. Determine the length of the unknown angles to the nearest degree.
   3. Determine the measures of the unknown side to the nearest tenth of a centimetre.

/3

1. Write the quadratic function in the form by completing the square.

/3

1. Solve the quadratic equation using the quadratic formula. Express your answers as exact roots.

/3

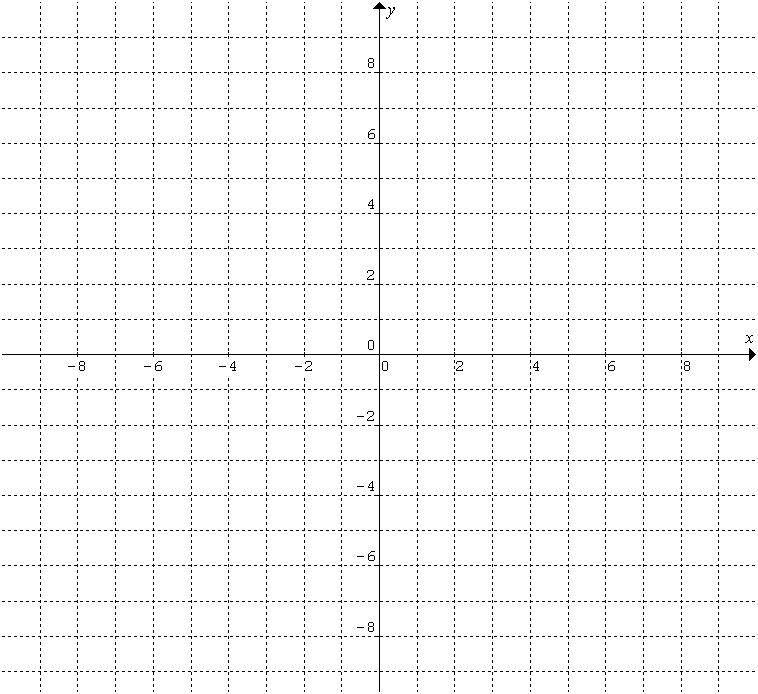
1. Given the equation
   1. Solve the equation.
   2. State any extraneous roots.
   3. Identify the values of *x* for which the radical is defined.

/3

1. Given the equation ,
   1. Solve the equation.
   2. Identify all non-permissible values.

/3

1. Consider the function .
   1. Sketch the graph of the function on the grid   
      to the right.



* 1. Determine all the *x*- and *y*-intercepts.
  2. State the domain and range.
  3. What is the piecewise notation form of the function?

/4

1. Solve the following system algebraically.

/3