**PRE-CALCULUS FINAL REVIEW – ALGEBRA PORTION**

**Find (a) the distance between points P and Q, and (b) determine the midpoint M of the segment joining P and Q.**

1. 
2. 

**Find the equation of the line (in slope-intercept form) satisfying the given conditions.**

1. Passing throughand perpendicular to the line passing throughand
2. Passing throughand parallel to

**Solve**

**Use the graph to answer the following questions**

1. Determine the intervals on which the following function is (a) increasing, (b) decreasing, and (c) constant. Then give the (d) domain and (e) range.



**Determine if the following functions are even, odd, or neither.**

1. 
2. 
3. 
4. 
5.

**Give the equation of the function whose graph is described.**

1. The graph ofis shifted 2 units to the left. This graph is then vertically stretched by applying a factor of 1.5. Finally, the graph is shifted 8 units upward.

**Solve.**

1. 
2. 
3.
4. 

**Write a piecewise-defined function that represents the graph below. Then give the domain and range**

1.

**Givenandfind the following:**

1. 
2. 
3. 
4. 

**Given and find the following:**

1. and the domain of

**Find the average rate of change for the given function over the given interval**

1. from to
2. from to

**Find the difference quotient for the following function**

**Simplify. Write each expression in the form**

1. 
2. 
3. 
4. 
5.

**Find the equation of the quadratic function satisfying the given conditions. Write your answer in the form**

1. Vertex: through

**Write the following function in vertex form**

**Find the vertex of the graph of the following function**

**Solve.**

1. 
2. 
3. 
4. 
5.

**Use the functionto answer the following.**

1. Use the leading coefficient test to determine the graph’s end behavior.
2. Find the x-intercept(s).
3. Find the y-intercept(s).
4. Determine whether the graph has y-axis symmetry, origin symmetry, or neither.
5. What are the maximum number of turning points?

**Divide.**

1. 
2. 

**Use synthetic division to find**

1. ,

**Find all zeroes of the following function**

1. given that is a zero

**Completely factor the following function**

**Find a cubic polynomial with the following zeroes:**

1. and

**Sketch a rough graph of the following function by finding the end behavior, zeroes, and their multiplicity**

1.

**Solve each equation and inequality. Assume that *k* is a positive constant.**

1.
2.

**Find all asymptotes (horizontal, vertical, and slant) of the following functions.**

1. 
2. 

**Solve.**

1.
2.
3. 
4. Suppose *p* varies directly with the square of *z* and inversely with *r.* Ifwhenandfind *p* whenand

**Determine the domain of each function.**

1. 
2. 
3.

**Simplify the following expression so that it does not contain negative exponents**

**Solve.**

1.
2.
3. 
4. 

**Determine if the following functions are one-to-one. If so, find their inverse. If not, state “not one-to-one”**

1. 
2. 
3. 
4. 

**Decide whether the pairs of functions are inverses.**

1. 
2. 

**Use the properties of logarithms to expand the expression completely, if possible**

1. 
2. 
3. 
4. 

**Use the properties of logarithms to rewrite each expression as a single logarithm with coefficient 1.**

1. 
2. 
3. 

**Find the domain of each logarithmic function.**

1. 
2. 
3. 
4. 

**Use the change-of-base rule to find an approximation for each logarithm to 3 decimal places.**

1. 
2. 

**Solve. Express all solutions in exact form.**

1.
2.
3.
4. 
5. 
6. 
7. 
8. 
9. 

**Solve each formula for the indicated variable.**

1. 
2. 
3. 

**Sketch a graph of the following function**

1.

**Solve each system.**

1. 
2. 
3. 

**Determine whether each equation has a circle as its graph. If it does, give the center and radius.**

1. 
2. 
3. 

**Applications.**

1. The manager at a restaurant earns 15% more than the chef. Together, their salaries are $78,475. How much is the manager’s salary?
2. How much water should be added to 8 milliliters of 6% saline solution to reduce the concentration to 4% saline?
3. A baseball is hit so that its height in feet after seconds is . How high is the baseball after 1 second? Find the maximum height of the baseball.
4. A raised wooden walkway is being constructed through a wetland. The walkway will have the shape of a right triangle with one leg 700 yards longer than the other and the hypotenuse 100 yards longer than the longer leg. Find the total length of the walkway.
5. Tommy and Alicia are laying a tile floor. Working alone, Tommy can do the job in 20 hours. If the two of them work together, they can complete the job in 12 hours. How long would it take Alicia to lay the floor working alone?
6. You have 80 yards of fencing to enclose a rectangular region. Find the dimensions of the rectangle that maximize the enclosed area. What is the maximum area?
7. Determine which of the following two plans will provide a better yield.
8. Plan A: $40,000 invested for 3 years at 2.5%, compounded quarterly

Plan B: $40,000 invested for 3 years at 2.4%, compounded continuously

1. Plan A: $50,000 invested for 10 years at 4.75%, compounded daily

Plan B: $50,000 invested for 10 years at 4.7%, compounded continuously

1. Find the present value of an account that will be worthin 2.75 years, if interest is compounded quarterly at 6%.
2. How long will it take for the amount in an investment to double if the investment earns compounded quarterly?
3. The growth of bacteria in food products makes it necessary to date some products (such as milk) so that they will be sold and consumed before the bacterial count becomes too high. Suppose that, under certain storage conditions, the number of bacteria present in a product iswhere *t* is time in days after packing of the product and the value of is in millions. If the product cannot be safely eaten after the bacterial count reaches 3,000,000,000, how long will this take?
4. A student invests a total of $5,000 at 3% and 4% annually. After 1 year, the student receives a total of $187.50 in interest. How much did the student invest at each interest rate?

**Answer Key**

1. (a) , (b) 
2. (a) 17y, (b) 
3. 
4. 
5. (a) none (b) (c) (d) (e)
6. Odd
7. Even
8. Neither
9. Even
10. Odd
11. 
12. 
13. No solution
14. 
15. Domain: Range:
16. 5
17. 3
18. Undefined
19. 
20. Domain:
21. 
22. 
23. 
24. 
25. 
26. 
27. 
28. 
29. 
30. As approaches , approaches
31. 
32. 
33. Neither
34. 3
35. 
36. 
37. 
38. VA:  HA: None SA: 
39. VA:  HA:  SA: None
40. 
41. 1
42. 
43. 
44. 
45. 
46. Not one-to-one
47. 
48. 
49. 
50. Yes
51. No
52. 
53. Cannot be rewritten
54. 
55. 
56. 
57. 
58. 
59. 
60. 
61. 
62. 
63. 
64. 
65. 
66. No solution
67. 
68. 
69. 3
70. 2.5
71. 
72. 
73. 3
74. 
75. 
76. 
77. 
78. 
79. No solution
80. 
81. Yes; 
82. No
83. Yes; 
84. $41,975
85. 4 mL
86. 32 ft, 34.25 ft
87. 3000 yards
88. 30 hours
89. 20 yards by 20 yards; 400 yards squared
90. (a) Plan A is better by $119.09.

 (b) Plan A is better by $398.52.

1. 
2. 27.81 years
3. 18 days
4. $1250 at 3%; $3750 at 4%