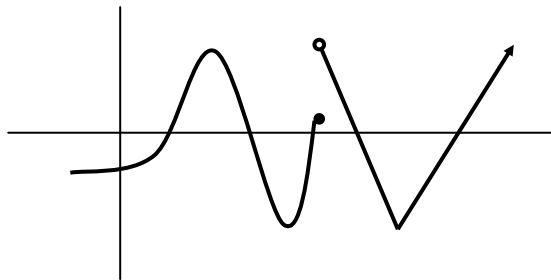


6pts 1. If $f(x) = -2(x - 3)^2 - 4$ determine the axis of symmetry, the vertex, and what the maximum/minimum value of the function is. (Make sure to state if it has a max or min).

6pts 2. Two positive numbers add up to 16. Find the numbers so that the sum of their squares is a minimum.

6pts 3. Suppose a farmer has 300 feet of fencing to make a rectangular garden. Find the maximum garden area.

6pts 4. Give 3 reasons the following is not the graph of a polynomial



6pts 5. Graph $y = \frac{4}{x^2}$

6pts 6. Graph $y = x^3 - x$

6pts 7. Graph $y = \frac{x^2}{x^2 - 4}$

6pts 8. Solve using the critical point method (write solution with interval notation)
 $(2x - 3)(x + 5)(x - 3) > 0$

6pts 9. Solve using the critical point method (write solution with interval notation)

$$\frac{x^2 - 7x + 12}{x + 5} \leq 0$$

6pts 10. Graph $y = (3)^{-x}$

6pts 11. How much interest is earned when \$250,000 is compounded quarterly at 4% for nine years?

6pts 12. Which is worth more? \$225,000 compounded annually at 2% for twelve years or \$250,000 compounded continuously at 3% for five years?

5pts 13. Write as a logarithm $2^6 = 64$

5pts 14. Solve for x: $\log_2 128 = x$

6pts 15. Solve for x: $x^2 e^x - 19x e^x + 48e^x = 0$

6pts 16. Write as a single logarithm: $3\log_5(x - 5) - 4\log_5(y + 1) + 2\log_5(z + 3)$

6pts 17. Solve $\log_4(x + 11) + \log_4(x - 4) = 2$

6pts 18. Suppose $A = (257.4)e^{0.058t}$ represents the population of a city in thousands t years after the year 2010. What is the expected population for the city in 2040 if the model is correct?

Some formulas you may need

1. $y = mx + b$

2. $(x - h)^2 + (y - k)^2 = r^2$

3. $y - y_1 = m(x - x_1)$

4. $m = \frac{y_2 - y_1}{x_2 - x_1}$

5. $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

6. $x^2 + y^2 = r^2$

7. $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

8. $2r = d$

9. $A = LW$

10. $x = -b/2a$

11. $I = Prt$

12. $A = P(1 + r/n)^{nt}$

13. $A = Pe^{rt}$

14. $A = P(1 + r)^t$

15. $\left(\frac{-b}{2a}, \frac{-b^2 + 4ac}{4a}\right)$

16. $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

17. $P = 2L + 2W$