1) Find the vertex of the parabola with equation $y = 2x^2 + 8x + 7$.

2) Find the maximum y-value of the parabola with equation $y = -4x^2 - 4x + 5$

3) Find the minimum y-value of the parabola with equation $y = \frac{1}{4}x^2 - x - 3$

4) Find the y-intercept of the parabola with equation $y = -3(x-4)^2 + 9$

5) Find the x-intercept(s) of the parabola with equation $y = \frac{1}{2}x^2 - x - 12$

6) What is the axis of symmetry for the parabola with equation $y = x^2 - 4x + 9$

7) What are the end behaviors of the graph of the polynomial
   $P(x) = -x^5 + 6x^3 - 7x^2 + 11x + 9$?

8) Find the zeros of the polynomial $P(x) = x^5 - 13x^4 + 30x^3$

9) Find the vertical asymptote(s) of $y = \frac{6x^2 - 24}{3x^2 - 9x}$

10) Find the horizontal asymptote of $y = \frac{24x - 12x^2}{3x^2 - 9}$

11) Find the x-intercept(s) of $y = \frac{8 - 2x^2}{x^2 - 9}$

12) Find the y-intercept of $y = \frac{4x^2 - 16}{8 - x^2}$

13) Y varies directly as the fourth root of X. When X = 16, Y = 10. What is the value of Y when X = 81?

14) Your score on the next exam varies inversely to the number of dates you have before the next exam. If you have 6 dates before the next, exam, you will make a 40% on the exam. What will you make on the exam if you just have 2 dates?

15) Write each of the following in logarithmic form:

a) $12^{-x} = y$ _____

b) $(T) = 3^{-Y}$ _____

16) Write each of the following in exponential form:

a) $\ln(7x + 3) = Y$ _____

b) $\log x = 13$ _____

17) Evaluate each of the following logarithms:

a) $\log_b \sqrt{b^5} =$ _____

b) $\log_3 \frac{1}{81} =$ _____

c) $\ln \frac{1}{e} =$ _____

d) $\log_{16} 32 =$ _____

e) $10^{\log 20} =$ _____

f) $\log_{\frac{1}{2}} 16 =$ _____

18) Expand: $\ln \left(\dfrac{7 t^{14} \sqrt[3]{y^{13}}}{x \sqrt{n}} \right)$

19) Write as one logarithm: $\dfrac{3}{2} \log x - \log y + \dfrac{1}{3} \log z - \log 22 - 5 \log m$

20) Find the horizontal asymptote and y - intercept for the graph of $y = 3^{x+2} + 5$

21) Find the vertical asymptote and x - intercept for the graph of $y = \ln \left(\dfrac{1}{4} x - 2 \right)$

22) Find the domain of $y = 5 \log_8 \left(\dfrac{1}{3} x - 5 \right) + 2$

23) Find the domain of $y = \dfrac{4}{\ln (2x - 4)}$

24) Write as one logarithm:

   a) $3 \ln 2 - 2 \ln 3$ b) $\dfrac{1}{2} \ln 9 - \dfrac{2}{3} \ln 8$

25) Find the range of $y = 2 (7^{-x}) + 6$

26) Solve each of the following for the variable x:

   a) $y = \dfrac{1}{2} \log_6 (3x - 9)$ b) $y = e^{2x+4} - 11$

27) If I invested $20000 into an account paying $8\frac{1}{2}\%$ interest compounded monthly, how much would be in the account after 25 years?

28) If I invested $9000 into an account paying 5% interest compounded continuously, how much would be in the account after 12 years?

29) Solve each of the following for x:

a) $4^{2x+1} = 8^{x-5}$

b) $3^{2-5x} = 7^{x+3}$

30) If I invested $2000 into an account at 6% interest compounded continuously, how long would it take the account to triple my money?

31) If $\log_b X = 0.78$ and $\log_b Y = 1.2$, then evaluate $\log_b X^3 \sqrt{Y}$

32) What is the inverse of the function $f(x) = 3\log_8(x-4) + 11$?

33) Find the value of x to the nearest tenth in each of the following:

a) $5^{x+2} = 500$

b) $x = 4^{\log_{\frac{1}{2}} 16}$

34) $\log_{\frac{1}{k}} \sqrt{k} = ??$ if $k > 1$.