1. Find the domain of the function

$$f(x) = \begin{cases} x + 4, & \text{if } x > 3 \\ \dfrac{x}{\sqrt{x+2}}, & \text{if } x \leq 3 \end{cases}$$

2. Which of the following are polynomials? For each polynomial determine its degree and circle its leading coefficient.

   (a) $f(x) = x^5 + x^2 - 6 - x^{11}$

   (b) $g(x) = 5\sqrt{x} + 4x - 2$

   (c) $h(x) = 2x^4 - x^2 + x$

   (d) $r(x) = x^2 + x^{-2}$

3. Solve for x

$$7^{x^2} = 7^{2x+3}$$

4. Amanda would like to remodel her kitchen in 4 years. How much should she invest now at 7% compounded monthly to have $15,000 four years from now? Round your answer to the nearest cent.

5. Solve for x

$$\log_5 x + \log_5(x+3) = \log_5 10$$

6. Write as a single logarithm

7. The financial department of a company that produces pens obtains the following price-demand equation

$$p = 35 - 0.34x$$

where p is the wholesale price in dollars per pen at which x pens are sold. The fixed costs for the company is $200 and the variable costs is $4.50 per pen. How many pens should be produced by the company to maximize the profit? Round the answer to the nearest integer.

8. A company that produces and sells T-shirts established the price-demand function $p(x) = 21 - 0.1x$, where $p(x)$ is the price per T-shirt at which x T-shirts can be sold. Suppose that the company must produce at least 50 shirts and its cost equation is $C(x) = 2x+250$. How many T-shirts must the company produce to break-even? Round your answer to the nearest T-shirt.

9. The quantity demanded of a certain brand of computers is 300/wk when unit price is $450. For each decrease in unit price of $30, the quantity demanded increases by 100 units. The company will not supply any computers if the unit price is $250 or lower. However, they will supply 375 computers if unit price is $325. Find the equaibrium price and the equilibrium quantity.

10. Suppose \$29,000 is deposited into an account paying 7.5% annual interest. How much will be in the account after 5 years if the account is compounded continuously?

11. Express the given quatities as a single logarithm:

    (a) $\log_2 x + 5\log_2(x+1) + \dfrac{1}{2}\log_2(x-1)$

    (b) $2\ln 4 - \ln 2$

12. How long will it take for the amount in an account to triple if the money is compounded continuously at an annual interest rate of 4.7%?

13. Evaluate the limit

    (a) $\displaystyle\lim_{x\to5} \frac{x^2 - 25}{x^2 + x - 30}$

    (b) $\displaystyle\lim_{h\to0} \frac{\sqrt{a+h} - \sqrt{a}}{h}$, $a \geq 0$.

    (c) $\displaystyle\lim_{x\to\infty} \frac{2x^3 + 1}{4 - x - x^3}$

14. Find the vertical and horizontal asymptotes of the curve $y = \dfrac{x^2 + 4}{3x^2 - 3}$.

15. Find all points of discontinuity for the function

$$f(x) = \begin{cases} x^2 + 1 & , \quad \text{if } x < 2, \\ x + 2 & , \quad \text{if } x \geq 2. \end{cases}$$

16. The displacement of an object moving in a straight line is given by $s(t) = 1 + 2t + t^2/4$ (t is in seconds).

    (a) Find the average velocity when t changes from $t = 1$ to $t = 2$.

    (b) Find the velocity of the object when $t = 1$.

17. Find the equation of the tangent line to the curve $y = 2x^2 - 3$ at the point (2,5).