1. Find the domain of $f(x) = \log_7(x^2 - 6x - 16)$.

2. Find each of the following limits.

   a) $\lim_{x\to\infty} \frac{-5}{2x^3}$ c) $\lim_{x\to-2-} \frac{-5}{2x^3}$ e) $\lim_{x\to-2} \frac{-5}{2x^3}$ g) $\lim_{x\to0+} \frac{-5}{2x^3}$

   b) $\lim_{x\to-\infty} \frac{-5}{2x^3}$ d) $\lim_{x\to-2+} \frac{-5}{2x^3}$ f) $\lim_{x\to0-} \frac{-5}{2x^3}$ h) $\lim_{x\to0} \frac{-5}{2x^3}$

3. Define $f(x) = \dfrac{2x^2 - 4x - 30}{12x + 3x^2 + 9}$. Find each of the following limits.

   a) $\lim_{x\to-\infty} f(x)$ c) $\lim_{x\to-3-} f(x)$ f) $\lim_{x\to-1-} f(x)$ i) $\lim_{x\to5-} f(x)$

   b) $\lim_{x\to\infty} f(x)$ d) $\lim_{x\to-3+} f(x)$ g) $\lim_{x\to-1+} f(x)$ j) $\lim_{x\to5+} f(x)$

   e) $\lim_{x\to-3} f(x)$ h) $\lim_{x\to-1} f(x)$ k) $\lim_{x\to5} f(x)$

4. Based on the previous problem, plot the graph of $f(x) = \dfrac{2x^2 - 4x - 30}{12x + 3x^2 + 9}$.

5. Find the coordinates of the point(s) where the graphs of $y = x^2 + 6x + 5$ and $y = 12x - 3$ intersect.

6. Simplify each of the following.

   a) $\log_5 125$ c) $\log_{10}\left(\frac{1}{100}\right)$ e) $\log_2\left(\frac{1}{8}\right)$ g) $\log_{32} 16$

   b) $\log_{1/3} 1$ d) $\log_{1/100} 10$ f) $\log_{16} 8$ h) $\log_2(-16)$

7. Graph each of the following pairs of functions in the same coordinate system.

   a) $f(x) = 2^x$ and $g(x) = \log_2 x$ b) $f(x) = 2^x$ and $g(x) = \left(\frac{1}{2}\right)^x$

8. Graph each of the following.

   a) $f(x) = \dfrac{1}{x+2} + 3$ b) $f(x) = (x-1)^3 - 2$

9. The location of an object, measured in meters, is given by $L(t) = t^3 - 5t + 8$, where t is measured in seconds. Find the average velocity of the object between

   a) $t = 2\,\text{s}$ and $t = 3\,\text{s}$ c) $t = 2\,\text{s}$ and $t = 2.1\,\text{s}$

   b) $t = 2\,\text{s}$ and $t = 2.5\,\text{s}$ d) $t = 2\,\text{s}$ and $t = 2.001\,\text{s}$

10. The location of an object, measured in meters, is given by $L(t) = t^3 - 5t + 8$, where t is measured in seconds. Find a good approximation for the **instanteneous velocity** of the object at $t = 3$ seconds.

11. The location of an object, measured in meters, is given by $L(t) = 6t + 20$, where t is measured in seconds. Find the average velocity of the object between

    a) $t = 2\,\text{s}$ and $t = 3\,\text{s}$

    b) $t = 2\,\text{s}$ and $t = 2.5\,\text{s}$

    c) $t = 2\,\text{s}$ and $t = 2.1\,\text{s}$

    d) $t = 2\,\text{s}$ and $t = 2.001\,\text{s}$

12. Based on the previous problem, how can we define uniform motion, and how can we describe the location function $L(t)$ of an object with uniform motion?

13. The cost of manufacturing q units of a product is given by $C(q) = 6q^2 + 10q$. Suppose we can sell all q units for \$250. Find the maximum profit we can achieve.