$\star$ means Advanced problem.

## Section 1.1 and 1.2

1. Find the domain of the following functions

   (a) $f(x) = \sqrt{2-x}$

   (b) $f(x) = \dfrac{x-3}{(x^2-4)(x+5)}$

   (c) $\star$ $f(x) = \sqrt{\dfrac{x}{4-x^2}}$

2. Let $f(x) = \dfrac{x}{x+1}$, $g(x) = x^5$, $h(x) = x+3$

   (a) Find $f \circ h$

   (b) Find $h \circ g$

   (c) $\star$ Find $f \circ f$

   (d) $\star$ Find $f \circ g \circ h$

3. Let $f(x) = \dfrac{1}{x^3+x}$ . Find the following:

   (a) $f(2)$

   (b) $f(y^2)$

   (c) $\star\star$ $\dfrac{f(x+3)-f(3)}{x}$

4. The following are composite functions. List the two functions $f$ and $g$.

   (a) $\frac{1}{3x+4}$

   (b) $(7x^4 + 5x^2 - 2)^{20}$

   (c) $\sqrt[3]{\sqrt{x}-1}$

   (d) $\star$ Find three functions for problem (4b) and (4c)

5. Determine if the functions are even, odd, or neither

   (a) $f(x) = x^{-3}$

   (b) $f(x) = x^4 - 4x^2$

   (c) $f(x) = 3x^3 + 2x^2 + 1$

6. Find the equation of the line between the points $(1, 2)$ amd $(-3, -6)$.

7. Sketch the graph of the piecewise functions

   (a) $f(x) = \begin{cases} 2x+3 & \text{if } x < -1 \\ 3-x & \text{if } x \geq -1 \end{cases}$

   (b) $\star$ $f(x) = \begin{cases} -1 & \text{if } x \leq -1 \\ 3x+2 & \text{if } |x| < 1 \\ 7-2x & \text{if } x \geq 1 \end{cases}$

8. Explain the type of transformation that is applied to the function $y = f(x)$

   (a) $y = 5f(x)$

   (b) $y = f(x-5)$

   (c) $y = 5f(x) - 3$