Functions

1. Find the domain of the following functions.

a. $f(x) = 2x^5 - 3x^4 + 2$

b. $f(z) = -4$

c. $f(x) = \sqrt{16 - x^2}$

d. $f(u) = \dfrac{3u - 5}{-u^2 + 3u + 4}$

e. $f(r) = \dfrac{2}{r^2 + 1}$

f. $f(x) = \dfrac{1}{\sqrt{x^2 + 1}}$

g. $f(x) = \sqrt{\dfrac{2x - 4}{5x + 25}}$

h. $f(x) = \dfrac{\sqrt{x^2 - 100}}{81 - x^2}$

i. $f(x) = \dfrac{\sqrt{x + 4}}{9 - x^2}$

j. $g(t) = \dfrac{\sqrt{t - 5}}{t^2 + 9}$

2. Find the function values for each function.

   a. $f(x) = 8$; $f(2)$, $f(t+8)$, $f(-\sqrt{17})$

   b. $F(t) = \begin{cases} 1, & if \quad t > 0 \\ 0, & if \quad t = 0 \\ -1, & if \quad t < 0 \end{cases}$ Find $F(10)$, $F(-\sqrt{3})$, $F(0)$.

   c. $G(x) = \begin{cases} x, & x \geq 3 \\ 2 - x^2, & x < 3 \end{cases}$ Find $G(8)$, $G(3)$, $G(-1)$, $G(1)$.

3. If $f(x) = x^2 - 1$ and $g(x) = 4$, find the following.

     a) $f(4)$ **b)** $g\left(\dfrac{1}{2}\right)$

     c) $g(-1)$ **d)** $f(-2)$

4. If $f(w) = \dfrac{1}{w^2 + 1}$ and $g(v) = \sqrt{v+2}$, find $f(-2)$ and $g(-4)$

5. If $g(u) = u^2 - 4u + 10$ and $h(x) = \sqrt{x-4}$, find
  a) $g(0)$

  b) $h(13)$

  c) $h(-2)$

6. If $f(p) = \dfrac{4-p}{p}$ and $g(p) = \dfrac{p-2}{3}$, find
  a) $f(0)$ **b)** $g(-2)$

Graphs in Rectangular Coordinates: Lines, Parabolas

1. Sketch the graph of the following linear functions.

a) $y = 3x - 4$

b) $\dfrac{x}{3} - y = -6$

c) $-2x + 8y = 0$

d) $\dfrac{x}{2} - \dfrac{y}{3} = -4$

2. Sketch the graph of the following quadratic functions.

a) $f(x) = x^2 - 9$

b) $f(x) = -x^2 + 9$

c) $f(t) = t^2 + 4t + 4$

d) $h(t) = 2t^2 + 3t - 2$

3. Sketch the graph of the following compound functions.

a) $G(x) = \begin{cases} x, & x \ge 3 \\ 2 - x^2, & x < 3 \end{cases}$

b) $f(x) = \begin{cases} 2x + 4, & -1 < x < 5 \\ 2 - x, & x \ge 5 \end{cases}$

c) $F(t) = \begin{cases} x, & if \quad t > 0 \\ 4, & if \quad t = 0 \\ -x, & if \quad t < 0 \end{cases}$