2.7 - Transformations of Functions

Review problems

1. **Graphs of functions.** Sketch the graph of each function. Label intercepts and asymptotes (if any).

   (a) $y = x$ (b) $y = x^2$ (c) $y = x^3$ (d) $y = |x|$ (e) $y = \frac{1}{x}$ (f) $y = \sqrt{x}$

Basic knowledge

2. Describe the transformations that produce the graph of function g from the graph of function f and sketch the graphs of functions g and f.

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

   (c) $f(x) = x^3$ $g(x) = (x - 4)^3$

   (d) $f(x) = |x|$ $g(x) = -|x + 3|$

   (e) $f(x) = \frac{1}{x}$ $g(x) = \frac{1}{x-2} + 5$

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

3. Write the equation of a function whose graph fits the given description:

   The graph of $f(x) = \sqrt{x}$ is reflected over the x-axis and shifted 5 units up.

Intermediate

4. Describe the transformations that produce the graph of function g from the graph of function f and sketch the graphs of f and g;

   (a) $f(x) = \sqrt{x}$ $g(x) = -2\sqrt{x+1}$

   (b) $f(x) = x^3$ $g(x) = \frac{1}{3}(-x - 4)^3 + 1$

5. Write the equation of a function whose graph fits the given description:

   The graph of $f(x) = x^2$ is shifted 3 units to the right, then reflected over the y-axis, then reflected over the x-axis, and shifted 5 units down.

Advanced

6. Sketch the graph of $y = \dfrac{-2}{x - 3} - 7$. Label intercepts and asymptotes.