3.5 Practice Problems

1. Write the function whose graph is the graph of $y=x^2$, but is:
   a. Shifted to the right 4 units — $y=(x-4)^2$
   b. Shifted to the left 2 units — $y=(x+2)^2$
   c. Shifted down 1 unit — $y=x^2-1$
   d. Shifted up 5 units — $y=x^2+5$
   e. Vertically stretched by a factor of 8 — $y=8x^2$
   f. Horizontally compressed by a factor of 8 — $y=(8x)^2$
   g. Reflected about the y-axis — $y=(-x)^2$
   h. Reflected about the x-axis — $y=-x^2$

2. Find the function that is finally graphed after each of the following transformations is applied to the graph of $y=\sqrt[3]{x}$ in the order stated.
   1) Shift down 3 units
   2) Shift right 1 unit
   3) reflect over the x-axis

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

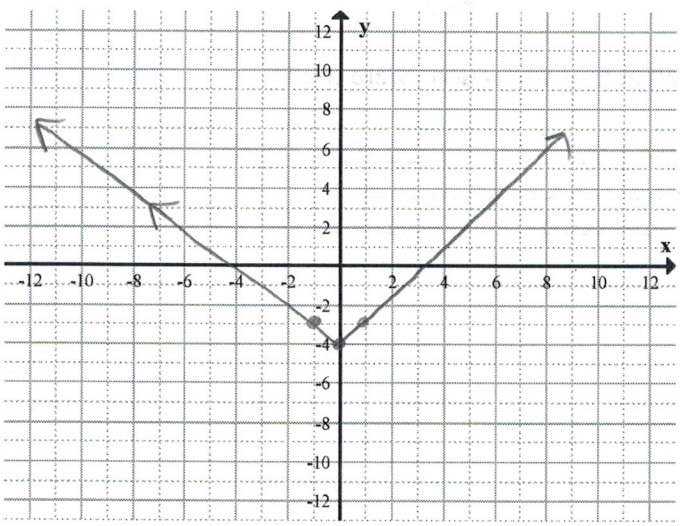
3. If the point $(2,3)$ is on the graph of $y=f(x)$
   a. What point will be on the graph of $y=2f(x)$? — $(2,6)$
   b. What point will be on the graph of $y=f(2x)$? — $(1,3)$
   c. What point will be on the graph of $y=f(x)-2$? — $(2,1)$
   d. What point will be on the graph of $y=f(x-2)$? — $(4,3)$
   e. What point will be on the graph of $y=f(-x)$? — $(-2,3)$

4. Suppose the x-intercepts of the graph of $y=f(x)$ are -3 and 4.
   a. What are the x-intercepts of the graph of $y=f(x+1)$? — $-4, 3$
   b. What are the x-intercepts of the graph of $y=f(-x)$? — $3, -4$
   c. What are the x-intercepts of the graph of $y=3f(x)$? — $-3, 4$

5. Graph the function using the techniques of shifting, compressing, stretching, and/or reflecting.
   $f(x)=|x|-4$

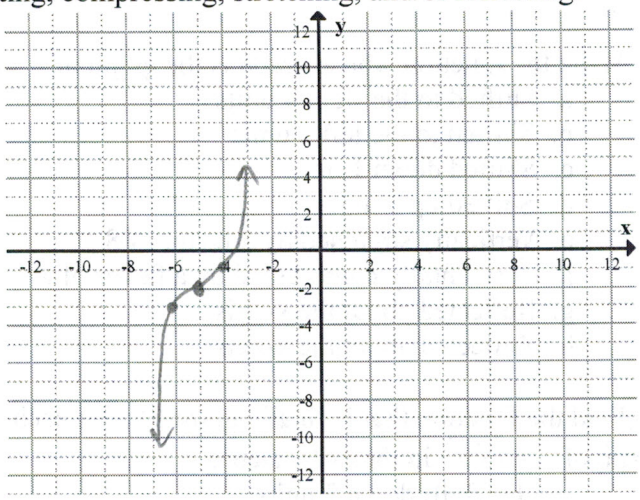
What transformation was used?

vertical shift down 4 units



6. Graph the function using the techniques of shifting, compressing, stretching, and/or reflecting.

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

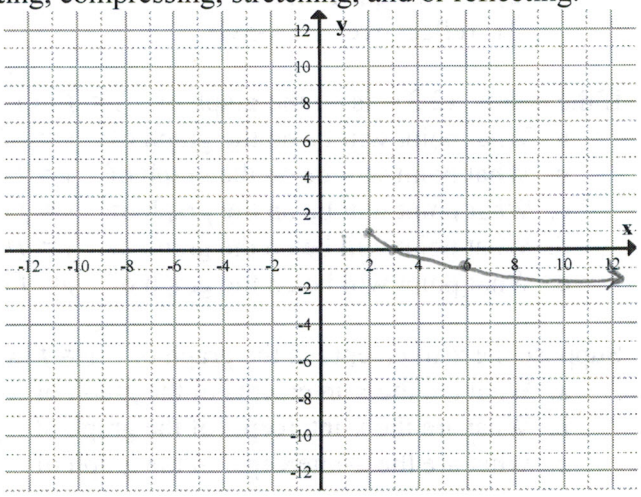


What transformations were used?

horizontal shift left 5 units
vertical shift down 2 units

7. Graph the function using the techniques of shifting, compressing, stretching, and/or reflecting.

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

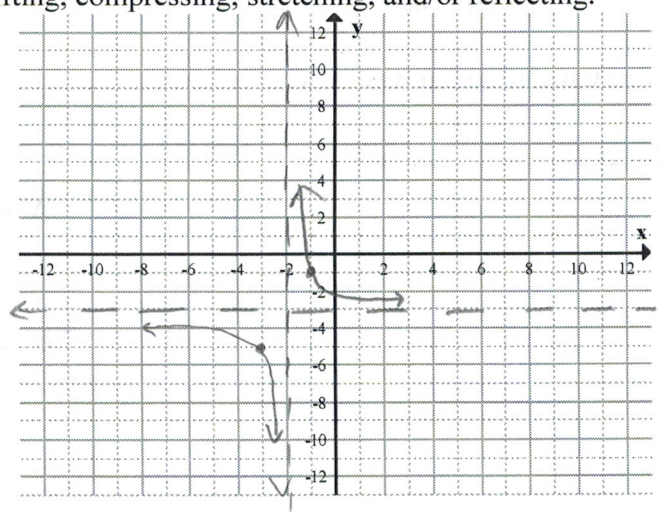


What transformations were used?

horizontal shift right 2 units
reflection over the x-axis.
vertical shift down 1 unit.

8. Graph the function using the techniques of shifting, compressing, stretching, and/or reflecting.

$f(x)=\frac{2}{x+2}-3$



What transformations were used?

horizontal shift left 2 units
vertical stretch by a factor of 2
vertical shift down 3 units