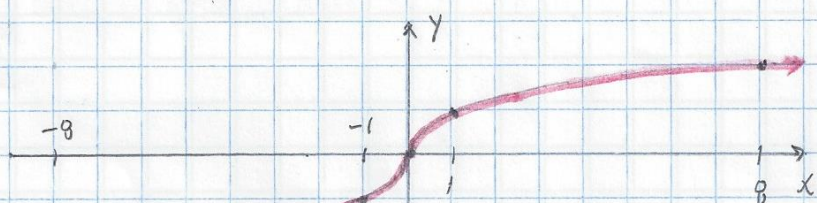
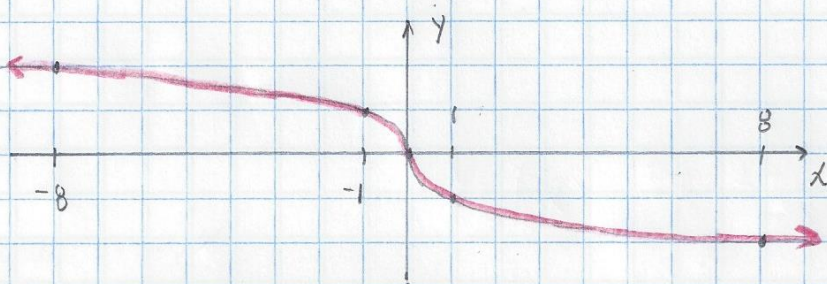


36.3, Cube Root Functions

10F2



$$y = \sqrt[3]{x}$$



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

Example #1. Let $y = f(x) = \sqrt[3]{x}$.

(a) Construct a function $y = g(x)$ which is a vertical stretch, by a factor of 2, of $y = f(x)$.

(b) Graph $y = g(x)$.

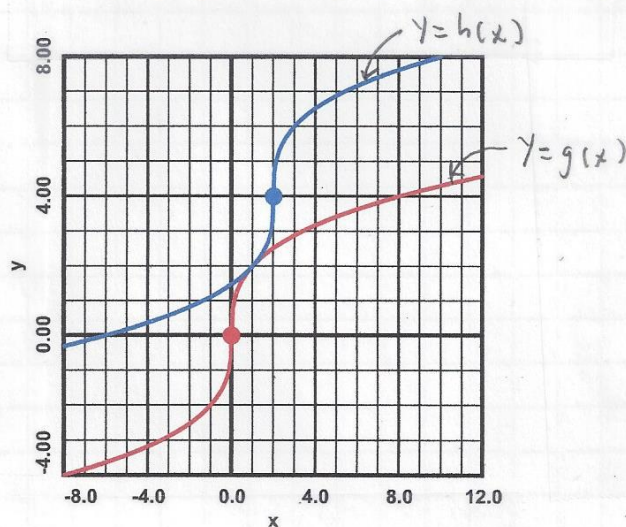
(c) Construct a function $y = h(x)$, which is a translation, by $(2, 4)$, of $y = g(x)$.

(d) Graph $y = h(x)$.

Solution:

(a) $y = g(x) = 2f(x) = 2 \cdot \sqrt[3]{x}$

(c) $y = h(x) = g(x-2) + 4 = 2 \cdot \sqrt[3]{x-2} + 4$



3C.3. Cube Root Functions

20F2

Example #2. Describe the transformation which takes $y = f(x) = \sqrt[3]{x}$ to $y = g(x) = 7 \cdot \sqrt[3]{x+11} + 13$.

Solution:

Vertically stretch $y = f(x)$ by a factor of 7, then translate by $(-11, 13)$ to obtain $y = g(x)$.

Example #3. For $y = f(x) = 14 \cdot \sqrt[3]{x-7} + 38$, calculate $y = f^{-1}(x)$.

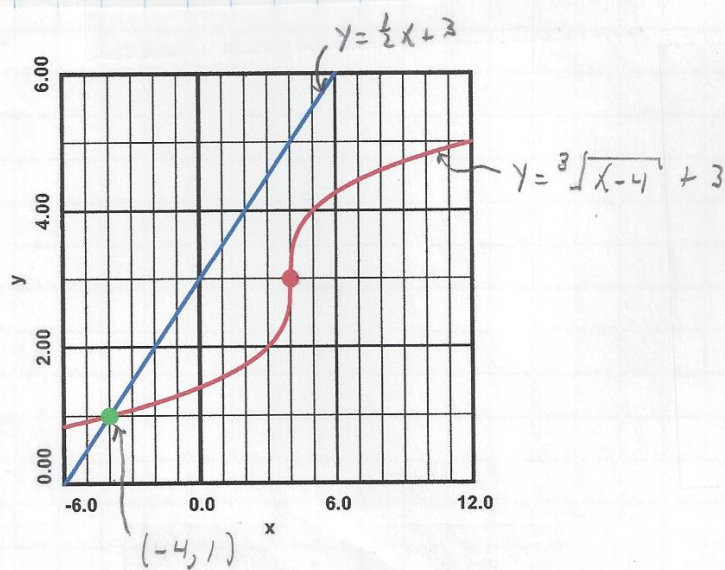
Solution:

$$x = 14 \cdot \sqrt[3]{y-7} + 38, \quad 14 \cdot \sqrt[3]{y-7} = x - 38, \quad \sqrt[3]{y-7} = \frac{1}{14}x - \frac{19}{7},$$

$$y - 7 = \left(\frac{1}{14}x - \frac{19}{7} \right)^3, \quad y = f^{-1}(x) = \left(\frac{1}{14}x - \frac{19}{7} \right)^3 + 7$$

Example #4. Solve $\sqrt[3]{x-4} + 3 = \frac{1}{2}x + 3$ by graphing.

Solution:



$$x = -4$$