

List transformations.

$$\textcircled{1} f(x) = \sqrt{\frac{1}{2}x + 3} + 2$$
$$= \sqrt{\frac{1}{2}(x+6)} + 2$$

$$\text{parent: } y = \sqrt{x} \quad \left| \begin{array}{l} \text{horiz. st. } 2 \\ \text{left } 6 \\ \text{vp } 2 \end{array} \right.$$

$$\textcircled{2} \text{ Domain: } y = -2|x-3| + 7 \quad \{x | x \in \mathbb{R}\}$$

a)

$$\text{b) } y = \frac{x-16}{x^2-16} \quad \{x | x \neq \pm 4\}$$

$$\begin{aligned} x^2 - 16 &= 0 \\ (x+4)(x-4) &= 0 \end{aligned}$$

$\textcircled{3}$ Solve.

$$\sqrt{4x+1} - \sqrt{x-2} = 3$$

$$(\sqrt{4x+1})^2 = (3 + \sqrt{x-2})^2$$

$$4x+1 = 9 + 6\sqrt{x-2} + x-2$$

$$4x+1 = 7 + 6\sqrt{x-2} + x$$

$$-x \quad -7 \quad -7 \quad -x$$

$$(3x-6)^2 = (6\sqrt{x-2})^2$$

$$(\sqrt{2m-3})^2 = (\sqrt{m+7} - 2)^2$$

$$2m-3 = (\sqrt{m+7} - 2)(\sqrt{m+7} - 2)$$

$$2m-3 = m+7 - 4\sqrt{m+7} + 4$$

$$\begin{array}{r} 2m-3 = m+7 - 4\sqrt{m+7} \\ -m-11 \quad -m-11 \end{array}$$

$$(m-14)^2 = (4\sqrt{m+7})^2$$

$$m^2 - 28m + 196 = 16(m+7)$$

$$\begin{array}{r} m^2 - 28m + 196 = 16m + 112 \\ -16m - 112 \quad -16m - 112 \end{array}$$

$$m=2$$

$$m^2 - 44m + 84 = 0$$

$$5-3 \mid 10x+8 \mid \neq -1$$

$$\{x \mid -1 \leq x \leq -\frac{3}{5}\}$$

$$2 \mid x+3 \mid + 11 < -27$$

no solution

Evaluate $f(x) = 4 - 3x^2$

$$\frac{f(x+h) - f(x)}{h}$$

$$\frac{4 - 3(x+h)^2 - (4 - 3x^2)}{h}$$

$$\frac{4 - 3(x+h)(x+h) - 4 + 3x^2}{h}$$

$$\frac{4 - 3(x^2 + 2xh + h^2) - 4 + 3x^2}{h}$$

$$\frac{\cancel{4} - 3x^2 - 6xh - 3h^2 - \cancel{4} + 3x^2}{h}$$

$$\frac{-6xh - 3h^2}{h} = \frac{-h(-6x - 3h)}{h}$$

$$\boxed{-6x - 3h}$$