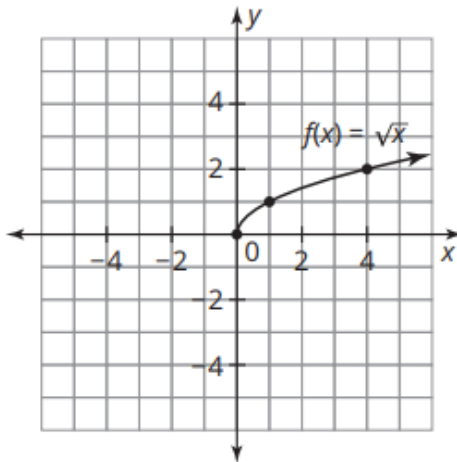Module 3 Topic 1
Radical Functions Review

1) Explain why the function $f(x) = x^3$ is invertible.

2) The graph of the square root function, $f(x) = \sqrt{x}$, is shown.

a. Use interval notation to write the domain and range of $f(x)$.

b. Sketch the graph obtained by shifting the graph of $f(x)$ to the right 2 units. Label the new function $h(x)$.

c. Write an an equation for the function $h(x)$.

d. Use interval notation to write the domain and range of $h(x)$.

3) Consider the function $f(x) = \sqrt{x}$.

a. Describe the combination of transformations of this function that you can use to obtain the graph of the function $g(x) = \sqrt{x - 3} + 7$ from the graph of $f(x)$.

b. Describe the combination of transformations that you can use to obtain the graph of the function $h(x) = 5\sqrt{x} + 2$ from the graph of $f(x)$.

c. Describe the combination of transformations that you can use to obtain the graph of the function $j(x) = -\sqrt{x} + 3$ from the graph of $f(x)$.

4) To extract roots from the radical $\sqrt{a^6 b^{12}}$, Jenna wrote the following:

$$\sqrt{a^6 b^{12}} = \sqrt{a^6} \cdot \sqrt{b^{12}}$$
$$= \sqrt{(a^3)^2} \cdot \sqrt{(b^6)^2}$$
$$= |a^3|\, b^6$$

a. Is Alex's work correct? If not, show how you would correct it.

b. Explain why Jenna used the absolute value symbol around a^3 but not around b^6.

5) Rewrite the radical by extracting all possible roots, and write your final answer in radical form.

a.
$$\sqrt{81x^{10}y^3z^{12}}$$

b.
$$\sqrt[3]{27x^4y^6z^9}$$

6) Combine like terms, if possible, and write your final answer in radical form.

$$\sqrt[3]{-8r} + \sqrt[3]{125r} - \sqrt[3]{-1000r}$$

7) Solve each equation and check for extraneous solutions.

a. $\sqrt{x} - x = -6$

b. $\sqrt[4]{x - 5} = 3$

c. $3 - 2\sqrt[3]{x} = 2$