

# Chapter 2 Test

## Multiple Choice

For #1 to #5, choose the best answer.

1. Which radical function has a domain of  $\{x \mid x \geq -2, x \in \mathbb{R}\}$  and range of  $\{y \mid y \leq 3, y \in \mathbb{R}\}$ ?

A  $y - 3 = -\sqrt{x + 2}$

B  $y + 3 = -\sqrt{x - 2}$

C  $y - 3 = \sqrt{x - 2}$

D  $y + 3 = \sqrt{x + 2}$

2. Given that the point  $(x, 4x^2)$ ,  $x \geq 0$ , is on the function  $y = f(x)$ , which of the following is the point  $y = \sqrt{f(x)}$  on?

A  $(\sqrt{x}, 4x^2)$

B  $(x, 2x)$

C  $(x, 2x^2)$

D  $(\sqrt{x}, 2x)$

3. The radical function  $y = \sqrt{f(x)}$  has an  $x$ -intercept at 2. If the graph of the function is stretched horizontally by a factor of  $\frac{1}{2}$  about the  $y$ -axis, what is the new  $x$ -intercept?

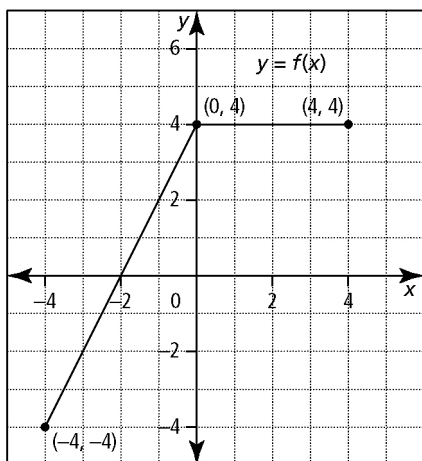
A 2

B 1

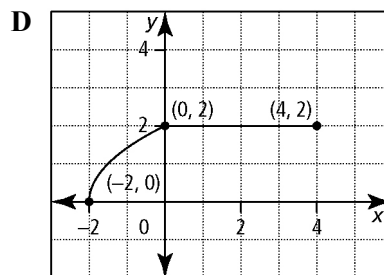
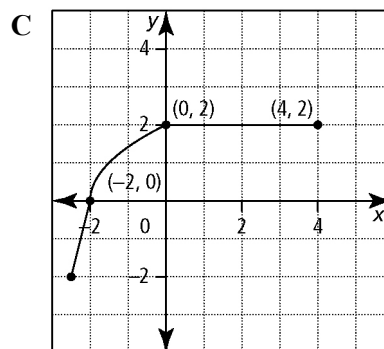
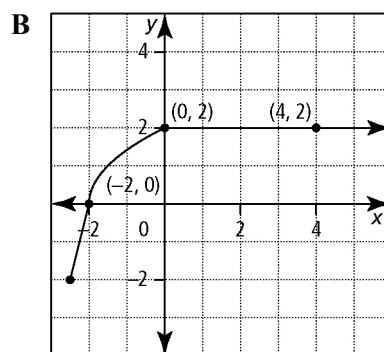
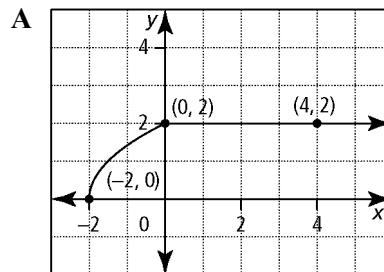
C  $\frac{1}{2}$

D  $\frac{1}{4}$

4. This graph is of the function  $y = f(x)$ .



What is the graph of  $y = \sqrt{f(x)}$ ?



5. The point (4, 10) is on the graph of the function  $f(x) = k\sqrt{3(x-1)} + 4$ . What is the value of  $k$ ?

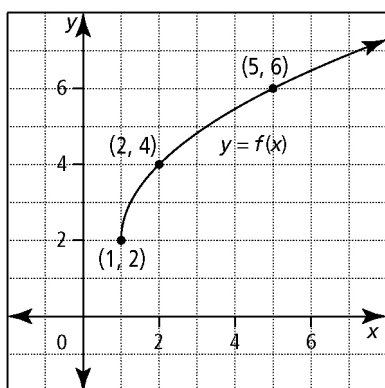
A -2                                      B 2  
C  $\pm 2$                                     D  $\frac{1}{2}$

**Short Answer**

6. The point (4,  $y$ ) is on the graph of  $f(x) = \sqrt{x}$ . The graph is transformed into  $g(x)$  by a horizontal stretch by a factor of 2, a reflection about the  $x$ -axis, and a translation up 3 units. Determine the coordinates of the corresponding point on the graph of  $g(x)$ .
7. State the invariant point(s) when  $y = x^2 - 25$  is transformed into  $y = \sqrt{x^2 - 25}$ .
8. The graph of  $f(x) = \sqrt{2x}$  is horizontally translated 6 units left. State the equation of the translated function  $g(x)$ .

**Extended Response**

9. This graph is of the function  $y = f(x)$ .



- a) Determine the equation of the graph in the form  $f(x) = \sqrt{b(x-h)} + k$ .
- b) Determine the equation in simplest form.

10. a) Describe the transformation of  $y = \sqrt{x}$  to  $y + 4 = 2\sqrt{x-3}$ .

b) State the domain and range of the transformed function.

c) Explain how the graph of the transformed function can be used to solve the equation  $0 = 2\sqrt{x-3} - 4$ .

11. The graph of  $f(x) = \sqrt{x}$  is stretched vertically by a factor of 4, reflected in the  $y$ -axis, vertically translated up 3 units, and horizontally translated left 5 units. Write the equation of the transformed function,  $g(x)$ , and sketch the graph.

12. What real number(s) is exactly one third its square root?

13. Mary solved the radical equation  $x + 1 = \sqrt{3x + 7}$  algebraically and determined that the solution is  $x = 3$  and  $x = -2$ . John solved the same equation graphically. He sketched graphs of the functions  $y = x + 1$  and  $y = \sqrt{3x + 7}$ , and determined that the point of intersection is (3, 4).

a) Determine the correct solution to the equation  $x + 1 = \sqrt{3x + 7}$ .

b) Explain how Mary's and John's solutions relate to the correct solution.

14. a) Solve  $3x - 1 = \sqrt{2x^2 + 2}$ .

b) Identify any restrictions on the variable.

c) Verify your solution.

15. On a clear day, the distance to the horizon,  $d$ , in kilometres, is given by  $d = \sqrt{12.7h}$ , where  $h$  is the height above ground, in metres, from which the horizon is viewed. If you can see a distance of 32.5 km from the roof of a building, how tall is the building, to the nearest tenth of a metre?

