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 \(y = f(x)\).
   A.
   B.
   C.
   D.

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

A.

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?