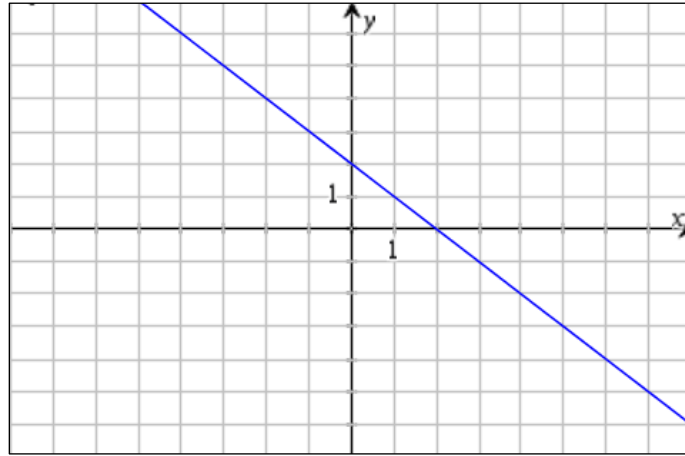


Year End Review

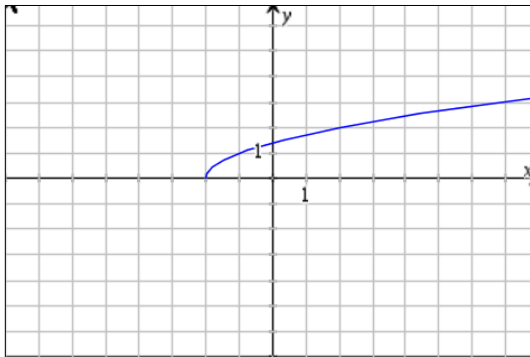
Radical, Rational and Composite Functions

1. The graph of the function $y = f(x)$ is shown below.

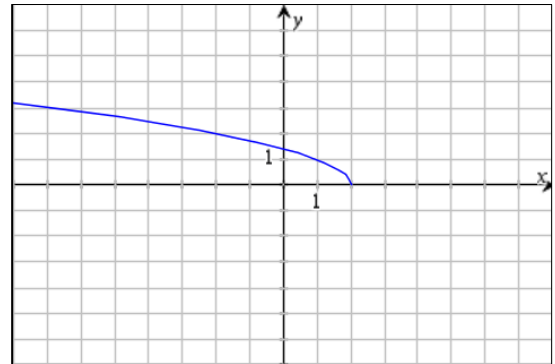


The correct graph of $y = \sqrt{f(x)}$ is

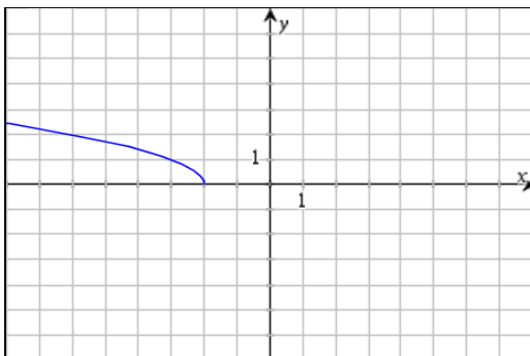
A.



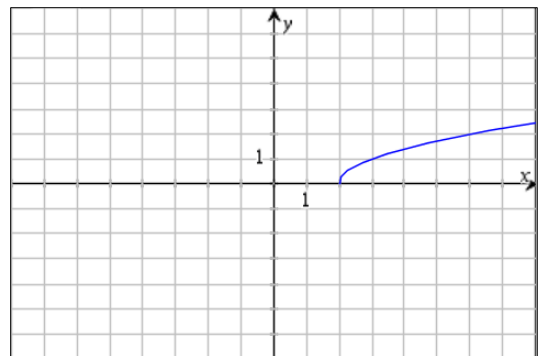
B.



C.



D.



2. Compared to the graph of $y = f(x)$, the graph of $y = \sqrt{f(-x-3)} - 5$ will be reflected in the

- A. x-axis and translated 3 units to the right and 5 units down.
- B. y-axis and translated 3 units to the right and 5 units down.
- C. x-axis and translated 3 units to the left and 5 units down.
- D. y-axis and translated 3 units to the left and 5 units down.

3. The restriction on the variable for the equation $\sqrt{x^2 - 9} - 2x + 5 = 0$ are

- A. $x \neq 0$
- B. $x \neq -3, 3$
- C. $-3 \leq x \leq 3$
- D. $x \leq 3, x \geq 3$

4. The equation $\sqrt{x^2 - 4x + 3} = -\sqrt{x^2 + x - 6}$ has

- A. 1 solution
- B. 2 solutions
- C. no solution
- D. infinitely many solutions

5. If a, b, c and d are all equal to 2, the value of x in the equation $ax + b = -\sqrt{c - dx^2}$ is

- A. -1
- B. -0.5
- C. 0
- D. 1

6. The roots of a rational equation correspond to the _____ of the graph of the related related rational function.

- A. y-intercepts
- B. x-intercepts
- C. vertical asymptotes
- D. horizontal asymptotes

7. Determine the vertical asymptote of $y = \frac{1}{x^2 + 1}$

- A. $x = 0$
- B. $x = -1$
- C. $x = 1$ or -1
- D. There is no vertical asymptote.

8. The x-intercepts of $y = \frac{x^2 + 3x - 4}{x + 5}$

- A. -5
- B. -4 and 1
- C. 4 , -1 , and -5
- D. -0.8

9. As the function $y = \frac{x-2}{(x-1)(x-3)}$ approaches $x = 1$ from the right side, the value of the function

will be

- A. constant
- B. increasing
- C. undefined
- D. decreasing

10. The restriction on the variable of the rational function $f(x) = \frac{2x+2}{x^2-x-2}$ are

- A. $x \neq 2$
- B. $x \neq -2$
- C. $x \neq -1$
- D. $x \neq -1, 2$

11. $f = \{(-2, 1), (-1, 4), (0, 5), (4, 8)\}$ and $g = \{(-4, 1), (-1, 0), (1, 5), (4, -3)\}$

What is $g(f(-1))$?

- A. -3
- B. -1
- C. 0
- D. 5

12. If $h(x) = \frac{1}{(x-1)^3}$, and if $h(x) = f(g(x))$, which of these statements could be correct?

A. $f(x) = x^3$, and $g(x) = \frac{1}{x-1}$

B. $f(x) = x^3$, and $g(x) = \frac{1}{x-3}$

C. $f(x) = \frac{1}{x^3}$ and $g(x) = x-3$

D. $f(x) = \frac{1}{x^3}$ and $g(x) = x-1$

13. Two functions are given.

$$f(x) = x^3 \quad g(x) = \sqrt{x^2 - 4}$$

Some operations involving the given functions are as follows:

I. $h(x) = 2f(x)$ II. $h(x) = (g(x))^2$ III. $h(x) = (f(x))^{\frac{1}{3}}$ IV. $h(x) = 2f(x)$

Which of the functions $h(x)$ have domain restrictions?

A. II and IV only

B. II and III only

C. I, II, and IV only

D. I, II, III, and IV

14. The function $h(x) = 2 - \sqrt{x^2 - 4}$ undergoes an operation that results in the new function

$g(x) = 8 - x^2$. The operation on $h(x)$ to give $g(x)$ was to,

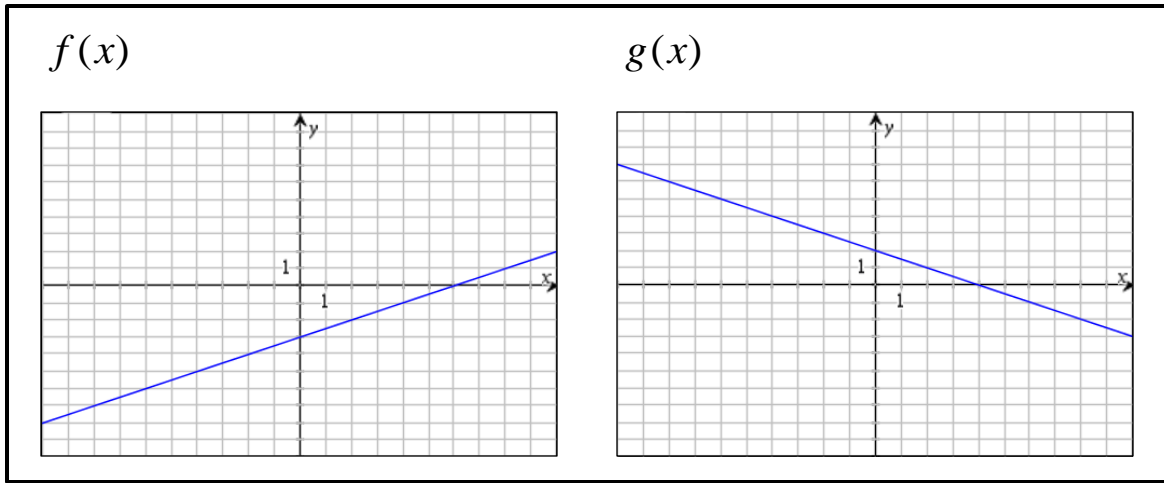
A. square $h(x)$.

B. add $h(x)$ to itself.

C. take the square root of $h(x)$.

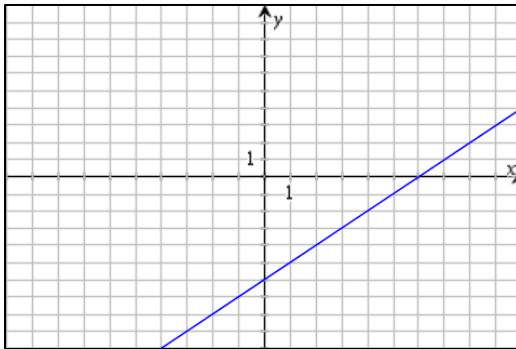
D. multiply $h(x)$ by its conjugate.

15. Two graphs of functions $f(x)$ and $g(x)$ are shown.

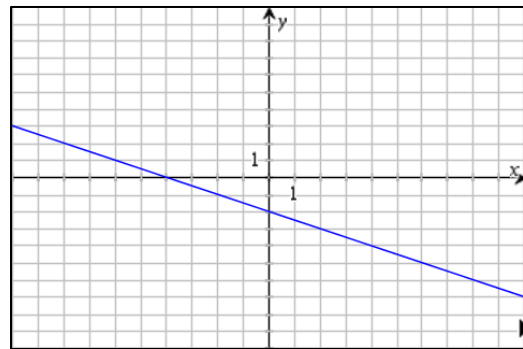


The graph of $h(x) = 2f(x) - g(x)$ would be

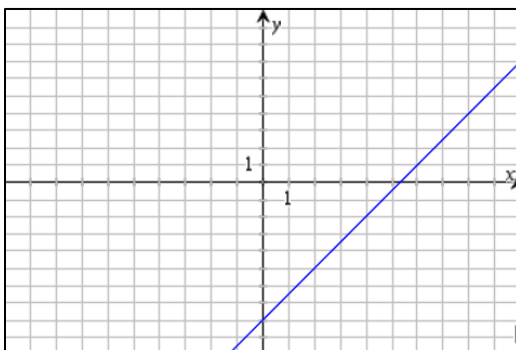
A.



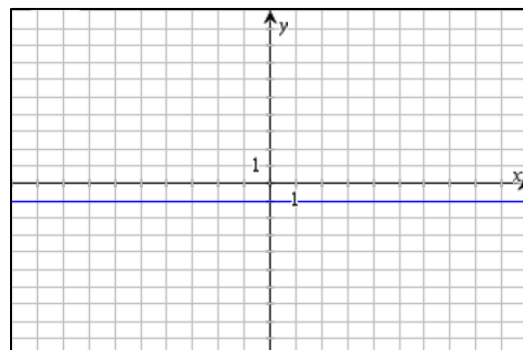
B.



C.



D.



Numeric Response:

1. The radical function $y = \sqrt{f(x)}$ has an x -intercept at $x = 2$. If the graph of the function is stretched horizontally by a factor $\frac{1}{4}$ about the y -axis, the new x -intercept will be _____.
2. The point $(4, 10)$ is on the graph of the function $f(x) = k\sqrt{3(x-1)} + 4$. The value of k is _____.
3. The real number that is exactly one-third of its square root, to the nearest hundredth, is _____.
4. The function $y = \frac{x}{x-2} + 3$ has an domain of $\{x | x \neq a, x \in \mathbf{R}\}$ and a range of $\{y | y \neq b, y \in \mathbf{R}\}$.
The value of $a \times b$ is _____.
5. The equation $\frac{8}{x^2 - 16} + 1 = \frac{1}{x - 4}$ has _____ roots.
6. The solution to the equation $4 + \sqrt{x+4} = x - 5$, rounded to the nearest tenth, is _____.
7. If $f(x) = \sqrt{2x-1}$ and $g(x) = x^2$, the value of $g(f(13)) \times g(g(4))$ equals _____.
8. If $f(x) = x^2$ and $g(x) = -2x^2 + 25x$, the x -intercepts of $(f + g)(x)$, stated from largest to smallest would be _____.
9. Given that $f(x) = x^2 - 1$ and $g(x) = -2x$, the absolute value of $(f \bullet g)(5)$ is _____.

Written Response:

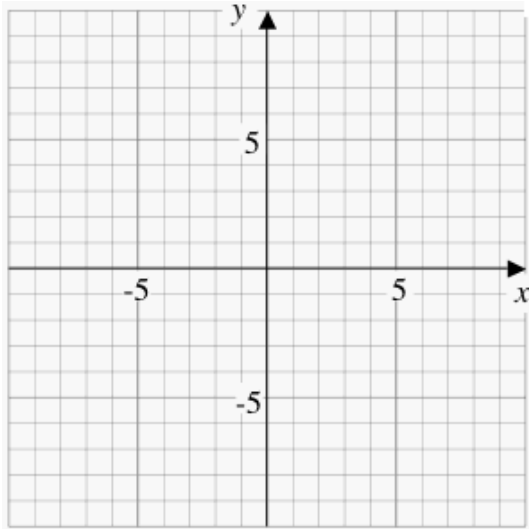
1. On a clear day, the distance to the horizon, d , in kilometres, is given by $d = \sqrt{12.7h}$, where h is the height above ground, in metres, from which the horizon is viewed. If you can see a distance of 32.5 km from the roof of a building, how tall is the building, to the nearest tenth of a metre?
2. 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 $g(x)$.
3. a) Describe two methods you could use to solve the equation $2(2x + 1) = \frac{3x^2 - 12x - 5}{x - 4}$ graphically.

b) Use one of the methods from part a) to solve the equation.

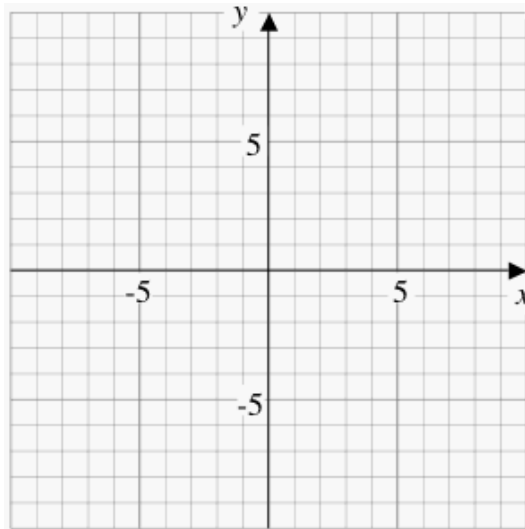
4. a) Sketch the graph of the function $y = \frac{x+2}{x^2-4}$.

b) Identify the domain, range, and asymptotes of the function.

c) Explain the behaviour of the function as the value of $|x|$ becomes very large.



5. Let $f(x) = x^2 - 9$ and $g(x) = \sqrt{x}$, sketch the graph of $(f \circ g)(x)$ and state its domain and range.



6. Consider the functions $f(x) = x^2$ and $g(x) = 2^x$.

a) Determine the equation of $h(x) = \frac{f(x)}{g(x)}$, and state the domain of $h(x)$.

b) How does the graph of $h(x)$ behave for large values of x ?