

Unit 3 Test

Multiple Choice

For #1 to 4, choose the best answer.

1. Which equation is false?

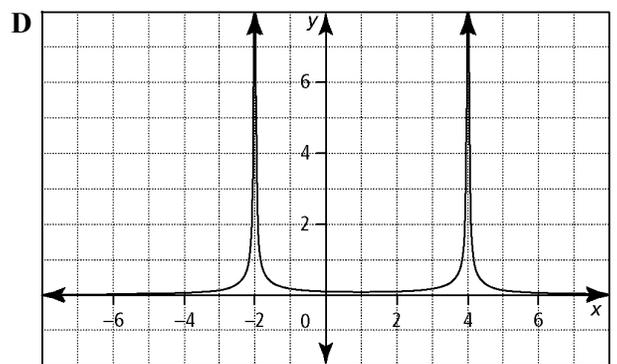
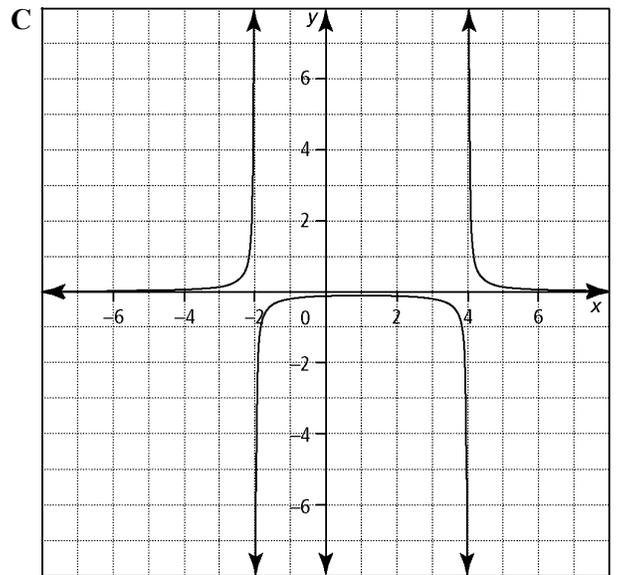
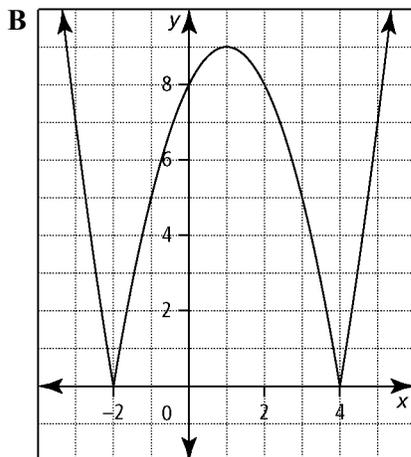
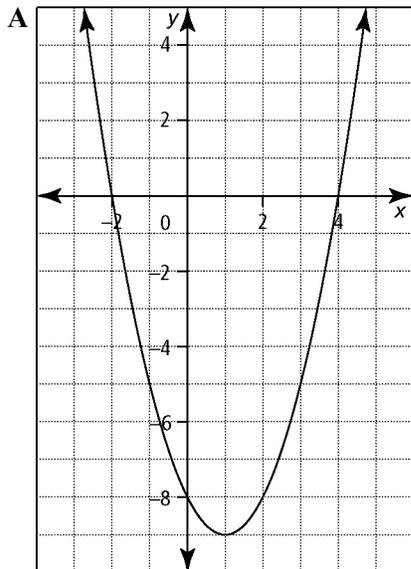
A $\sqrt{250a^2} = 5a\sqrt{10}$

B $(2\sqrt{6x})(3\sqrt{18x^2}) = 36x\sqrt{3x}, x \geq 0$

C $3\sqrt{5} + 7\sqrt{5} = 10\sqrt{5}$

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

2. Given $f(x) = x^2 - 2x - 8$, which graph represents $y = |f(x)|$?



3. Determine the difference between

$$\frac{x+1}{x-2} \text{ and } \frac{x-1}{x+2}$$

A $\frac{6x}{x^2-4}$

B $-\frac{1}{2}$

C $\frac{4}{(x+2)(x-2)}$

D $\frac{2x^2+4}{x^2-4}$



4. The equation $\frac{r^2 + 6r + 5}{2r + 2} = \frac{r + 5}{2}$ is

- A always true, $x \in \mathbb{R}$
- B never true, $x \in \mathbb{R}$
- C sometimes true, $x \in \mathbb{R}$
- D true for $r = -1$

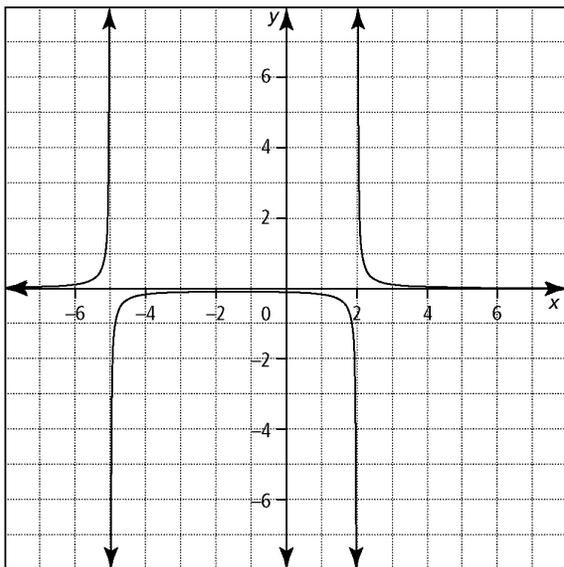
Numerical Response

Complete the statements in #5 to 7.

5. Given the absolute value function in piecewise notation $y = \begin{cases} 3x - 9, & x \geq k \\ -3x + 9, & x < k \end{cases}$, the value of k is .

6. The rate at which water sprays out of a hose from a firetruck depends on the nozzle pressure. The flow rate, f , in litres per minute, is determined using the equation $f = 173\sqrt{k}$, where k is the nozzle pressure in kilopascals. When the flow rate is 3000 L/min, the nozzle pressure is kPa, expressed to the nearest tenth.

7. Using the graph of $y = \frac{1}{f(x)}$, the function $f(x)$ can be described as $f(x) = x^2 + mx - 10$, where the value of m is .

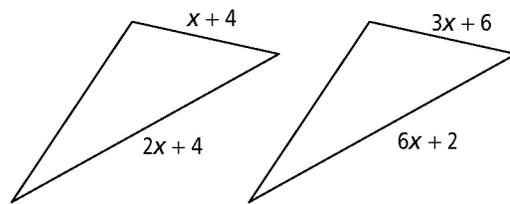


Written Response

8. Consider the equation $\sqrt{-3x - 5} - 3 = x$.

- a) Determine any restriction(s) on x in the equation.
- b) Solve the equation algebraically.
- c) Verify by substitution whether the values determined in part b) are roots of the equation.
- d) Explain your reasoning for rejecting any value(s) from part b) as roots of the equation.

9. Consider the similar triangles shown.



- a) Write a proportion to compare the similar sides.
- b) List any restrictions on the variable, x .
- c) Solve the rational equation and determine the length of each given side of both triangles.

10. Suppose you are asked to solve the equation $|5x + 3| - 2x = 4$.

- a) Explain a possible first step to solve the equation algebraically.
- b) Determine the solution to the equation algebraically.
- c) William suggests that an absolute value is never negative. How would you explain to William that the negative result from part b) is actually a solution to the equation?

