

# Unit 3 Test

## Multiple Choice

For #1 to 4, choose the best answer.

1. Which equation is false?

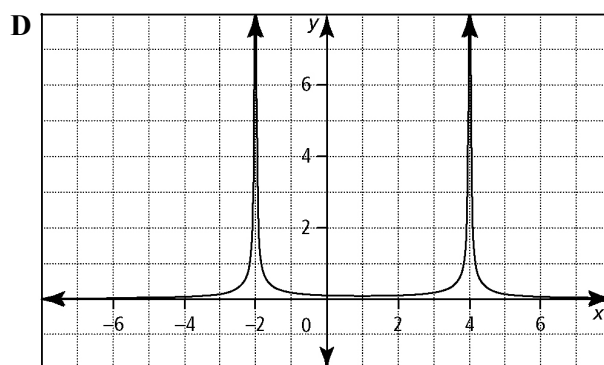
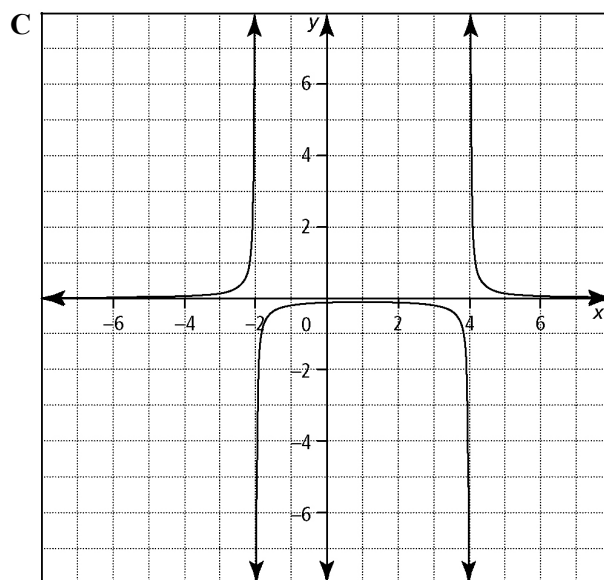
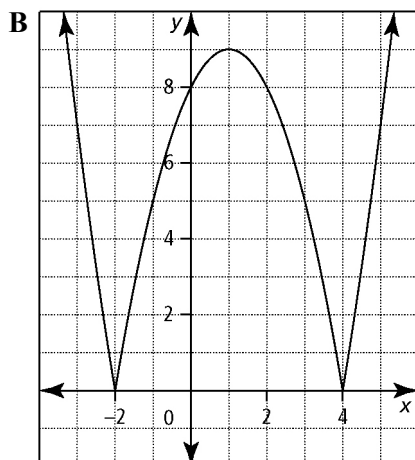
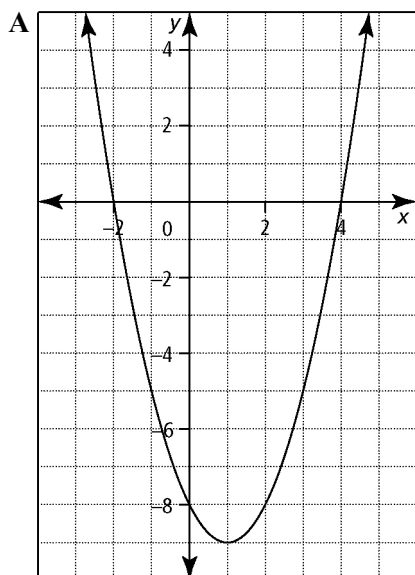
A  $\sqrt{250a^2} = 5a\sqrt{10}$

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

$\frac{x+1}{x-2}$  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  $r = -1$

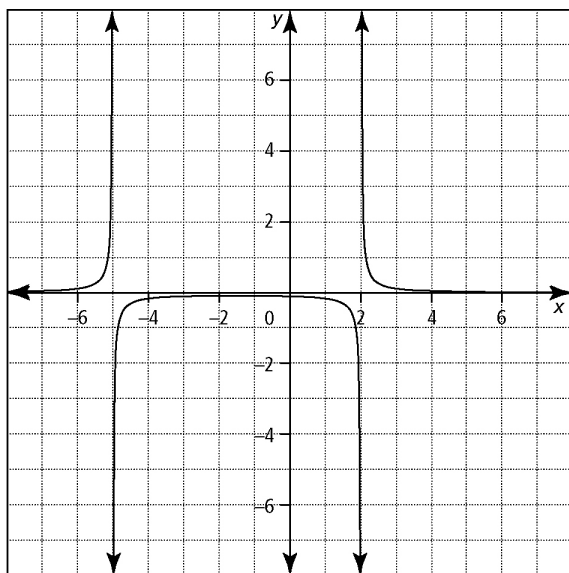
### Numerical Response

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  $\square$ .

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  $\square$  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  $\square$ .

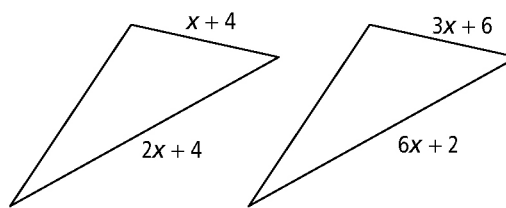


### Written Response

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?

