Date Completed: _____
Mentor Initials: _____

Rational Expressions

1. What value of x in the equation $\frac{x^2+4x}{x-4}$ results in an undefined output?

A. -4
B. -2
C. 2
D. 4
E. 8

2. What value of x satisfies the equation $\frac{x^2+4x}{x+4} = 4$?

A. -4
B. -2
C. 2
D. 4
E. 8

3. Which of the following expressions is equal to $\frac{5}{5-\sqrt{5}}$?

A. $\frac{5}{4}$
B. $\frac{25}{4}$
C. $\frac{5+\sqrt{5}}{4}$
D. $\frac{5+\sqrt{5}}{5}$
E. $\frac{25+\sqrt{5}}{5}$

4. Given $h(x) = \frac{x+3}{x^2}$, which of the following expressions is equal to $h(x-3)$ for all x in its domain?

A. $\frac{x}{x^2-6x+9}$
B. $\frac{x}{x^2+9}$
C. $\frac{x}{x+3}$
D. $\frac{x-3}{x+3}$
E. $\frac{x^2-6x+9}{x}$

5. Given $h(x) = \frac{x-4}{x^2-4}$, what is the domain of the function?

A. All real numbers
B. All real numbers except $x = -4$
C. All real numbers except $x = -2$
D. All real numbers except $x = -2$ and $x = 2$
E. All real numbers except $x = -4$ and $x = 4$

6. What is the vertical asymptote of the function $f(x) = \frac{x^2-3}{x-4}$?

A. $x = -4$
B. $x = -3$
C. $x = 0$
D. $x = 3$
E. $x = 4$

7. What is the horizontal asymptote of the function $f(x) = \frac{x^2-3}{x-4}$?

A. $y = -3$
B. $y = -\frac{3}{4}$
C. $y = 0$
D. $y = 1$
E. There is no horizontal asymptote of $f(x)$.

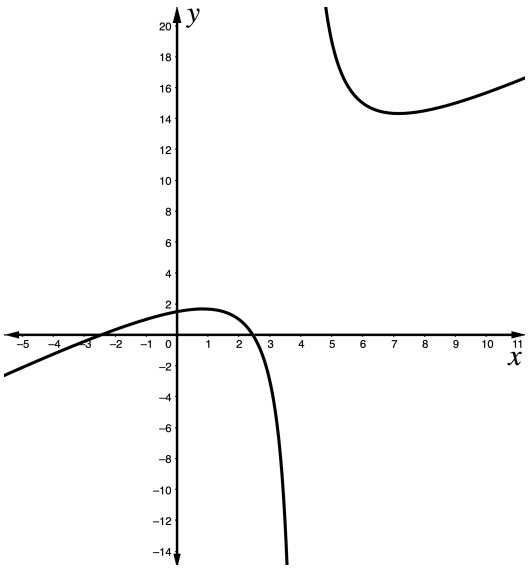
8. What is the horizontal asymptote of the function $f(x) = \frac{x-3}{x-4}$?

A. $y = -3$
B. $y = -\frac{3}{4}$
C. $y = 0$
D. $y = 1$
E. There is no horizontal asymptote of $f(x)$.

9. What is the horizontal asymptote of the function $f(x) = \frac{x-3}{x^2-4}$?

A. $y = -3$
B. $y = -\frac{3}{4}$
C. $y = 0$
D. $y = 1$
E. There is no horizontal asymptote of $f(x)$.

10. At what point in the standard (x, y) coordinate plane do the asymptotes of the function $y = \frac{x^2-6}{x-4}$, graphed below, intersect?



A. $(-\sqrt{6}, 0)$
B. $(\sqrt{6}, 0)$
C. $(4, 8)$
D. $(4, 12)$
E. $(4, 20)$

11. Which of the following expressions is equivalent to $\frac{\frac{x}{2}+\frac{1}{2}}{\frac{3}{4}-\frac{1}{3}}$?

A. $\frac{12x+12}{5}$
B. $\frac{6x+6}{5}$
C. $\frac{x+1}{5}$
D. $\frac{x+6}{2}$
E. $6x + 6$

12. For all positive values of x, which of the following is equal to $3 + \frac{2x}{x+3} - \frac{6}{3x+9}$?

A. $\frac{5x+7}{x+3}$

B. $\frac{6x-6}{3x+9}$

C. $\frac{11x+21}{3x+9}$

D. $\frac{2x-3}{4x+12}$

E. $\frac{2x-3}{4x+13}$

13. For all values of x greater than 4, which of the following expressions is equivalent to $\frac{x^2-6x+8}{x^2-16}$?

A. $\frac{-6x-8}{-16}$

B. $\frac{x-2}{x+4}$

C. $\frac{x-2}{x-4}$

D. $\frac{x+2}{x+4}$

E. $\frac{x+2}{x-4}$

14. For all positive values of c and d, which of the following expressions is equal to $\frac{c}{2d} + \frac{d}{2c}$?

A. $\frac{c+d}{2d+2c}$

B. $\frac{cd}{4dc}$

C. $\frac{2c+2d}{4dc}$

D. $\frac{2c^2+2d^2}{4dc}$

E. $\frac{2c^2+2d^2}{2c+2d}$