

**Directions:** For each of the following, determine if the given rational function has a horizontal asymptote. If it does, write the equation of the horizontal asymptote.

1.  $f(x) = \frac{3x^2 - 1}{2x^2 + 5x + 7}$

Horizontal Asymptote: Y or N

If Yes, Equation: \_\_\_\_\_

2.  $g(x) = \frac{x^3 + 2x^2 + x + 4}{5x^2 + 7x + 8}$

Horizontal Asymptote: Y or N

If Yes, Equation: \_\_\_\_\_

3.  $h(x) = \frac{5x^3 - 2x^2 - 1}{x^4 - 6}$

Horizontal Asymptote: Y or N

If Yes, Equation: \_\_\_\_\_

4.  $k(x) = \frac{6x^3 + 2x + 3}{2x^2 - 11x + 4}$

Horizontal Asymptote: Y or N

If Yes, Equation: \_\_\_\_\_

5.  $r(x) = \frac{(2x-1)(5x+6)}{(x+3)(x-6)}$

Horizontal Asymptote: Y or N

If Yes, Equation: \_\_\_\_\_

6.  $q(x) = \frac{(x^2 - 3)^2}{3x^3 + 4x^2 + 7}$

Horizontal Asymptote: Y or N

If Yes, Equation: \_\_\_\_\_

7.  $p(x) = \frac{(3x-1)^2}{2x^2 + 3x + 5}$

Horizontal Asymptote: Y or N

If Yes, Equation: \_\_\_\_\_

8.  $y = \frac{(x-2)(4-x)}{(x+3)^2}$

Horizontal Asymptote: Y or N

If Yes, Equation: \_\_\_\_\_

9.  $s(x) = \frac{(2x^2 + 3)^2(x-4)}{(x^2 + 5)(x-2)}$

Horizontal Asymptote: Y or N

If Yes, Equation: \_\_\_\_\_

**Directions:** Write limit statements for the end behavior of the following rational functions.

10.  $y = \frac{2x^3 - 5x + 6}{6x^3 + 10x^2 - 4x - 12}$

Left:

Right:

11.  $y = \frac{(4x+3)^2}{(3x-1)(2x+5)}$

Left:

Right:

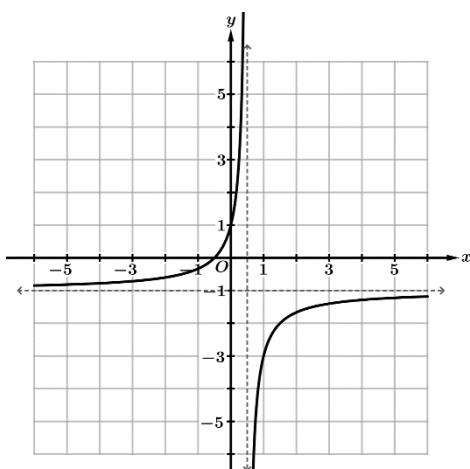
12.  $y = \frac{x^2}{(x-1)^3}$

Left:

Right:

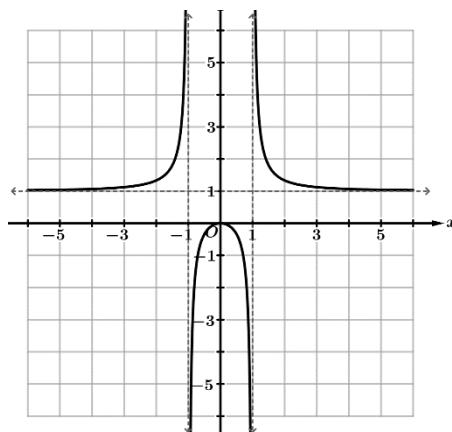
**Directions:** Write a limit statement describing the output values for the following graphs and verbal descriptions of the input values.

13. The input values decrease without bound



Graph of  $f(x)$

14. The input values increase without bound

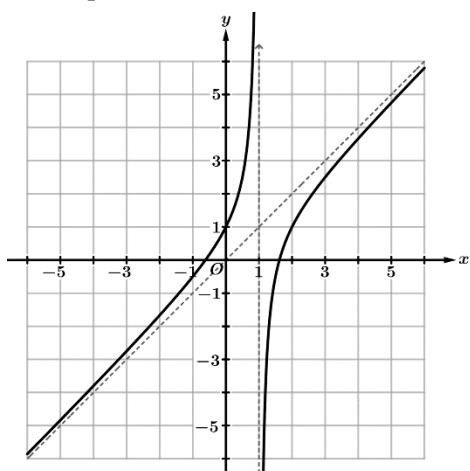


Graph of  $g(x)$

13. Limit Statement: \_\_\_\_\_

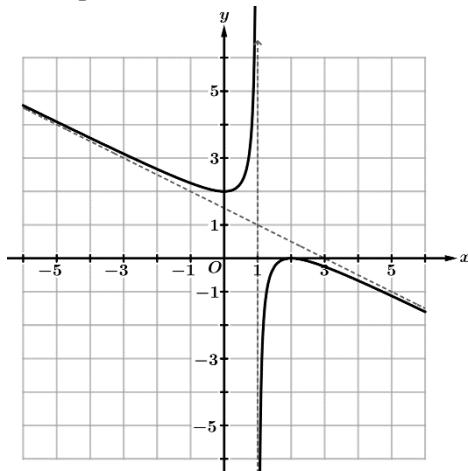
14. Limit Statement: \_\_\_\_\_

15. The input values increase without bound



Graph of  $h(x)$

16. The input values decrease without bound



Graph of  $k(x)$

15. Limit Statement: \_\_\_\_\_

16. Limit Statement: \_\_\_\_\_