

**Rational Functions Practice**

Graph the following rational functions. Be sure to label asymptotes and holes in the graph, and find the specified limits for the function.

$$1) f(x) = \frac{x+3}{x-4}$$

Horizontal asymptote: \_\_\_\_\_

Removable discontinuity: \_\_\_\_\_

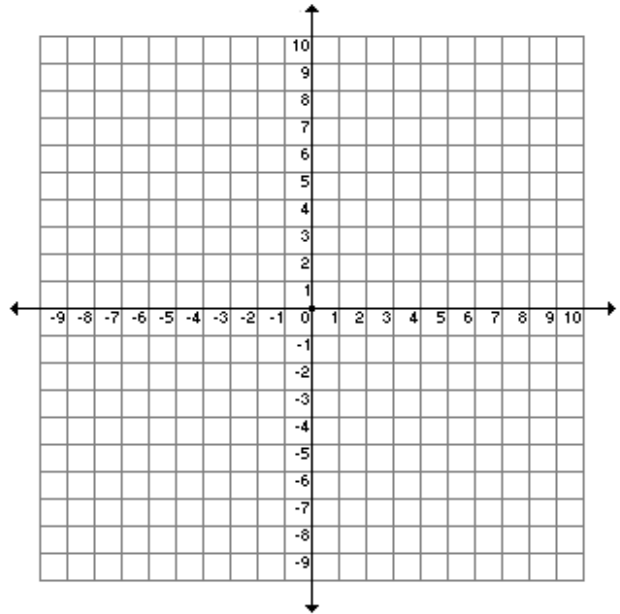
Vertical asymptote: \_\_\_\_\_

x-intercept: \_\_\_\_\_

y-intercept: \_\_\_\_\_

domain: \_\_\_\_\_

range: \_\_\_\_\_



Does this graph cross the horizontal asymptote, and if so where? \_\_\_\_\_

$$2) f(x) = \frac{x^2 + 2x - 8}{x^2 - 16}$$

Horizontal asymptote: \_\_\_\_\_

Removable discontinuity: \_\_\_\_\_

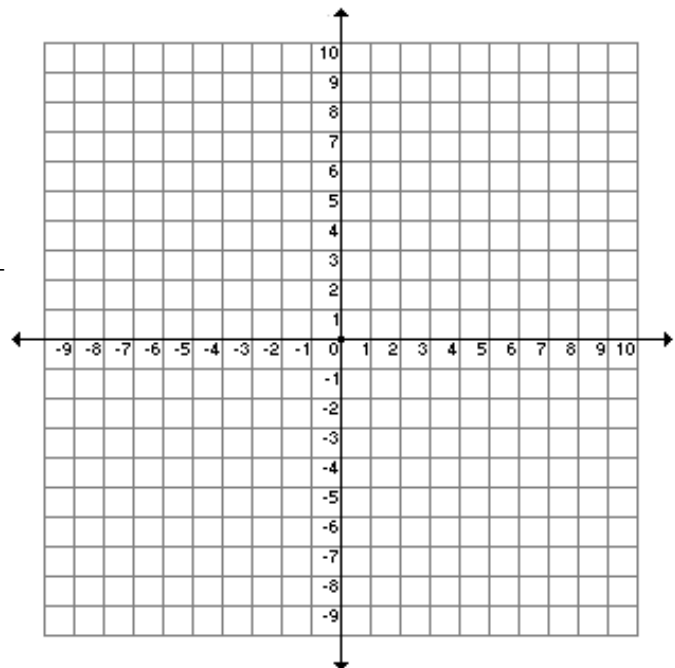
Vertical asymptote: \_\_\_\_\_

x-intercept: \_\_\_\_\_

y-intercept: \_\_\_\_\_

domain: \_\_\_\_\_

range: \_\_\_\_\_



Does this graph cross the horizontal asymptote, and if so where? \_\_\_\_\_

3)  $f(x) = \frac{3x^2 + 3x - 6}{x^2 + x - 12}$

Horizontal asymptote: \_\_\_\_\_

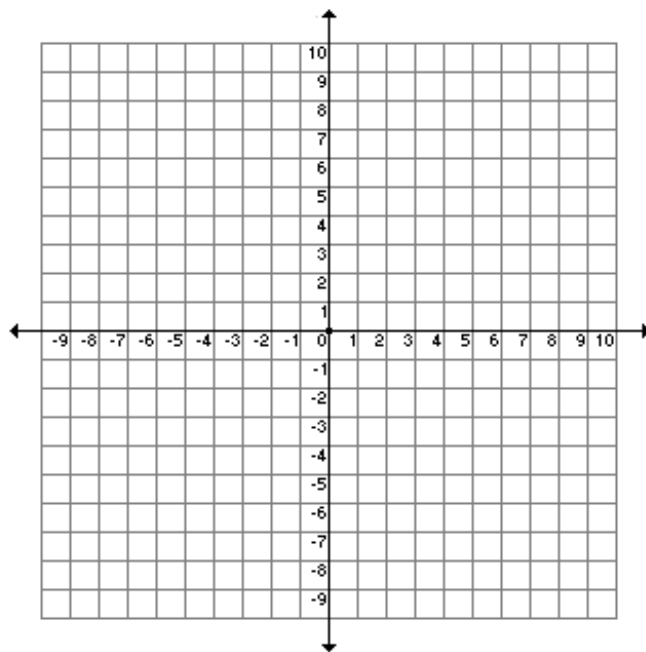
Removable discontinuity: \_\_\_\_\_

Vertical asymptote: \_\_\_\_\_

x-intercept: \_\_\_\_\_

y-intercept: \_\_\_\_\_

domain: \_\_\_\_\_



Does this graph cross the horizontal asymptote, and if so where? \_\_\_\_\_

4)  $f(x) = \frac{2x^2 + 6x - 8}{x^2 - 1}$

Horizontal asymptote: \_\_\_\_\_

Slant asymptote: \_\_\_\_\_

Removable discontinuity: \_\_\_\_\_

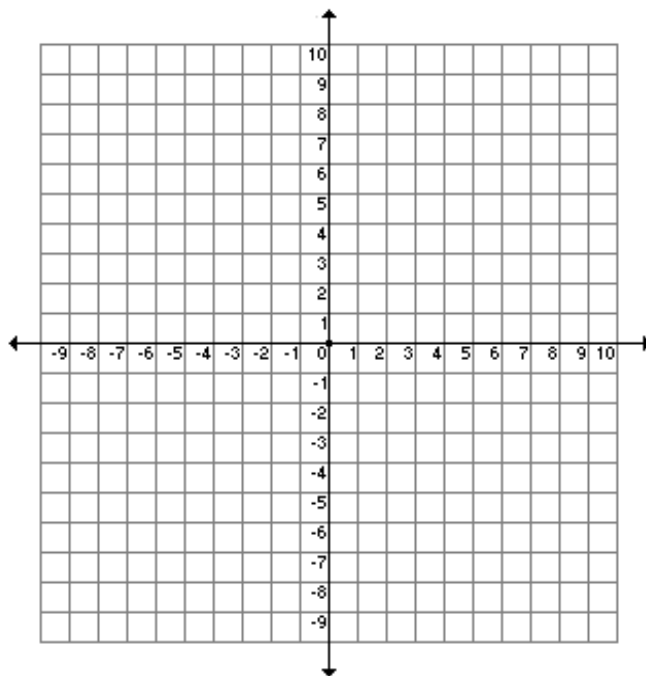
Vertical asymptote: \_\_\_\_\_

x-intercept: \_\_\_\_\_

y-intercept: \_\_\_\_\_

domain: \_\_\_\_\_

range: \_\_\_\_\_



Does this graph cross the horizontal asymptote, and if so where? \_\_\_\_\_

$$5) f(x) = \frac{3x^2 - 12x - 15}{x^3 - 2x^2 - 25x + 50}$$

Horizontal asymptote: \_\_\_\_\_

Slant asymptote: \_\_\_\_\_

Removable discontinuity: \_\_\_\_\_

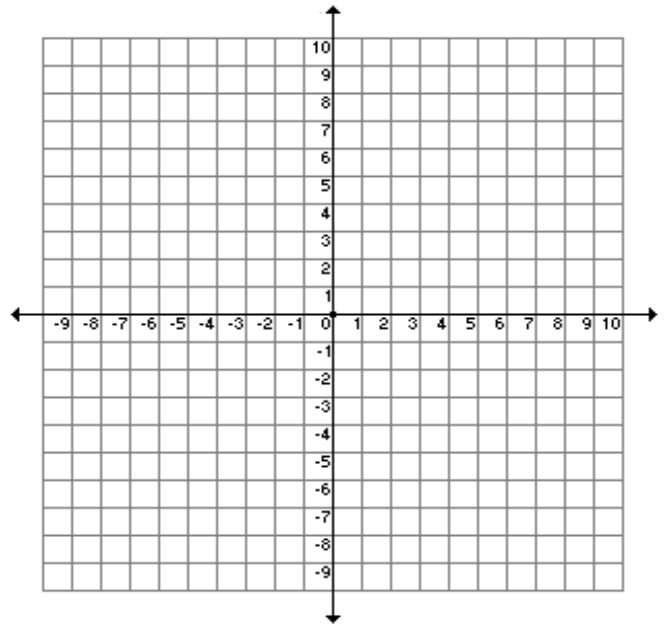
Vertical asymptote: \_\_\_\_\_

x-intercept: \_\_\_\_\_

y-intercept: \_\_\_\_\_

domain: \_\_\_\_\_

Does this graph cross the horizontal asymptote, and if so where? \_\_\_\_\_



$$6) f(x) = \frac{3x^3 - 12x}{x^3 - 2x^2 - 16x + 32}$$

Horizontal asymptote: \_\_\_\_\_

Slant asymptote: \_\_\_\_\_

Removable discontinuity: \_\_\_\_\_

Vertical asymptote: \_\_\_\_\_

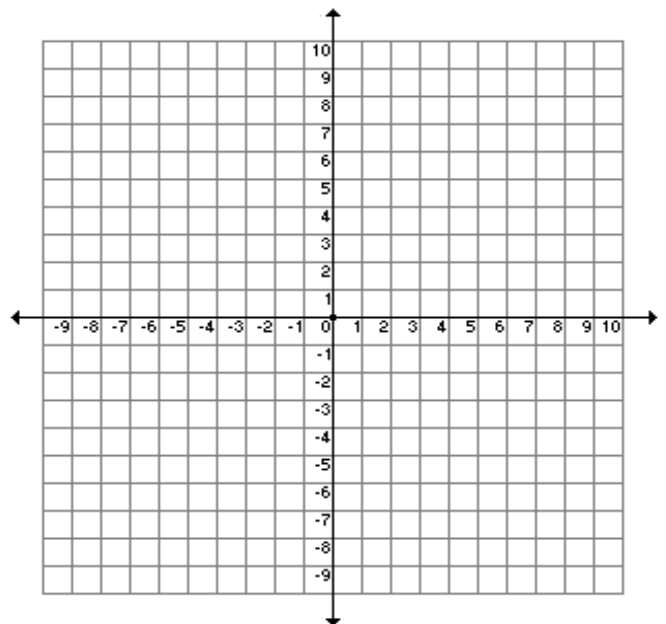
x-intercept: \_\_\_\_\_

y-intercept: \_\_\_\_\_

domain: \_\_\_\_\_

range: \_\_\_\_\_

Does this graph cross the horizontal asymptote, and if so where? \_\_\_\_\_



7)  $g(x) = \frac{4x^2 - 5}{x - 2}$

Horizontal asymptote: \_\_\_\_\_

Slant asymptote: \_\_\_\_\_

Removable discontinuity: \_\_\_\_\_

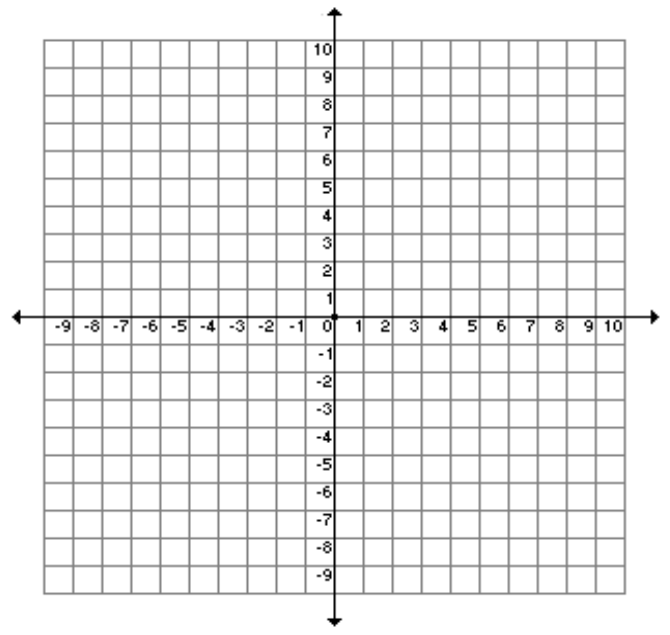
Vertical asymptote: \_\_\_\_\_

x-intercept: \_\_\_\_\_

y-intercept: \_\_\_\_\_

domain: \_\_\_\_\_

range: \_\_\_\_\_



Does this graph cross the horizontal asymptote, and if so where? \_\_\_\_\_

For the following questions, create your own function that will meet the given criteria. Leave your answer in factored form please! Note: there are a variety of correct answers.

8) A function that has a vertical asymptote at  $x = 3$ .

9) A function that has a vertical asymptote at  $x = 5$  and a hole at  $x = 1$ .

10) A function has a zero at  $x = 3$ , a vertical asymptote at  $x = -4$  and a hole at  $x = 0$ .

11) A function that has a vertical asymptote at  $x = 5$ , a hole at  $x = -2$ , and a horizontal asymptote at  $y = 0$ .