

Graphing Simple Rational Functions

Identify the vertical asymptotes, horizontal asymptote, domain, and range of each.

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

Vertical Asym.: $x = 0$

Horz. Asym.: $y = 0$

Domain: All reals except 0

Range: All reals except 0

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

Vertical Asym.: $x = 1$

Horz. Asym.: $y = 1$

Domain: All reals except 1

Range: All reals except 1

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

Vertical Asym.: $x = 1$

Horz. Asym.: $y = -1$

Domain: All reals except 1

Range: All reals except -1

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

Vertical Asym.: $x = 0$

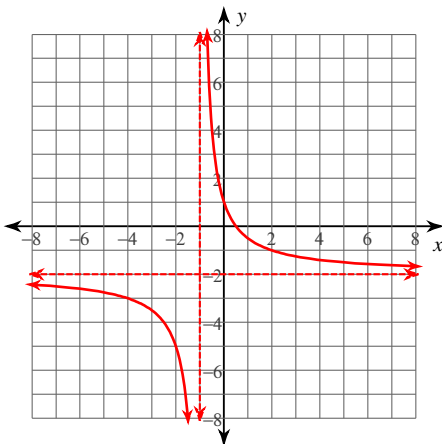
Horz. Asym.: $y = 0$

Domain: All reals except 0

Range: All reals except 0

Identify the vertical asymptotes, horizontal asymptote, domain, and range of each. Then sketch the graph.

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



Vertical Asym.: $x = -1$

Horz. Asym.: $y = -2$

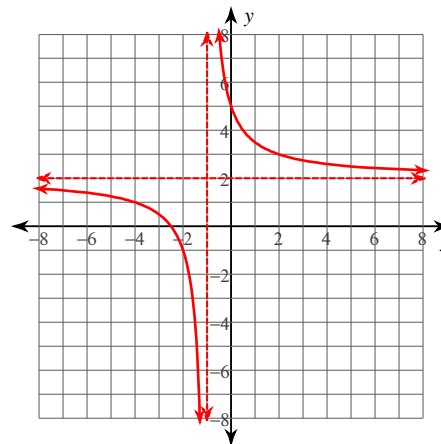
Domain:

All reals except -1

Range:

All reals except -2

$$6) f(x) = \frac{3}{x+1} + 2$$



Vertical Asym.: $x = -1$

Horz. Asym.: $y = 2$

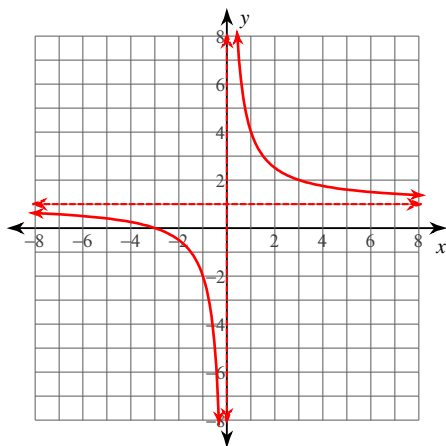
Domain:

All reals except -1

Range:

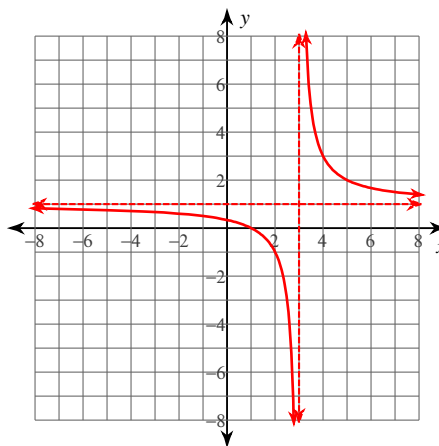
All reals except 2

$$7) f(x) = \frac{3}{x} + 1$$



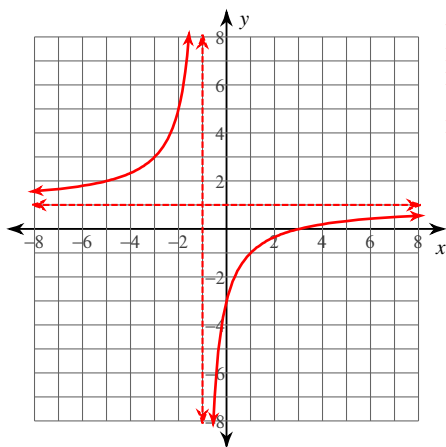
Vertical Asym.: $x = 0$
 Horz. Asym.: $y = 1$
 Domain:
 All reals except 0
 Range:
 All reals except 1

$$8) f(x) = \frac{2}{x-3} + 1$$



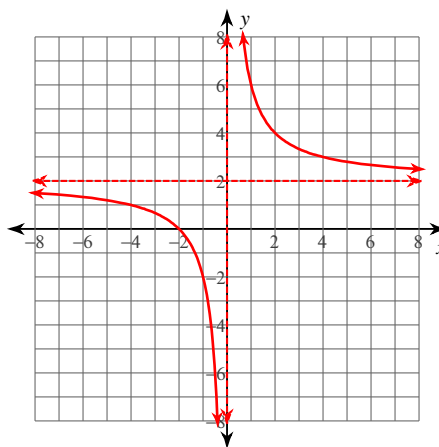
Vertical Asym.: $x = 3$
 Horz. Asym.: $y = 1$
 Domain:
 All reals except 3
 Range:
 All reals except 1

$$9) f(x) = -\frac{4}{x+1} + 1$$



Vertical Asym.: $x = -1$
 Horz. Asym.: $y = 1$
 Domain:
 All reals except -1
 Range:
 All reals except 1

$$10) f(x) = \frac{4}{x} + 2$$



Vertical Asym.: $x = 0$
 Horz. Asym.: $y = 2$
 Domain:
 All reals except 0
 Range:
 All reals except 2

Critical thinking question:

11) Write a function of the form $f(x) = \frac{a}{x-h} + k$ with a vertical asymptote at $x = 25$

Many answers. Ex: $f(x) = \frac{1}{x-25}$