Pg. 184 2.6 – Rational Functions

Asymptote – a line that a graph approaches and intersects once or never touches.

Vertical Asymptote
Find the zeros of the denominator.

Horizontal Asymptote

1) If the degree of the denominator is greater than the numerator, then the horizontal asymptote is y = 0
2) If the degree of the denominator is less than the numerator, then NO horizontal asymptote.
3) If the degrees are equal, then the horizontal asymptote is the ratio of the leading coefficients.

Ex 1:
Find the domain of the function, decide if the function is continuous, and identify any horizontal and vertical asymptotes.

a) $f(x) = \frac{4}{(x-2)^3}$ **b)** $f(x) = \frac{1-5x}{1+2x}$ **c)** $f(x) = \frac{2x^2}{x+1}$

Domain: **Domain:** **Domain:**

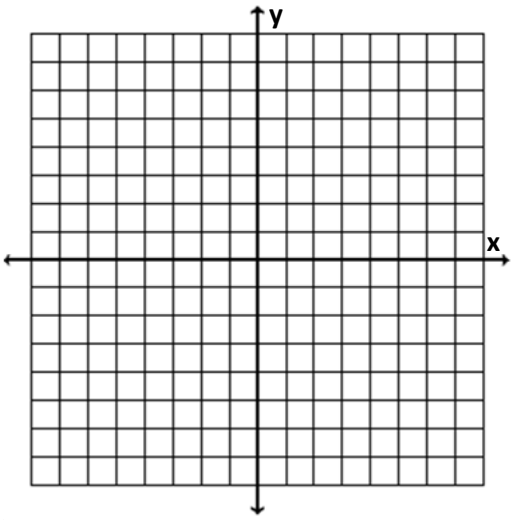
Note: If there is a gap in the domain, then the graph is NOT continuous.
Continuous: **Continuous:** **Continuous:**

Vertical Asymptote(s): **Vertical Asymptote(s):** **Vertical Asymptote(s):**

Horizontal Asymptote(s): **Horizontal Asymptote(s):** **Horizontal Asymptote(s):**

Ex 2:
(a) Find the domain of the function, **(b)** decide if the function is continuous, **(c)** identify all intercepts, **(d)** identify any horizontal or vertical asymptotes and **(e)** plot additional solution points as needed to sketch the graph of the function.

$f(x) = \frac{1}{x-3}$ **(e) T-Chart**



(a) Domain:

(b) Continuous:

(c) x-intercept(s):

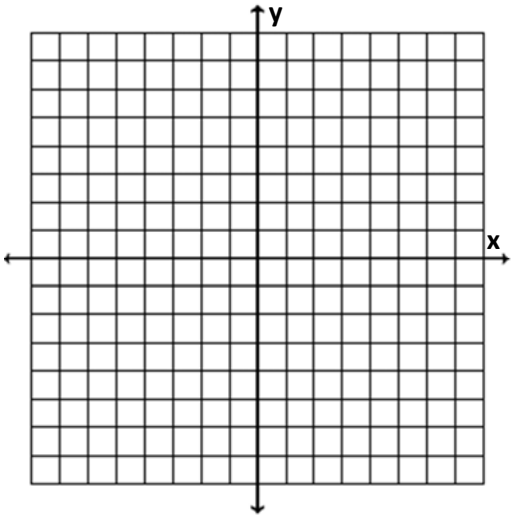
y-intercept(s):

(d) Vertical Asymptote(s):

Horizontal Asymptote(s):

Ex 3:
(a) Find the domain of the function, **(b)** decide if the function is continuous, **(c)** identify all intercepts, **(d)** identify any horizontal or vertical asymptotes and **(e)** plot additional solution points as needed to sketch the graph of the function.

$f(x) = \frac{1-3x}{1-x}$ **(e) T-Chart**



(a) Domain:

(b) Continuous:

(c) x-intercept(s):

y-intercept(s):

(d) Vertical Asymptote(s):

Horizontal Asymptote(s):

Slant Asymptote

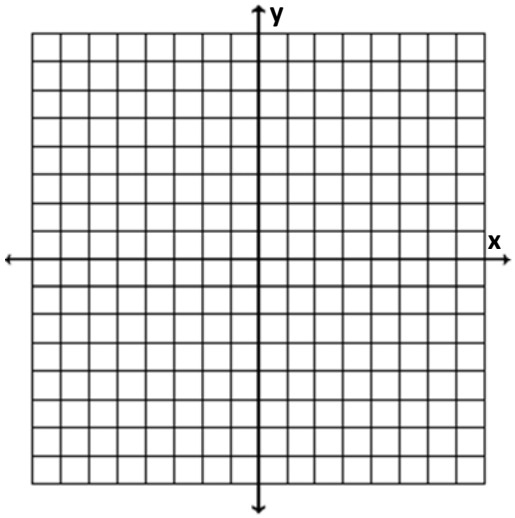
If the degree of the numerator is exactly one more than the degree of the denominator then the function has a slant asymptote. The slant asymptote is the quotient obtained after dividing the rational function.

Ex 4:

(a) Find the domain of the function, **(b)** decide if the function is continuous, **(c)** identify all intercepts, **(d)** identify any horizontal or vertical asymptotes and **(e)** plot additional solution points as needed to sketch the graph of the function.

$f(x) = \frac{x^2 + 5}{x}$

(e) T-Chart



(a) Domain:

(b) Continuous:

(c) x-intercept(s):

y-intercept(s):

(d) Vertical Asymptote(s):

Horizontal Asymptote(s):

Assignment 2.6

Pg. 193 Vocab #'s 1-3

Problem Set #'s 5– 45 ODD, 51-63 ODD, 73-79 ODD

REQUIRED: Vocab, 5, 7, 9, 27, 31, 39, 53, 59, 73, 77