



Math 150 - Week-In-Review 4

Saud Hussein

Section 3.2 – Properties of Rational Functions

1. Describe the end behavior of the graph of each rational function and the behavior near any vertical asymptotes using approaching notation. Find the domain and the location of any holes for each rational function.

(a) $f(x) = \frac{x - 2}{x^2 - 4}$

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

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



2. Determine the equation of any slant asymptotes for each rational function.

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

(b) $f(x) = \frac{x^2 - x - 6}{x - 1}$

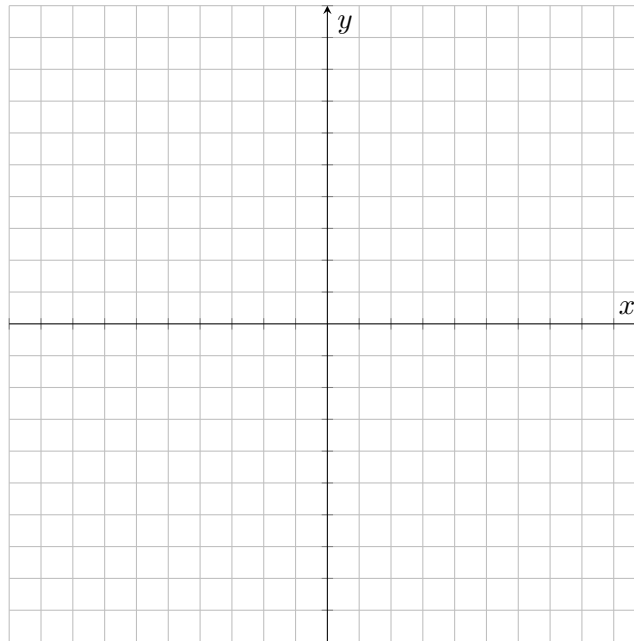
3. A large mixing tank contains 100 gallons of water, into which 5 pounds of sugar has been mixed. A tap opens pouring 10 gallons a minute of water into the tank at the same time sugar is poured into the tank at a rate of one pound a minute. Find the concentration $C(t)$ (lb. per gallon) of sugar in the tank after t minutes and explain the physical meaning of the horizontal and vertical asymptotes of the graph of $C(t)$.



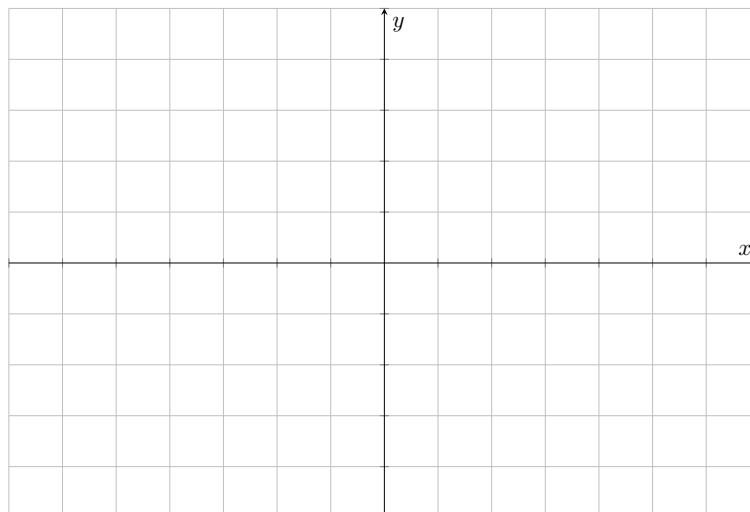
Section 3.3 – Graphs of Rational Functions

1. Sketch the graph of each rational function.

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

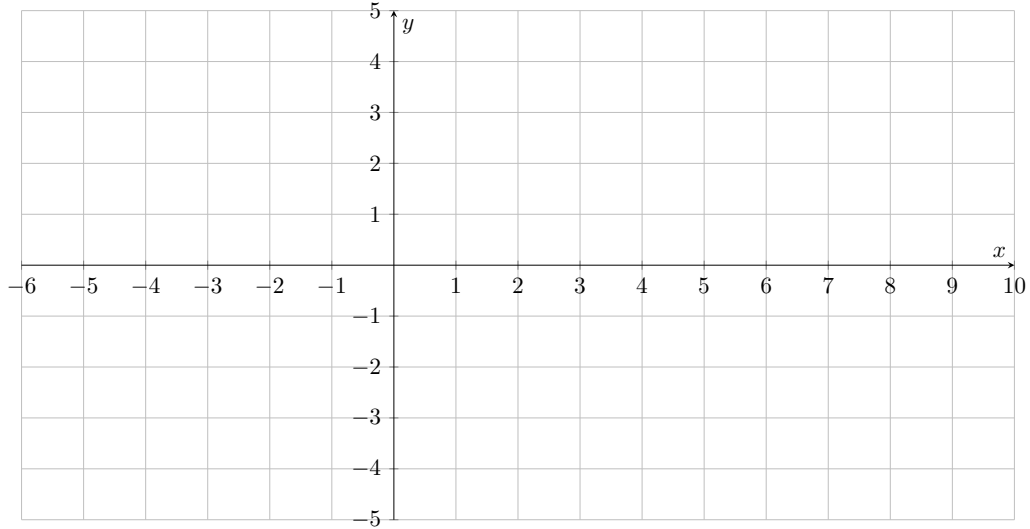


(b) $f(x) = \frac{27(x - 2)}{(x + 3)(x - 3)^2}$

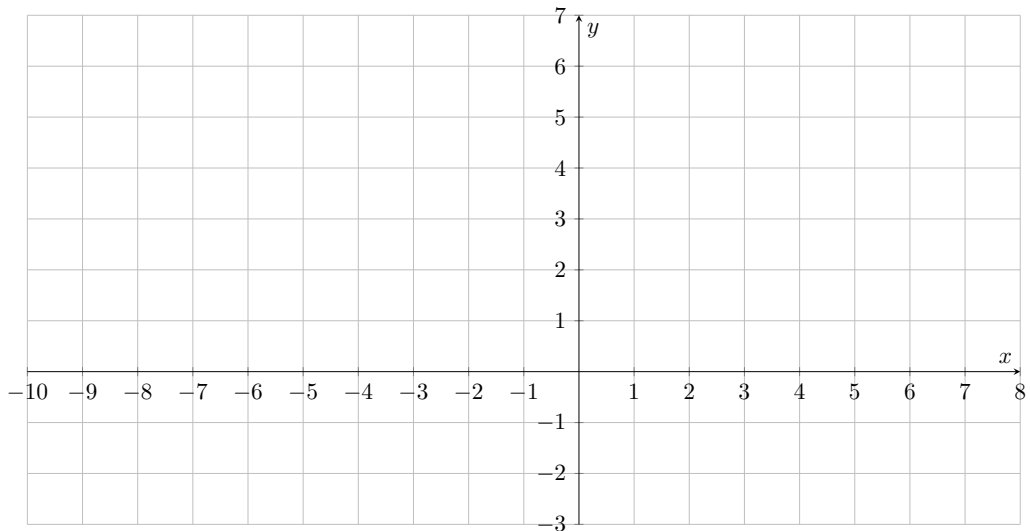




(c) $f(x) = \frac{3(x^2 + 2x - 8)}{(x + 1)(x^2 - 7x + 10)}$

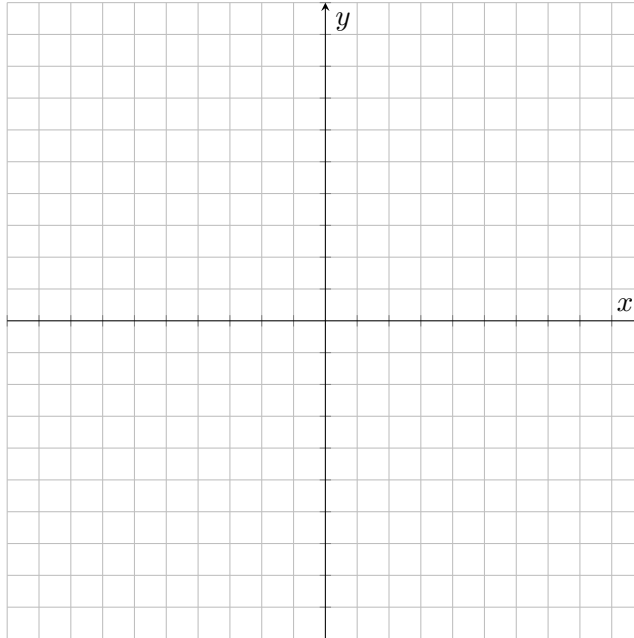


(d) $f(x) = \frac{2(x + 1)^2(x - 3)}{(x + 3)^2(x - 2)}$

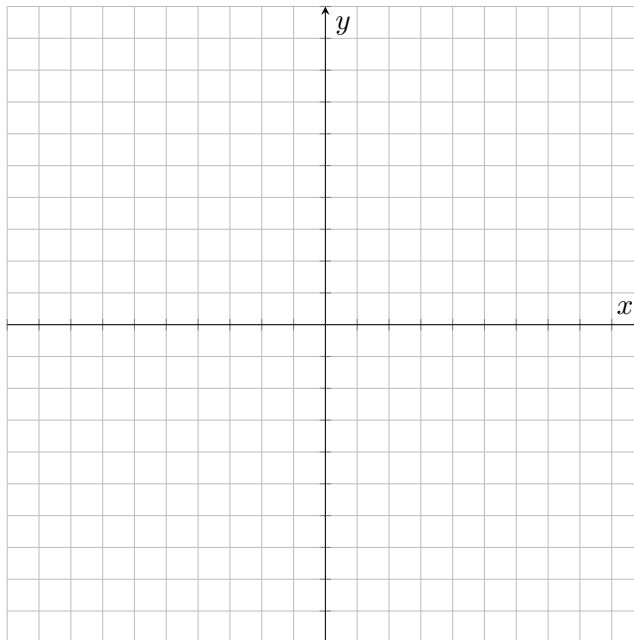




(e) $f(x) = \frac{-2x(x-3)}{(x-4)(x+3)}$



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

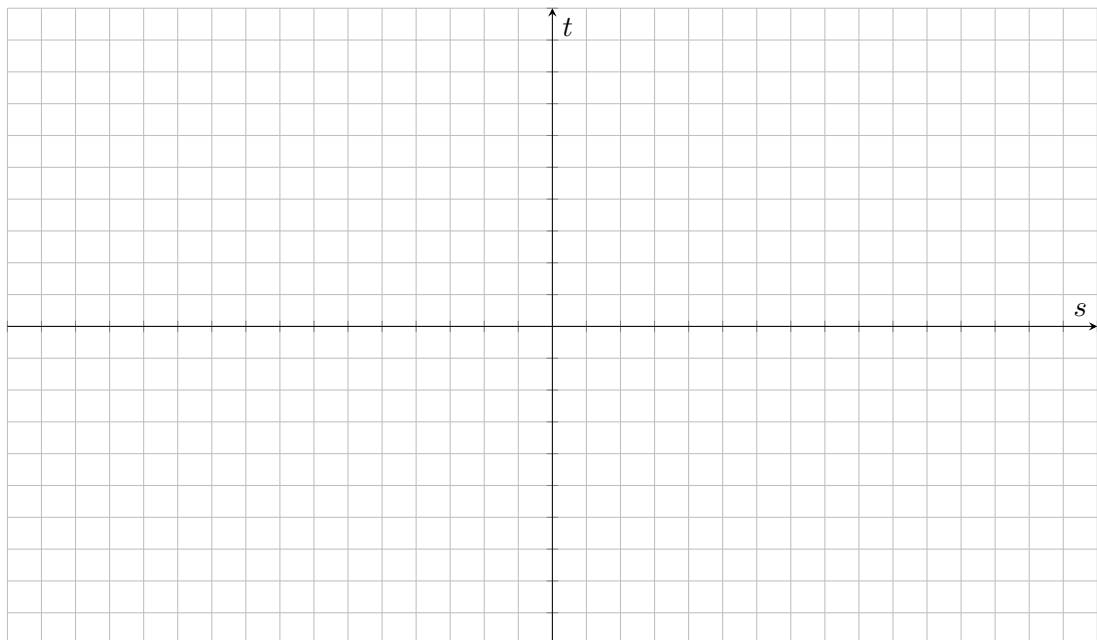




2. An airplane flies 200 miles into a 30 mph headwind and then flies another 200 miles with a 20 mph tailwind.

(a) Find an equation for the time t of the trip as a function of the speed s of the plane.

(b) Graph the function found in part (a) and describe what the horizontal and vertical asymptotes of the function physically mean.





Section 3.4 – Solving Rational Equations

1. Solve the following rational equations.

(a)
$$\frac{1}{x-2} = \frac{3}{x+2} - \frac{6x}{x^2-4}$$

(b)
$$\frac{3}{x-1} - \frac{2}{x-8} = \frac{1}{x^2-9x+8}$$



(c) $\frac{x}{x+4} = \frac{32}{x^2-16} + 5$

(d) $\frac{x}{x+3} = \frac{18}{x^2-9} + 4$



$$(e) \frac{x+3}{3x} + \frac{x}{24} = \frac{1}{x}$$

$$(f) \left| \frac{4x}{x^2 - x - 12} \right| = \left| \frac{2}{x - 4} \right|$$

