

Solutions

Online Chapter 3 Review

1. Given: $f(x) = \frac{x^2-9}{2x^2+25} = \frac{(x+3)(x-3)}{2x^2+25}$

a) Find the x-intercept

$$0 = x^2 - 9$$

$$0 = (x+3)(x-3)$$

$$\boxed{(-3, 0) + (3, 0)}$$

d) Find the horizontal asymptote

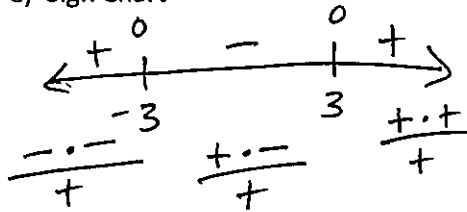
$$y = \frac{1x^2}{2x^2} \quad \boxed{y = \frac{1}{2}}$$

b) Find the y-intercept

$$y = \frac{0^2-9}{2(0)^2+25} = \frac{-9}{25}$$

$$\boxed{(0, -\frac{9}{25})}$$

e) Sign Chart



c) Find the vertical asymptote(s)

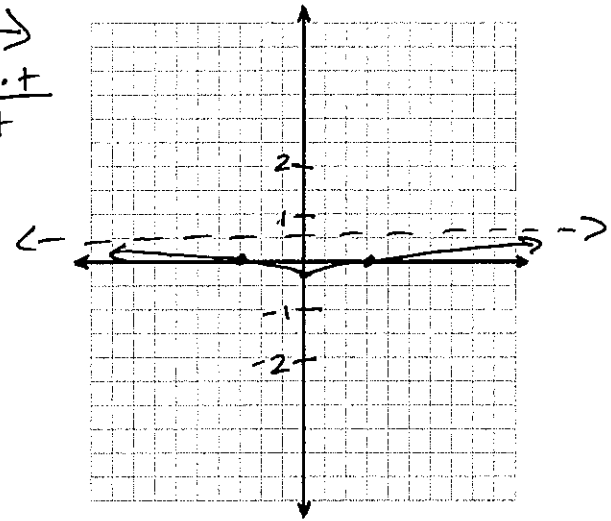
$$2x^2 + 25 = 0 \Rightarrow x = \pm \sqrt{\frac{-25}{2}}$$

$$2x^2 = -25$$

$$x^2 = \frac{-25}{2}$$

imaginary
no real V.A.

f) Graph



2. Given $f(x) = \frac{x}{x^2+2x+1} = \frac{x}{(x+1)(x+1)}$

a) Find the x-intercept

$$0 = x$$

$$\boxed{(0, 0)}$$

d) Find the horizontal asymptote

$$y = \frac{1x}{x^2} = \frac{1}{x}$$

As $x \rightarrow \infty, y \rightarrow 0$
As $x \rightarrow -\infty, y \rightarrow 0$

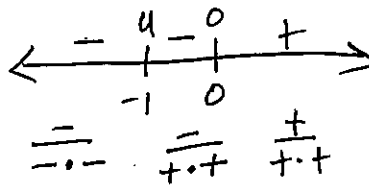
HA: $\boxed{y=0}$

b) Find the y-intercept

$$y = \frac{0}{0^2+2(0)+1} = \frac{0}{1}$$

$$\boxed{(0, 0)}$$

e) Sign Chart



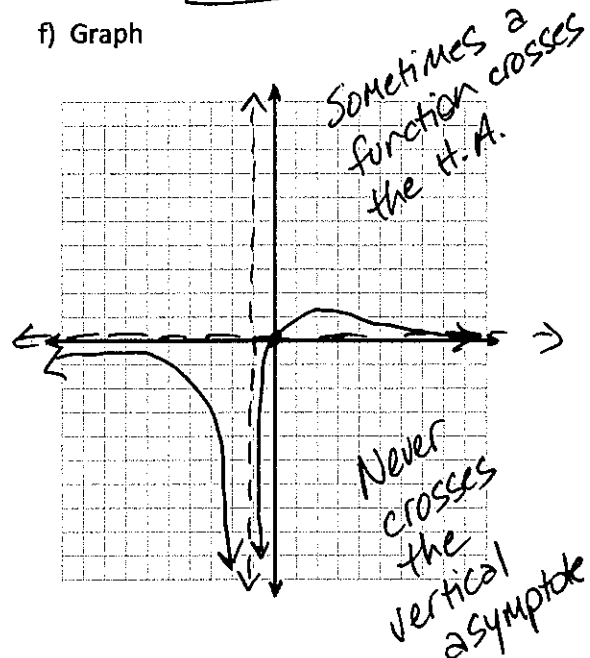
c) Find the vertical asymptote(s)

$$x^2 + 2x + 1 = 0$$

$$(x+1)(x+1) = 0$$

$$\boxed{x = -1}$$

f) Graph



3. Given: $y = \frac{3x^2 - 11x - 4}{4x^2 - 25} = \frac{(3x+1)(x-4)}{(2x+5)(2x-5)}$

a) Find the x-intercept

$0 = (3x+1)(x-4)$
 $3x+1=0$ $x=4$
 $3x=-1$ $x=-\frac{1}{3}$
 $x = -\frac{1}{3}$ $(-\frac{1}{3}, 0)$
 $x = 4$ $(4, 0)$

b) Find the y-intercept

$y = \frac{3(0)^2 - 11(0) - 4}{4(0)^2 - 25}$
 $y = \frac{-4}{-25} = \frac{4}{25}$ $(0, \frac{4}{25})$

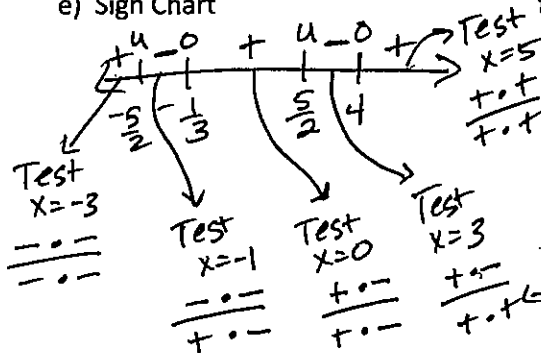
c) Find the vertical asymptote(s)

$(2x+5)(2x-5) = 0$
 $2x+5=0$ $2x-5=0$
 $2x=-5$ $2x=5$
 $x = -\frac{5}{2}$ $x = \frac{5}{2}$

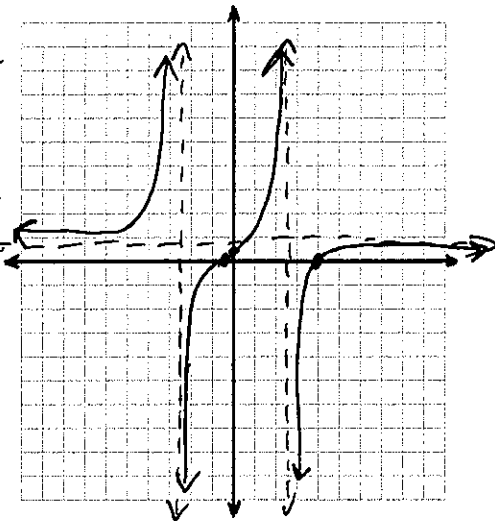
d) Find the horizontal asymptote

$y = \frac{3x^2}{4x^2}$ $y = \frac{3}{4}$

e) Sign Chart



f) Graph



4. Find the product or quotient and state the domain.

a) $\frac{x^2+8x}{x^3+5x^2-24x} \cdot (x^3+2x^2-15x)$

Factor $\frac{x(x+8)}{x(x^2+5x-24)} \cdot x(x^2+2x-15)$
 $\frac{x(x+8)}{x(x+8)(x-3)} \cdot x(x+5)(x-3)$
 $\frac{x(x+5)(x-3)}{x(x+8)(x-3)}$
 $\frac{x(x+5)}{x(x+8)}$
 $\frac{x+5}{x+8}$
 ARN except $x=0, -8, 3$

b) $\frac{x^2-36}{x^2-3x-18} \div \frac{x^2+2x-24}{x^2+7x+12}$

$\frac{(x+6)(x-6)}{(x-6)(x+3)} \cdot \frac{(x+3)(x+4)}{(x+6)(x-4)}$
 $\frac{x+4}{x-4}$
 ARN except $x=6, -3, 4$

5. Find the sum or difference.

a) $\frac{6x}{x^2-8x} + \frac{4}{2x-16}$

Factor $\frac{6x}{x(x-8)} + \frac{4}{2(x-8)}$

c.d. $\frac{12x+4x}{2x(x-8)} = \frac{8x}{2x(x-8)} = \frac{8}{x-8}$

b) $\frac{4x}{x^2-1} - \frac{4}{x-1}$

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

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

c) $\frac{y-1}{3y+15} - \frac{y+3}{5y+25}$

$\frac{3(y-5) - 5(y+5)}{15(y+5)}$

$\frac{2y-14}{15(y+5)} = \frac{2(y-7)}{15(y+5)}$

6. Solve. Check for extraneous solutions!

a) $\frac{9}{x-1} = 3(x-1)$

$9 = 3x - 3$

$12 = 3x$

$x = 4$

b) $3x(-\frac{4}{3} + \frac{2}{x}) = 8$

$3x(-\frac{4}{3}) + 3x(\frac{2}{x}) = 24x$

$-4x + 6 = 24x$
 $6 = 28x$

$x = \frac{6}{28}$
 $x = \frac{3}{14}$

c) $(x-8)(-8 + \frac{64}{x-8}) = \frac{x^2}{x-8}$

$-8(x-8) + 64 = x^2$

$-8x + 64 + 64 = x^2$

$x^2 + 8x - 128 = 0$

$(x-8)(x+16) = 0$