

Section 5.4: Properties of rational functions

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

Use the graph of $f(x)$ the function to find the following, then confirm your answer using Algebra.

- a) find the domain, express your answer using interval notation $(-\infty, -2) \cup (-2, \infty)$
- b) find the equation of the vertical asymptote(s) $x = -2$
- c) find the equation of the horizontal asymptote $y = 2$
- d) find the x- intercept $(3,0)$
- e) find the y-intercept $(0, -3)$

3) $f(x) = \frac{4x-12}{2x+12}$

Use the graph of $f(x)$ the function to find the following, then confirm your answer using Algebra.

- a) find the domain, express your answer using interval notation $(-\infty, -6) \cup (-6, \infty)$
- b) find the equation of the vertical asymptote(s) $x = -6$
- c) find the equation of the horizontal asymptote $y = 2$
- d) find the x- intercept $(3,0)$
- e) find the y-intercept $(0, -1)$

5) $f(x) = \frac{x-14}{x^2+6x-7}$

Use the graph of $f(x)$ the function to find the following, then confirm your answer using Algebra.

- a) find the domain, express your answer using interval notation $(-\infty, -7) \cup (-7,1) \cup (1, \infty)$
- b) find the equation of the vertical asymptote(s) $x = -7$ $x = 1$
- c) find the equation of the horizontal asymptote $y = 0$
- d) find the x- intercept $(14,0)$
- e) find the y-intercept $(0,2)$

7) $f(x) = \frac{x-4}{x^2-11x-12}$

Use the graph of $f(x)$ the function to find the following, then confirm your answer using Algebra.

- a) find the domain, express your answer using interval notation $(-\infty, -1) \cup (-1,12) \cup (12, \infty)$
- b) find the equation of the vertical asymptote(s) $x = -1$ $x = 12$
- c) find the equation of the horizontal asymptote $y = 0$
- d) find the x- intercept $(4,0)$
- e) find the y-intercept $(0, \frac{1}{3})$

$$9) f(x) = \frac{x^2+5x-6}{x+3}$$

Use the graph of $f(x)$ the function to find the following, then confirm your answer using Algebra.

- find the domain, express your answer using interval notation $(-\infty, -3) \cup (-3, \infty)$
- find the equation of the vertical asymptote(s) $x = -3$
- find the equation of the SLANT asymptote $y = x + 2$
- find the x- intercept $(-6,0)$ $(1,0)$
- find the y-intercept $(0, -2)$

$$11) f(x) = \frac{x^2-6x-16}{x-2}$$

Use the graph of $f(x)$ the function to find the following, then confirm your answer using Algebra.a) find the domain, express your answer using interval notation $(-\infty, 2) \cup (2, \infty)$

- find the equation of the vertical asymptote(s) $x = 2$
- find the equation of the SLANT asymptote $y = x - 4$
- find the x- intercept $(-2,0)$ $(8,0)$
- find the y-intercept $(0,8)$

$$13) f(x) = \frac{x+3}{x^2-9}$$

Find the following:

- equation of the vertical asymptote $x = 3$
- coordinates of the "hole" in the graph of $f(x)$ $(-3, -\frac{1}{6})$

$$15) f(x) = \frac{x+2}{x^2-6x-16}$$

Find the following:

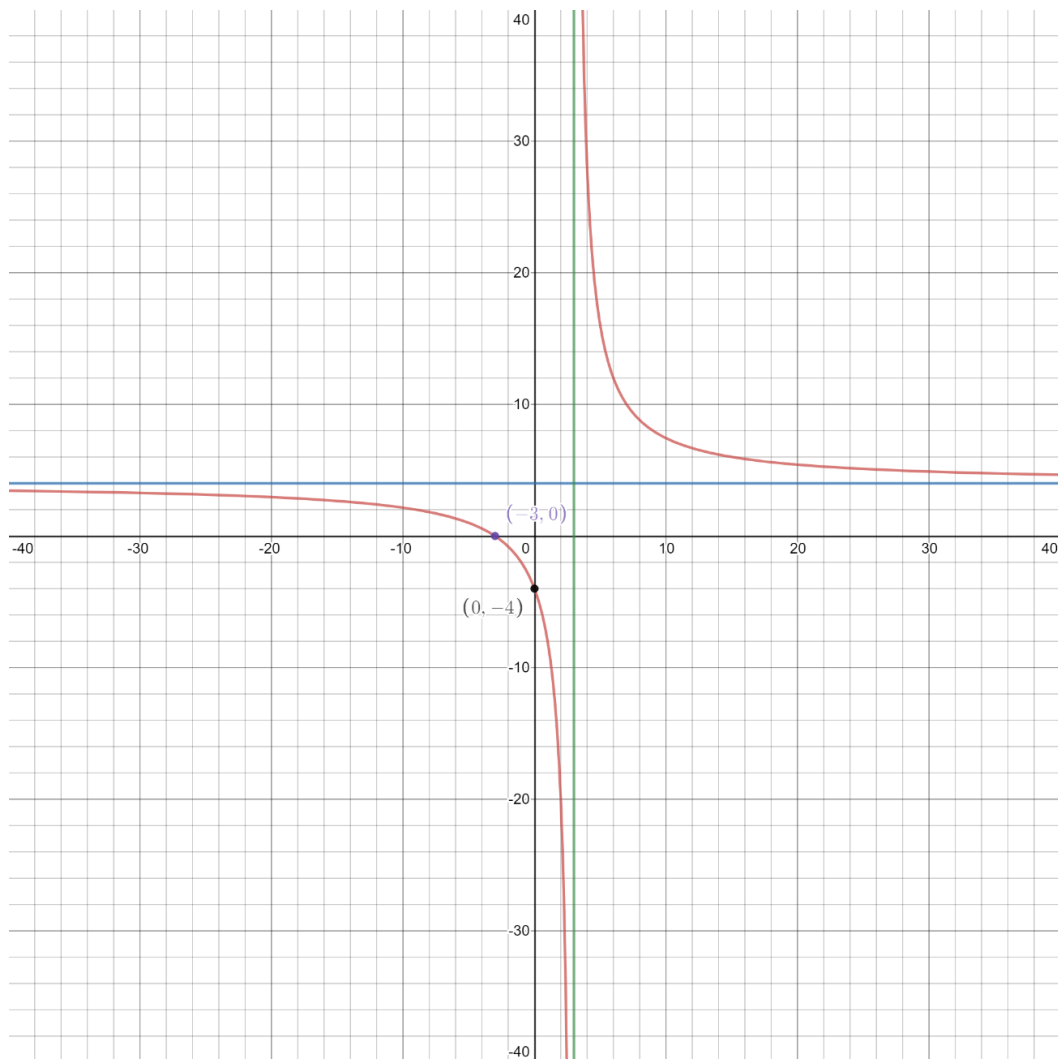
- equation of the vertical asymptote $x = 8$
- coordinates of the "hole" in the graph of $f(x)$ $(-2, -\frac{1}{10})$

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For each problem find the following:

- the domain of $f(x)$ written in interval notation $(-\infty, 3) \cup (3, \infty)$
- the equation of the vertical asymptote (write none if there is no vertical asymptote) $x = 3$
- the equation of the horizontal asymptote (write none if there is no horizontal asymptote) $y = 4$
- the equation of the slant asymptote (write none if there is no slant asymptote) NONE
- write the coordinates of any "hole" (write none if there is no hole) NONE
- x- intercept(s) if any $(-3, 0)$
- y- intercept(s) if any $(0, -4)$
- Sketch a graph of the function

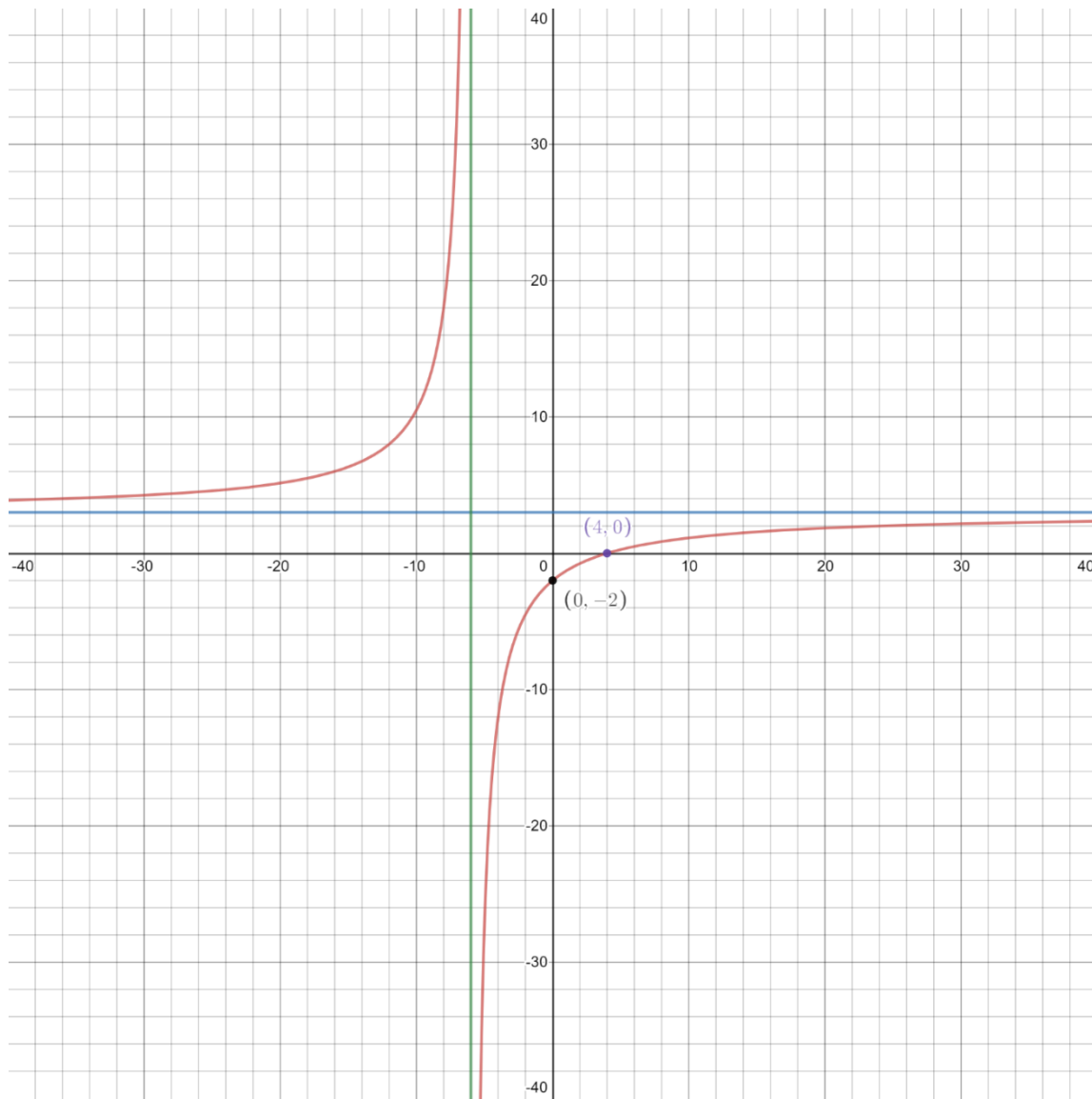
17) $f(x) = \frac{4x+12}{x-3}$



For each problem find the following:

- a) the domain of $f(x)$ written in interval notation $(-\infty, -6) \cup (-6, \infty)$
- b) the equation of the vertical asymptote (write none if there is no vertical asymptote) $x = -6$
- c) the equation of the horizontal asymptote (write none if there is no horizontal asymptote) $y = 3$
- d) the equation of the slant asymptote (write none if there is no slant asymptote) NONE
- e) write the coordinates of any "hole" (write none if there is no hole) NONE
- f) x- intercept(s) if any $(4,0)$
- g) y- intercept(s) if any $(0, -2)$
- h) Sketch a graph of the function

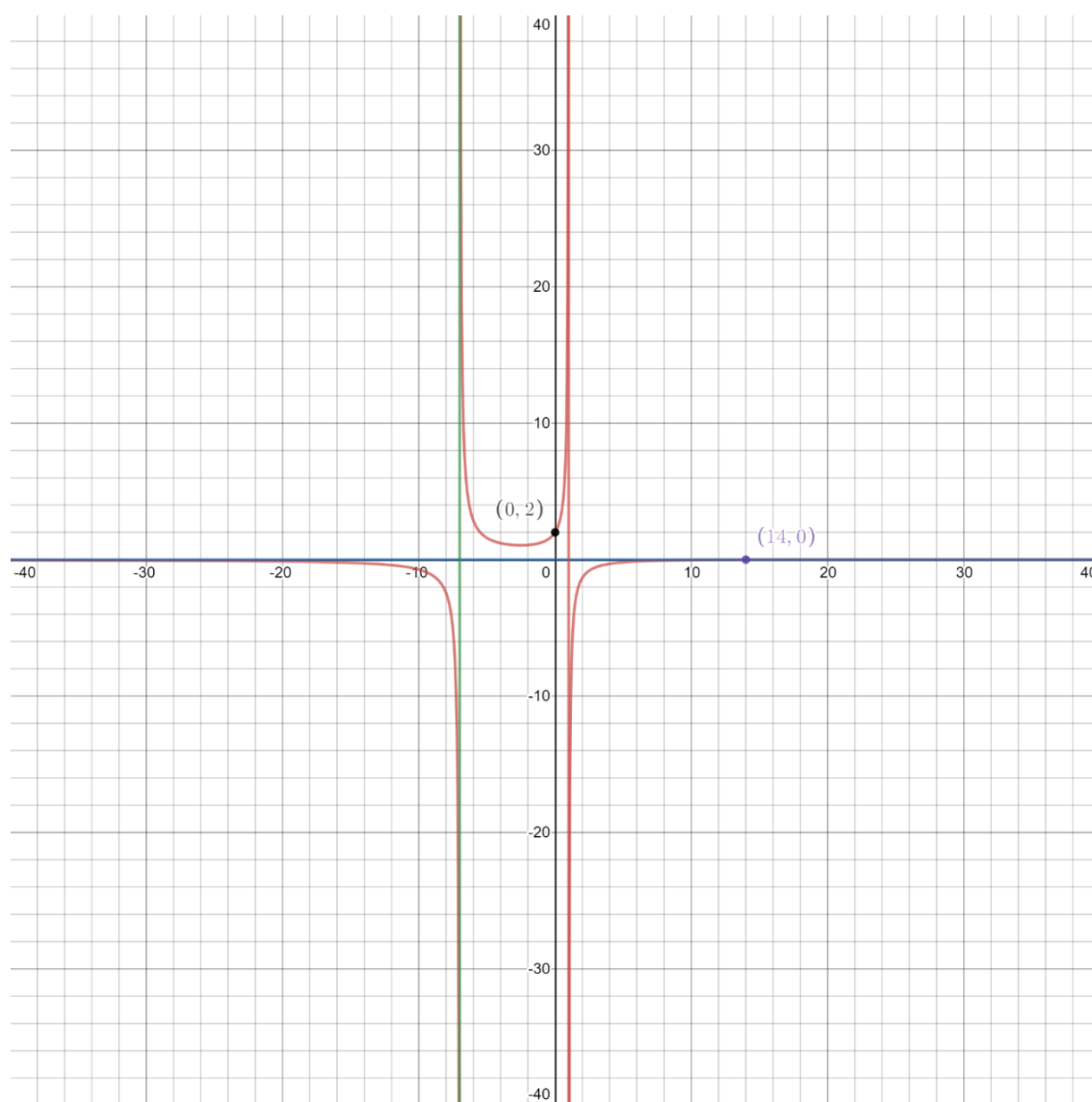
19) $f(x) = \frac{6x-24}{2x+12}$



For each problem find the following:

- a) the domain of $f(x)$ written in interval notation $(-\infty, -7) \cup (-7, 1) \cup (1, \infty)$
- b) the equation of the vertical asymptote (write none if there is no vertical asymptote)
 $x = -7$ $x = 1$
- c) the equation of the horizontal asymptote (write none if there is no horizontal asymptote) $y = 0$
- d) the equation of the slant asymptote (write none if there is no slant asymptote) NONE
- e) write the coordinates of any "hole" (write none if there is no hole) NONE
- f) x- intercept(s) if any $(14, 0)$
- g) y-intercept(s) if any $(0, 2)$
- h) Sketch a graph of the function

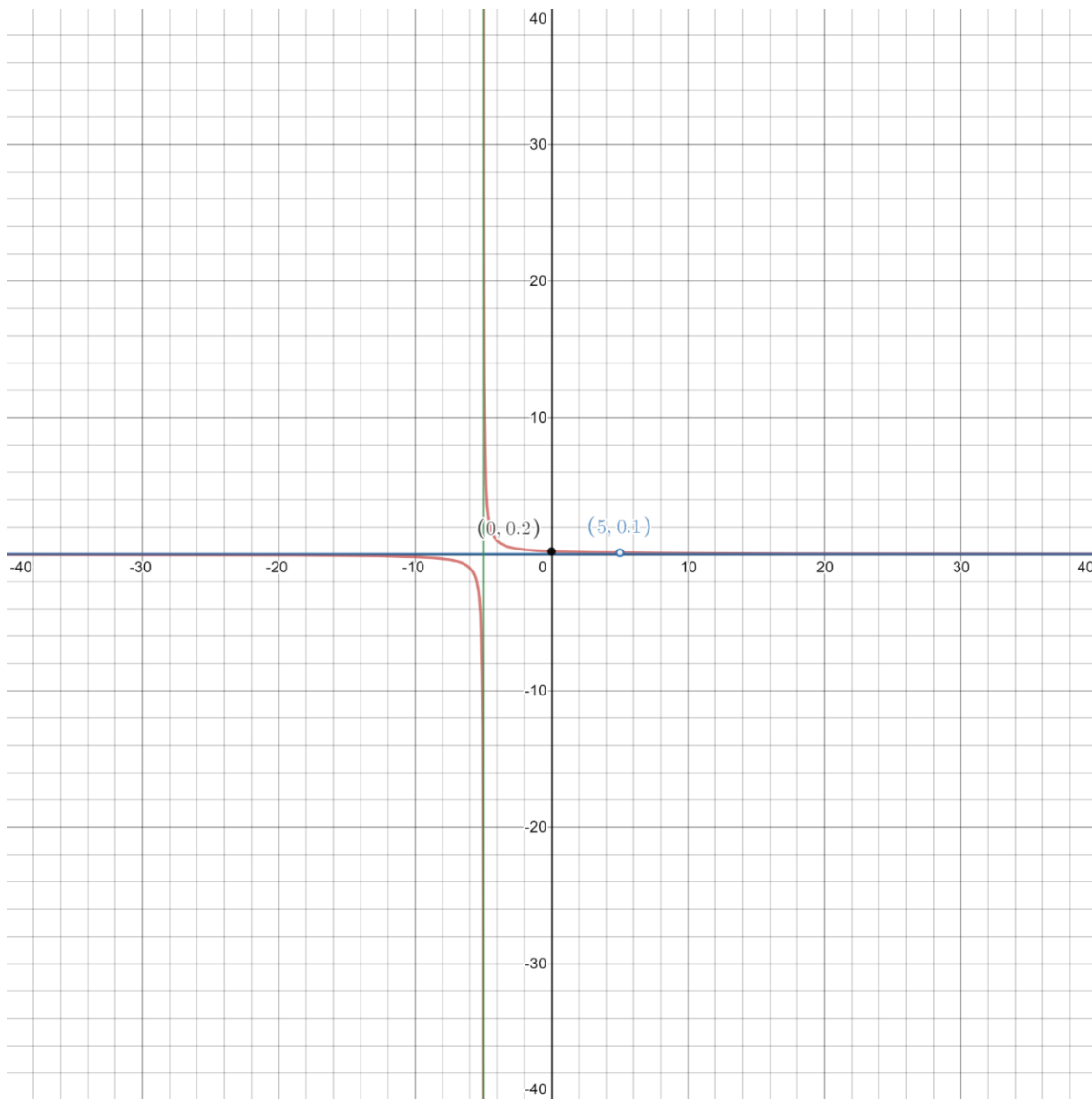
21) $f(x) = \frac{x-14}{x^2+6x-7}$



For each problem find the following:

- the domain of $f(x)$ written in interval notation $(-\infty, -5) \cup (-5, 5) \cup (5, \infty)$
- the equation of the vertical asymptote (write none if there is no vertical asymptote) $x = -5$
- the equation of the horizontal asymptote (write none if there is no horizontal asymptote) $y = 0$
- the equation of the slant asymptote (write none if there is no slant asymptote) NONE
- write the coordinates of any "hole" (write none if there is no hole) $(5, \frac{1}{10})$
- x- intercept(s) if any NONE
- y-intercept(s) if any $(0, \frac{1}{5})$.
- Sketch a graph of the function

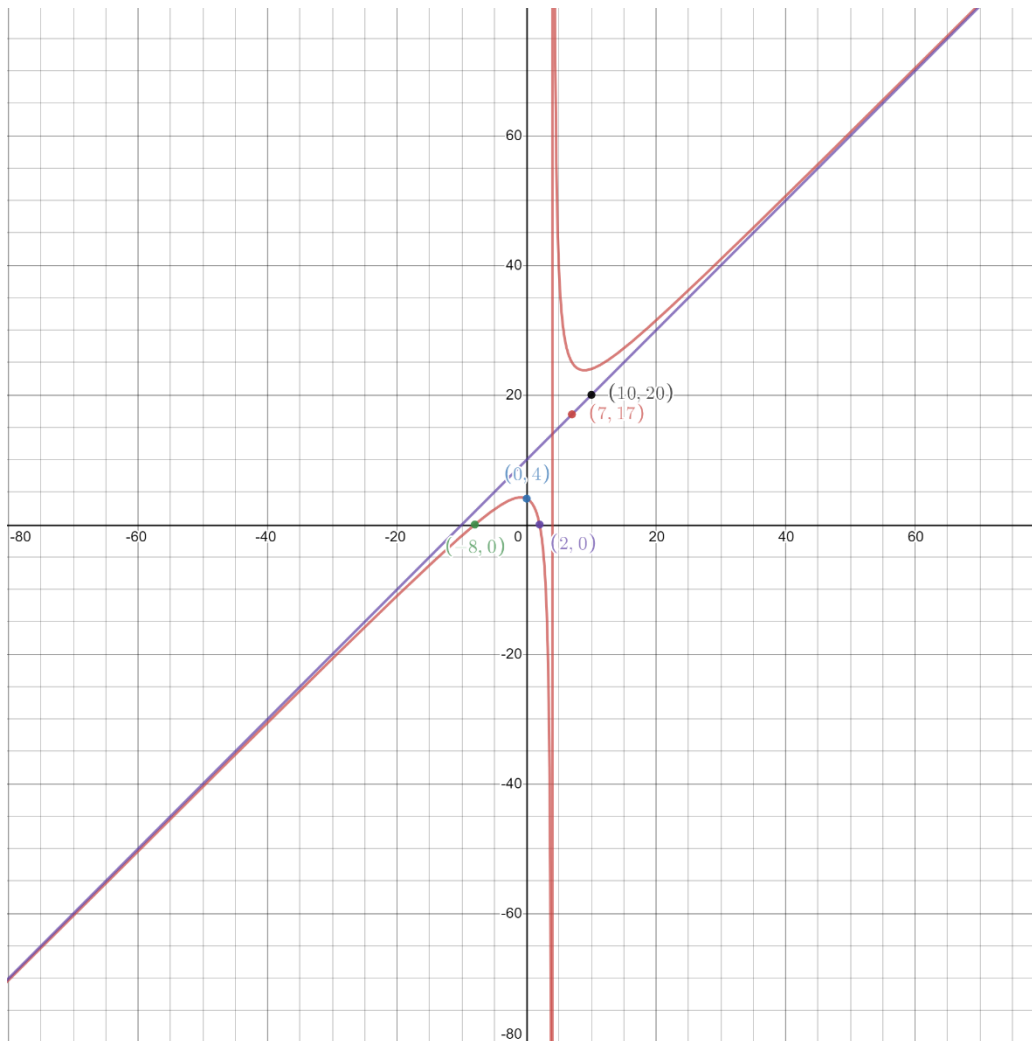
23) $f(x) = \frac{x-5}{x^2-25}$



For each problem find the following:

- a) the domain of $f(x)$ written in interval notation $(-\infty, 4) \cup (4, \infty)$
- b) the equation of the vertical asymptote (write none if there is no vertical asymptote) $x = 4$
- c) the equation of the horizontal asymptote (write none if there is no horizontal asymptote) NONE
- d) the equation of the slant asymptote (write none if there is no slant asymptote) $y = x + 10$
- e) write the coordinates of any "hole" (write none if there is no hole) NONE
- f) x- intercept(s) if any $(-8,0)$ $(2,0)$
- g) y- intercept(s) if any $(0,4)$
- h) Sketch a graph of the function

25) $f(x) = \frac{x^2+6x-16}{x-4}$



For each problem find the following:

- a) the domain of $f(x)$ written in interval notation $(-\infty, 1) \cup (1, \infty)$
- b) the equation of the vertical asymptote (write none if there is no vertical asymptote) $x = 1$
- c) the equation of the horizontal asymptote (write none if there is no horizontal asymptote) NONE
- d) the equation of the slant asymptote (write none if there is no slant asymptote) $y = x + 4$
- e) write the coordinates of any "hole" (write none if there is no hole) NONE
- f) x- intercept(s) if any $(-6,0)$ $(3,0)$
- g) y-intercept(s) if any $(0,18)$
- h) Sketch a graph of the function

27) $f(x) = \frac{x^2+3x-18}{x-1}$

