161 Final Name: _____

1. Fill in the blanks

   (a) The equation for the y axis is _____ and the equation for the x axis is _____

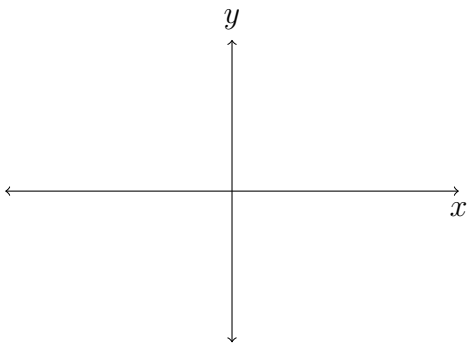
   (b) For the polynomial $f(x) = 5x^4 - 5x^2 + 3x - 5$ the degree is _____, the leading coefficient is _____ and the constant is _____

   (c) How many real zeros can the polynomial above have? _____

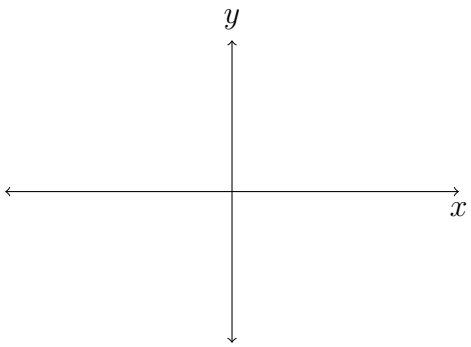
   (d) The equation for a line with slope m and y intercept b is _____

2. Graph the following:

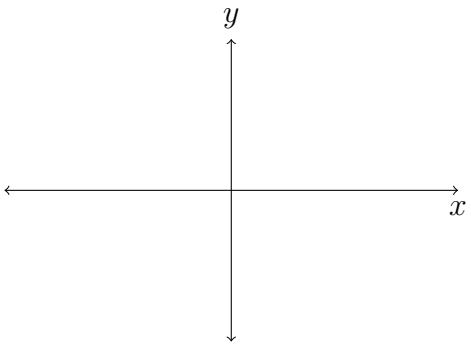
   (a) A quadratic (second degree) polynomial with positive leading coefficient and zeros at $x = -3$ and $x = 2$



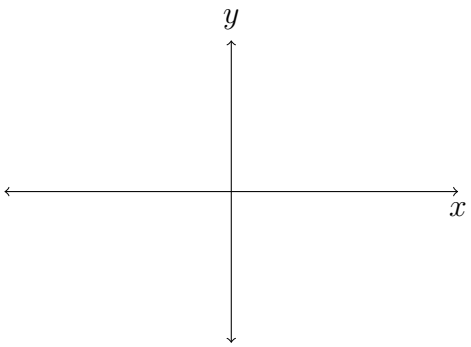
   (b) A cubic polynomial with two zeros; $x = -2$ and $x = 3$ with multiplicty two.



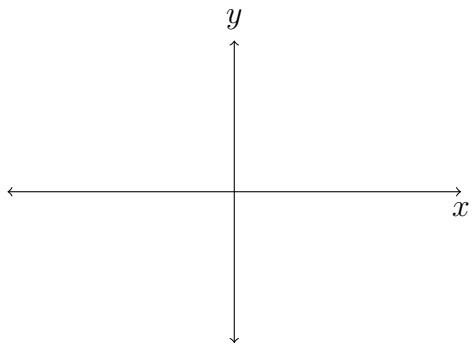
   (c) A fourth degree polynomial with zeros at $x = -2, x = 0, x = 2, x = 4$



   (d) A rational function with vertical asympote at $x = 2$ and horizontal asymptote at $y = 1$



(e) A rational function with horizontal asymptote at $y = 0$ and vertical asymptotes at $x = 3, x = -3$



3. Find examples given above.

   (a) An example of a quadratic polynomial with positive leading coefficient and zeros at $x = -3$ and $x = 2$ is $f(x) =$_____

   (b) An example of a cubic polynomial with two zeros $x = -2$ and $x = 3$ with multiplicty two $f(x) =$_____

   (c) An example of a fourth degree polynomial with zeros at $x = -2, x = 0, x = 2, x = 4$ is $f(x) =$_____

   (d) An example of a rational function with vertical asympote at $x = 2$ and horizontal asymptote at $y = 1$ is $f(x) =$_____

   (e) An example of a rational function with horizontal asymptote at $y = 0$ and vertical asymptotes at $x = 3, x = -3$ is $f(x) =$_____

4. For the rational function

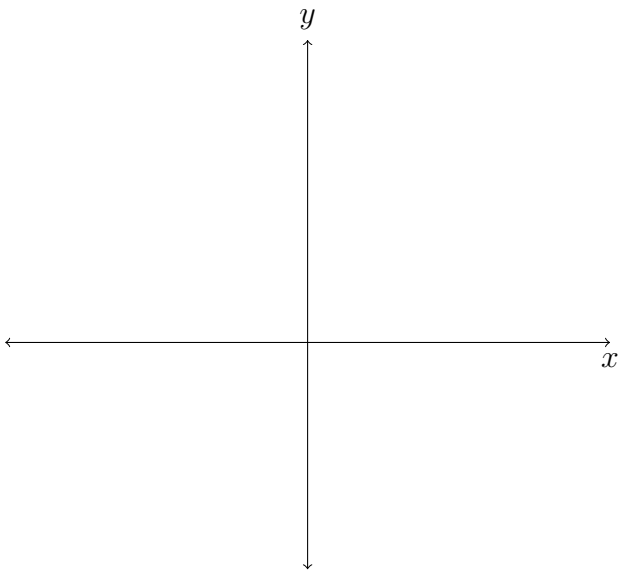
$$f(x) = \frac{2x+1}{x-2}$$

(a) Find the domain.

(b) Find the vertical asymptote.

(c) Find the horizontal asymptote.

(d) Graph the function using the above information.

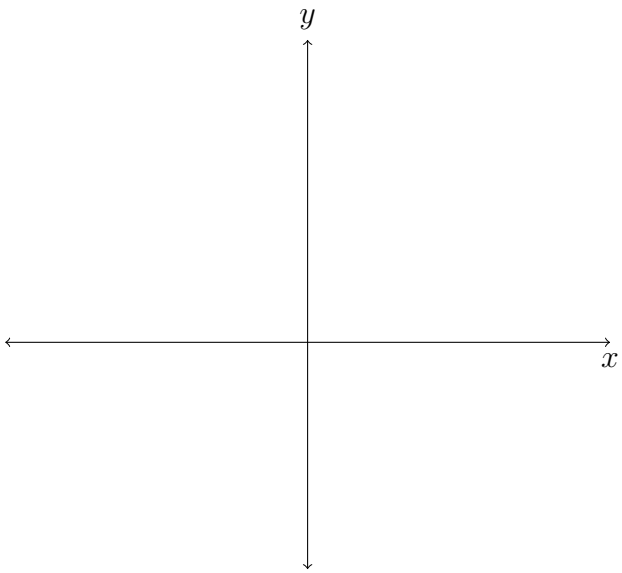


5. For the polynomial $p(x) = x^3 - 7x - 6$

   (a) Use synthetic divsion to check that $p(-1) = 0$

   (b) Factor $p(x)$ and then find the other two zero.

   (c) Using the information above, graph $p(x)$



6.

$$\text{Let } g(x) = \frac{x^2}{x^2 - 4}$$

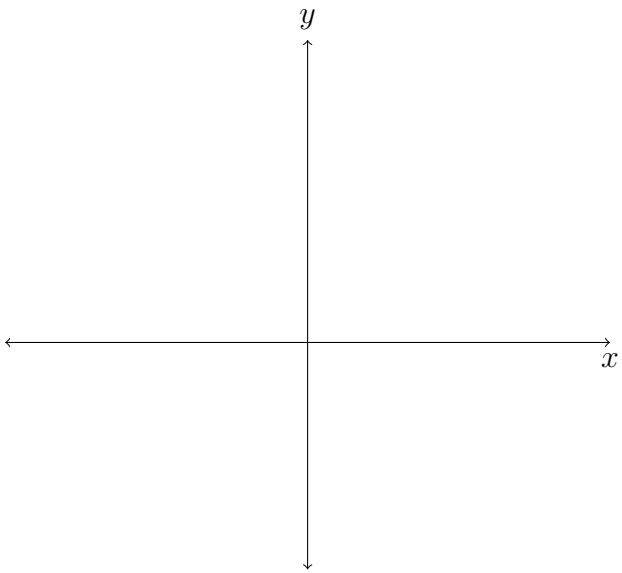
(a) Find the domain.

(b) Find the vertical asymptotes.

(c) Find the horizontal asymptote.

(d) Is g even, odd, or neither?

(e) Use the information above to graph $g(x)$

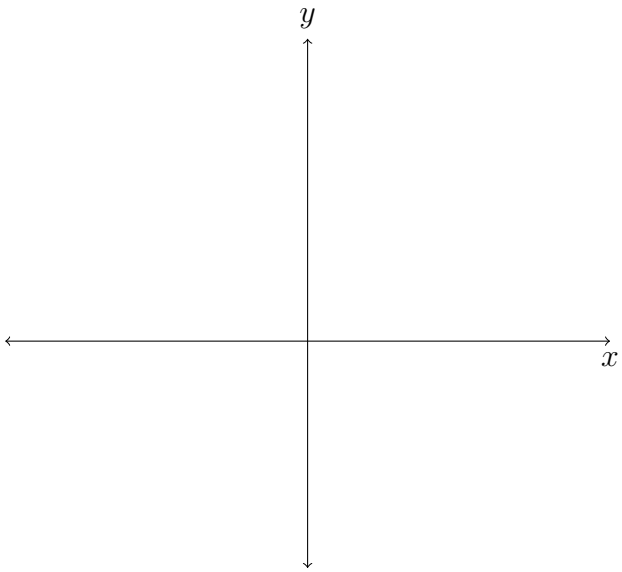


7. Let $p(x) = 2x^2 - 8x + 3$

   (a) Find the vertex.

   (b) Find the zeros.

   (c) Graph $P(x)$



8. For the rational function

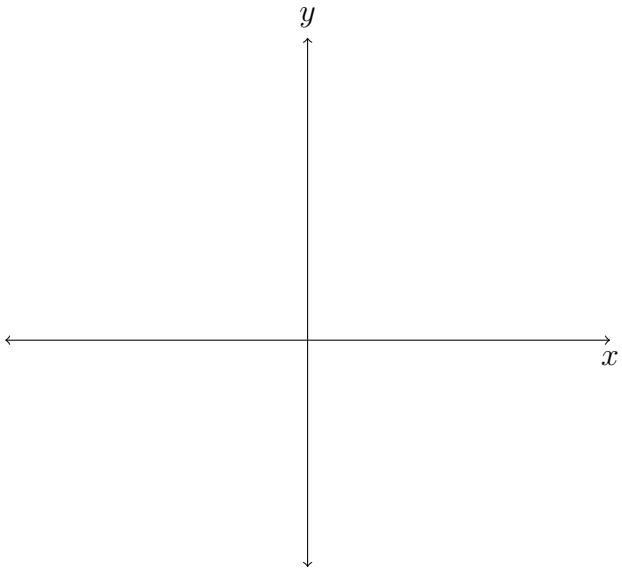
$$f(x) = \frac{x^2 - x - 5}{x - 3}$$

(a) Find the domain.

(b) Find the vertical asymptote.

(c) Find the slant asymptote.

(d) Graph the function using the above information.



9. Decompose

$$\frac{5x+1}{(x-4)(x+3)}$$

Enjoy the rest of your summer!