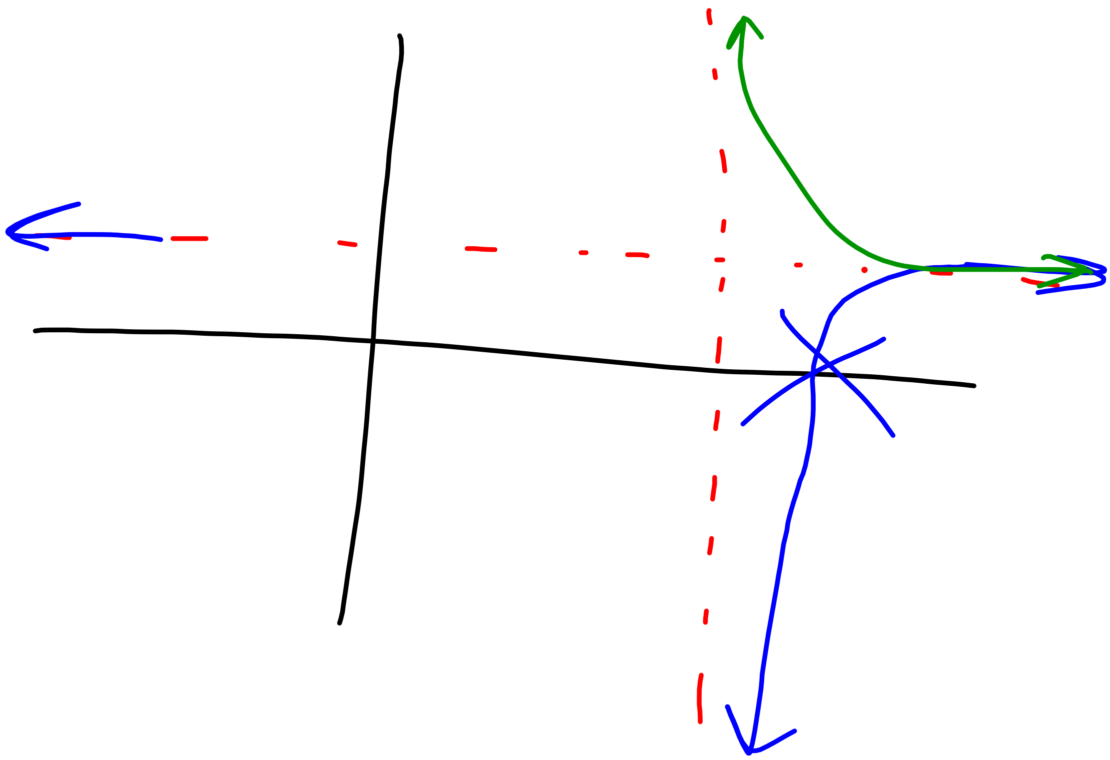
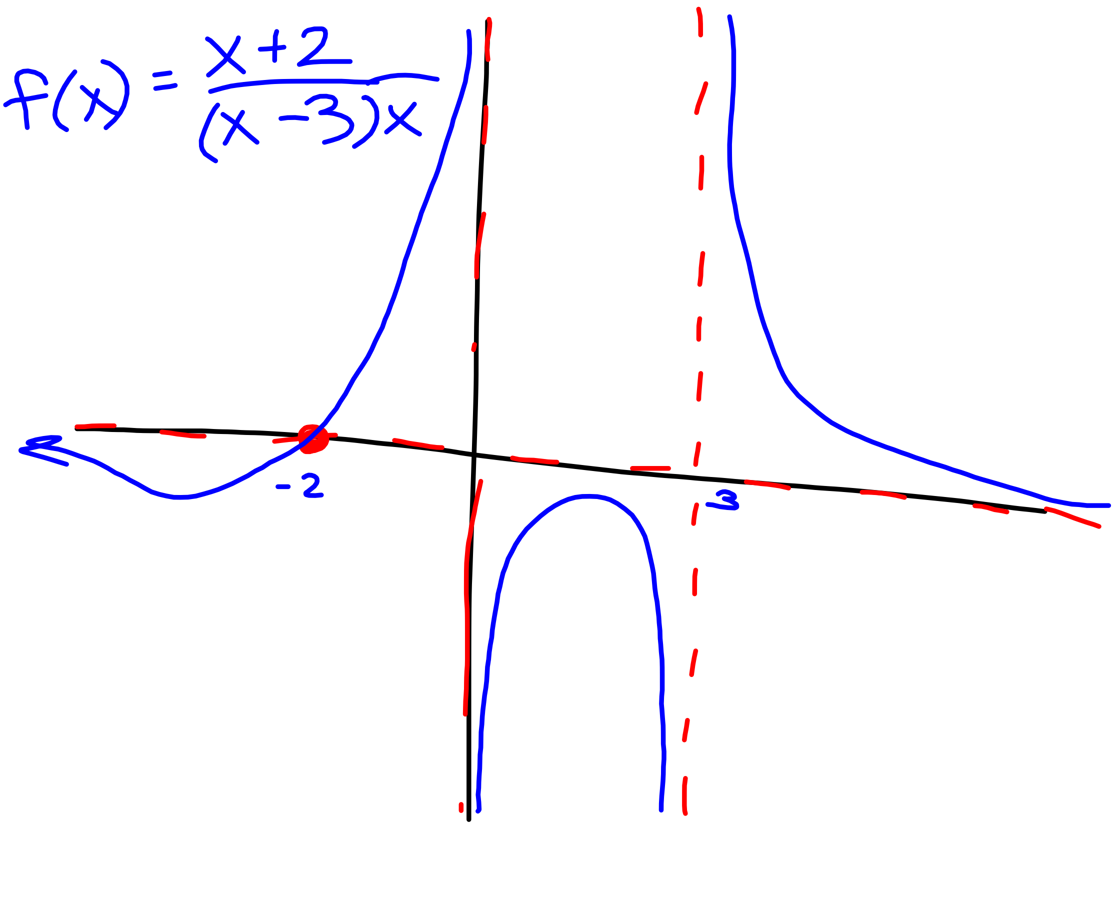


$f(x) = \dfrac{x+2}{(x-3)x}$



zeros: a, b, $\underline{c+\sqrt{d}}$, $\underline{e-fi}$

$c-\sqrt{d}$ $\quad$ $e+fi$

$$f(x) = (x-a)(x-b)(x-(c+\sqrt{d}))(x-(c-\sqrt{d})) \cdot$$
$$\cdot (x-(e-fi))(x-(e+fi))$$

59. $f(x) = x^3 - 5x^2 + 11x + 17$

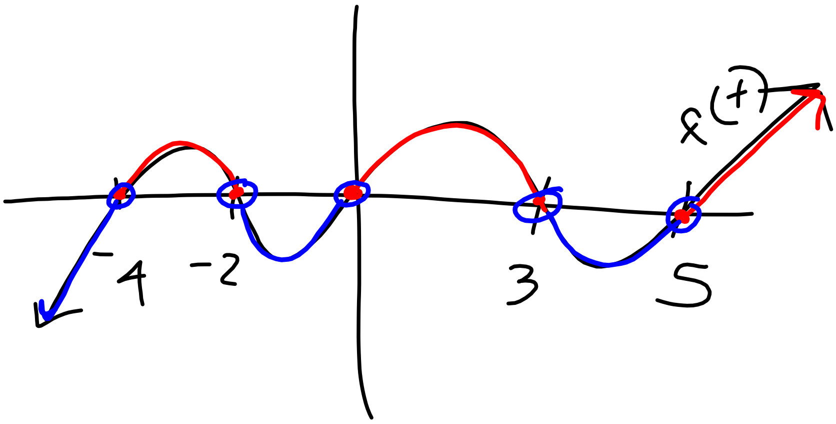
possible: $\dfrac{\pm 1, \pm 17}{\pm 1}$

$= \pm 1, \pm 17$

-1	1	-5	11	17
		-1	6	-17
	1	-6	17	$\boxed{0}$

$f(x) = (x+1)(x^2 - 6x + 17)$

$(x+1)(x- \quad)(x- \quad)$ $x = a \pm b$



$f(x) \geq 0$ Where is f(x) positive or zero?

$[-4,-2] \cup [0,3] \cup [5,\infty)$

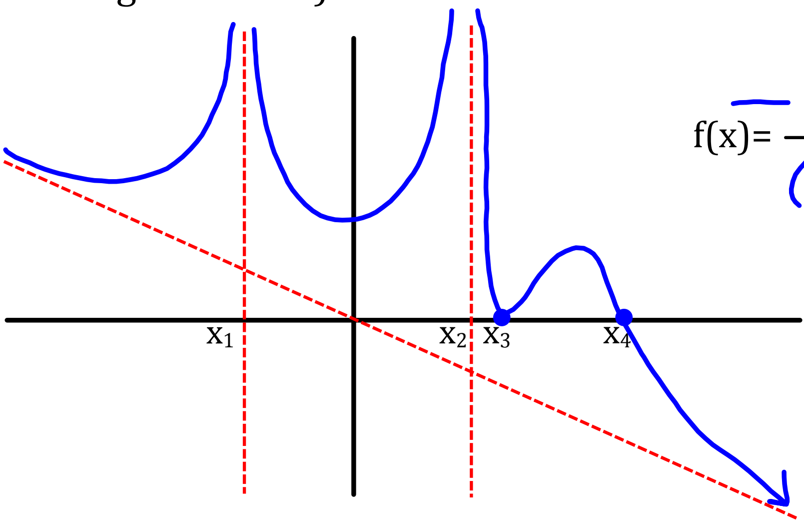
$f(x) < 0$ Where is f(x) negative?

$(-\infty,-4) \cup (-2,0) \cup (3,5)$

$$\frac{5x^3+7x^2+3x-1}{2x+4} \geq \frac{3x^2+7}{2x^3-5x}$$

This inequality is hard to solve algebraically!
It's much easier to compare it to zero
and ask "where is it positive or negative?"

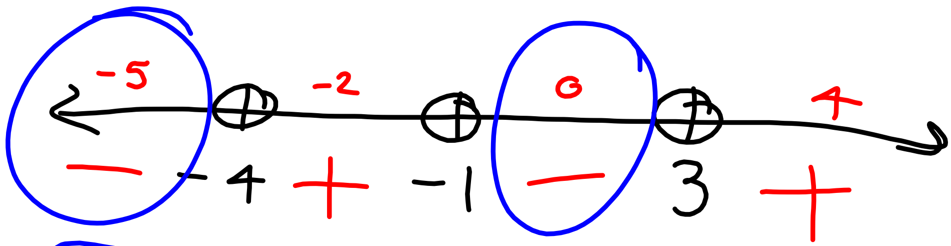
The *only* x-values at which the value of f(x) *can* change from positive to negative (or negative to positive) are at x-intercepts and vertical asymptotes (but it doesn't necessarily have to change at either).



$$f(x)=\frac{-(x-x_3)^2(x-x_4)}{(x-x_1)(x-x_2)}$$

$$(x+4)(x-3)(x+1)<0$$

zeros: $-4, 3, -1$

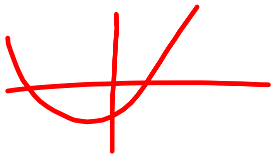


$$\boxed{(-\infty,-4)\cup(-1,3)}$$

$x^2+6x \geq 7$

$0 < x$

$x > 0$



1. rearrange to compare to zero

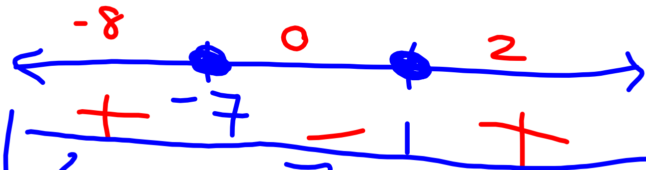
$x^2+6x-7 \geq 0$

2. factor to find zeros (and/or vertical asymptotes)

$(x+7)(x-1) \geq 0$

zeros: $-7, 1$

3. split real number line into intervals according to values found in step 2; test a value in each interval to determine if the expression being compared to zero is positive or negative in that interval

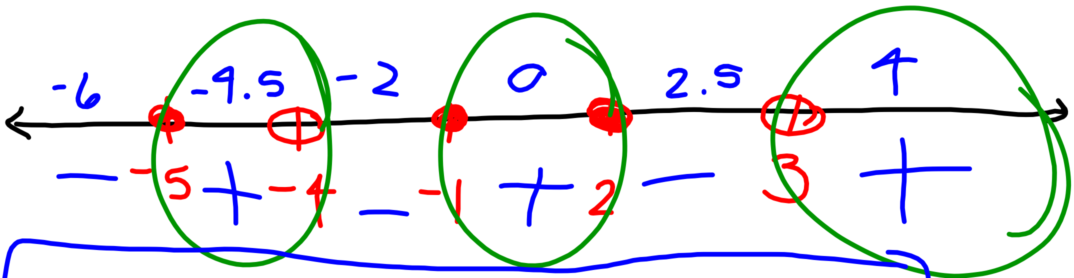


$\boxed{(-\infty,-7] \cup [1,\infty)}$

$$\frac{(x+5)(x+1)(x-2)}{(x-3)(x+4)} \geq 0$$

zeros: $-5, -1, 2$

V.A.: $-4, 3$



$\boxed{[-5,-4) \cup [-1,2] \cup (3,\infty)}$

3.6

56. $\dfrac{3}{x^2-4} \le \dfrac{5}{x^2+7x+10}$

$\dfrac{3}{(x-2)(x+2)} \cdot \dfrac{x+5}{x+5} - \dfrac{5}{(x+2)(x+5)} \cdot \dfrac{x-2}{x-2} \le 0$

$3x+15-5x+10$

$\dfrac{3(x+5)-5(x-2)}{(x-2)(x+2)(x+5)} \le 0$

$-2(x-12.5)$

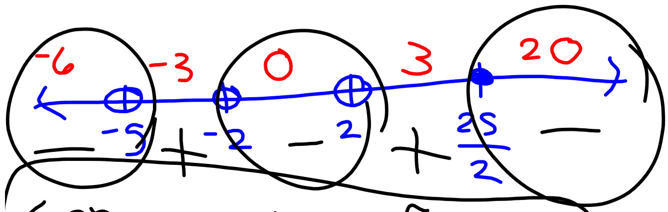
$\dfrac{-2x+25}{(x-2)(x+2)(x+5)} \le 0$

V.A.: $2, -2, -5$

zeros: $-2x+25=0$

$-2x=-25$

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



$(-\infty, -5) \cup (-2, 2) \cup [25/2, \infty)$

HW #6 (due Fri, 09/12)

- 3.4: #7-16all Given the zeros of a polynomial, find the polynomial
  #25-32all; 43-47odd Given some zeros of a polynomial, find the other zeros
  #51-54all List all possible rational zeros
  #55-69odd Find all the zeros and write f(x) in factored form
  #79,89,93 Descartes' rule of signs
  #95-98all Graph the polynomial
- 3.5: #7-25odd Determining asymptotes of rational functions
  #27-67odd Graphing rational functions
- 3.6: #15-39odd Solving polynomial inequalities
  #47, 53-61odd Solving rational inequalities

Test #2 - Mon, 09/15