$f(x) = x^4 - 5x^3 + 15x^2 - 5x - 26$

3 or 1 pos.

$f(-x) = x^4 + 5x^3 + 15x^2 + 5x - 26$

1 neg.

$\frac{p}{q}$: $\pm 1, \pm 2, \pm 13, \pm 26$

$-1\,|\,1 \quad -5 \quad 15 \quad -5 \quad -26$

$\quad\quad -1 \quad 6 \quad -21 \quad 26$

$1\,|\,1 \quad -6 \quad 21 \quad -26 \quad 0$

$\quad\quad 1 \quad -5 \quad 16$

$1 \quad -5 \quad 16$

Newp

$-2\,|\,1$

$2\,|\,1 \quad -6 \quad 21 \quad -26$

$\quad\quad 2 \quad -8 \quad 26$

$1 \quad -4 \quad 13 \quad$ sweet

$f(x) = (x+1)(x-2)(x^2-4x+13)$

$x^2 - 4x + 13 \overset{SET}{=} 0$

$x^2 - 4x + 2^2 = -13 + 4$

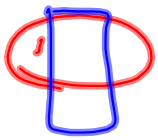
$(x-2)^2 = -9$

$x - 2 = \pm\sqrt{-9} = \pm 3i$

$x = 2 + 3i, -1, 2$

$f(x) = (x+1)(x-2)(x-(2+3i))(x-(2-3i))$

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



$D = \mathbb{R} \setminus \{-1, 2, 3\}$

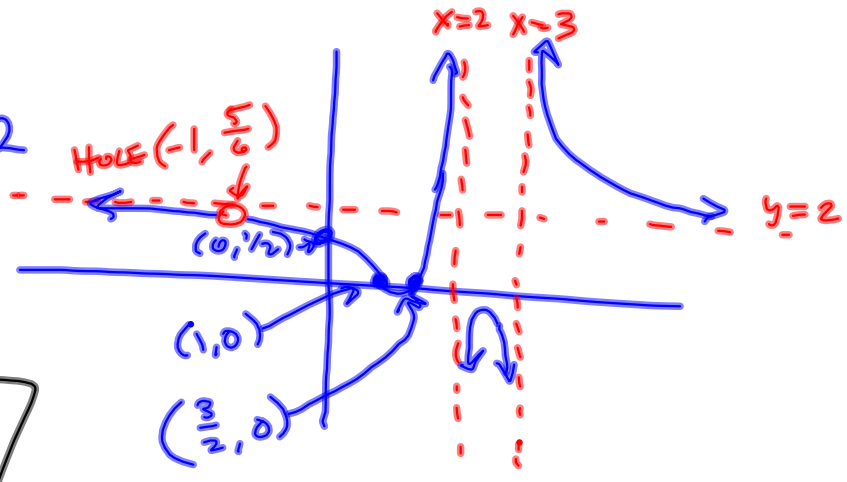
Hole @ $x = -1$: $\frac{(-1-1)(2(-1)-3)}{(-1-2)(-1-3)} = \frac{-1}{-2}\frac{(-5)}{-3(-4)}$

$= \frac{5}{6} \rightsquigarrow (-1, \frac{5}{6})$ HOLE

V.A.: $x = 2$, $x = 3$

H.A.: $y = 2$

Zeros: $x = 1, \frac{3}{2}$



$f(0) = \frac{1}{2}$

$$2\frac{(x-1)(x-\frac{3}{2})(x+1)}{(x-2)(x-3)(x+1)}$$

$$f(0) = \frac{2(-1)(-\frac{3}{2})(1)}{(-2)(-3)(1)} = \frac{2 \cdot \frac{3}{2}}{6} = \frac{2 \cdot 3}{12} = \frac{3}{4} = \frac{1}{2}$$

Find the oblique asymptote.

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

$$4x - 5 \text{ r } -6x+3$$

$$x^2+2 \;\big|\; 4x^3-5x^2+2x-7$$

$$+(-4x^3 \quad -8x)$$

$$-5x^2-6x-7$$

$$+(+5x^2 \quad +10)$$

$$-6x+3$$

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

$\frac{-5x^2}{x^2} = -5$

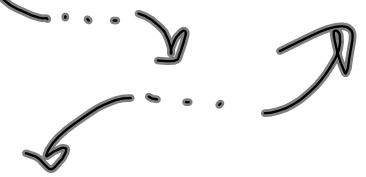
$y = 4x-5$ is oblique Asymptote

This says $\frac{4x^3-5x^2+2x-7}{x^2+2} = 4x-5 + \frac{-6x+3}{x^2+2}$

$-x, -x^3, -x^5, -x^7, \ldots$

$x, x^3, x^5, x^7, \ldots$

$x^2, x^4, x^6, x^8, \ldots$



$f(x) = -27x^{52} + \text{smaller}$

$\lim_{x \to \infty} (f(x)) = -\infty$

$\lim_{x \to -\infty} (f(x)) = -\infty$

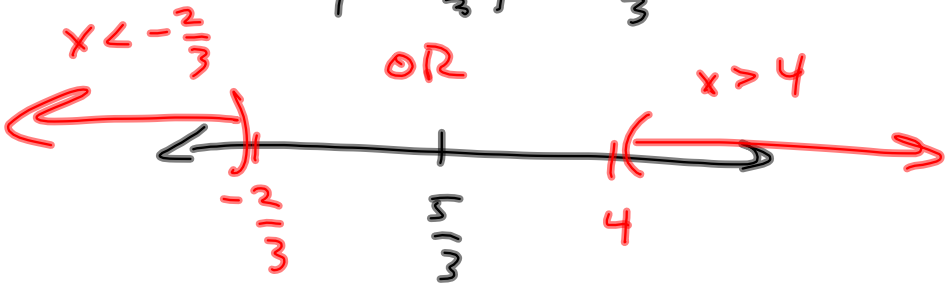
$|3x-5| > 7$

Distance from x to $\frac{5}{3}$.

See old Midterms - 2 versions

$3\left|x-\frac{5}{3}\right| > 7$

$\left|x-\frac{5}{3}\right| > \frac{7}{3}$



$3x-5 > 7$ OR $3x-5 < -7$

$|3x-5| > 7$

$-7 > 3x-5 > 7$

$-\frac{2}{3} > x > 4$

$3x-5 > 7$ OR $3x-5 < -7$

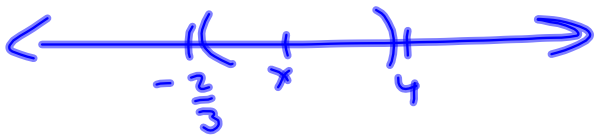
Using lies to seek truth

$|3x-5| < 7$

$-7 < 3x-5 < 7$

$-2 < 3x < 12$

$-\frac{2}{3} < x < 4$



$|3x-5| < 7$

$3x-5 < 7$ AND $3x-5 > -7$

$|3x-5| < -7$ Never!

$|3x-5| > -7$ Always