

POLYNOMIAL, RATIONAL, & RADICAL FUNCTIONS REVIEW

$$f(x) = 4x - 3x^3 + 2x^4 - x^5 + 1$$

x-int (Roots) = 5

Rel max/min = $5 - 1 = 4$

$\lim_{x \rightarrow -\infty} f(x) = +\infty$
far left

$\lim_{x \rightarrow \infty} f(x) = -\infty$
far right

y-axis

y-axis



$-x^8$

$$d) \quad 2x^4 + 5x^3 + 4x^2 - x - 10 = 0 \quad \frac{t_1 \ t_2 \ t_5 \ t_{10}}{t_2 \ t_1}$$

$$\frac{\quad}{(\) (\) (\) (\)} \quad | \quad x =$$

$$\begin{array}{r} 1 \downarrow \\ 2 \quad 5 \quad 4 \quad -1 \quad -10 \\ + \quad 2 \quad 7 \quad 11 \quad 10 \\ \hline 2 \quad 7 \quad 11 \quad 10 \quad 0 \end{array}$$

$$(x-1)(2x^3 + 7x^2 + 11x + 10)$$

$$\begin{array}{r} -2 \downarrow \\ 2 \quad 7 \quad 11 \quad 10 \\ + \quad -4 \quad -6 \quad -10 \\ \hline 2 \quad 3 \quad 5 \quad 0 \end{array}$$

$$(x-1)(x+2)(2x^2 + 3x + 5)$$

$$x = \frac{-3 \pm \sqrt{9 - 4(2)(5)}}{2(2)}$$

$$= \frac{-3 \pm \sqrt{-31}}{4} =$$

$$\begin{array}{l} x = 1 \\ x = -2 \\ \frac{-3 \pm i\sqrt{31}}{4} \end{array}$$

Roots: $2, \pm 5i$
 $x = 2$ $x = 5i$ $x = -5i$
 $x - 2 = 0$ $x - 5i = 0$ $x + 5i = 0$
 $(x - 2)(x - 5i)(x + 5i)$
 $(x - 2)(x^2 + 25i^2)$
 $(x - 2)(x^2 + 25)$
 $x^3 + 25x - 2x^2 - 50 = 0$

8 / Pull out common factors!

$$\frac{6x^2 (x+4)^{-2} (2x+7)^{1/2} - 30x (x+4)^{-1/2} (2x+7)^{-1/2}}{[(2x+7)^{1/2}]^2}$$

$$\frac{6x \cdot \cancel{(x+4)^2} \cdot \cancel{(2x+7)^{1/2}} \left[x(2x+7) - 5(x+4) \right]}{(x+4)^2 (2x+7)^{1+1/2}}$$

$$\frac{6x [2x^2 + 7x - 5x - 20]}{(x+4)^2 (2x+7)^{3/2}}$$

$$\frac{6x [2x^2 + 2x - 20]}{(x+4)^2 (2x+7)^{3/2}} = \frac{12x [x^2 + x - 10]}{(x+4)^2 (2x+7)^{3/2}}$$