Shapes of Polynomial Graphs

Tuesday, November 25, 2008
9:45 AM

1. Find all vertical asymptotes of

$$y = \frac{(x+2)(x-4)}{(x-4)^2(x+3)}$$

VA at $x = 4$ and $x = -3$

At 4, $\frac{0}{0}$ → tiny / tinier = big

Yesterday: $\frac{x+4}{x^2+2x-8} = \frac{x+4}{(x+4)(x-2)}$

If $\frac{0}{0}$, factor & reduce, and analyze reduced function.

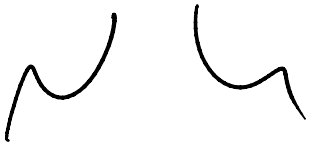
f has a VA at $x = a$ if

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

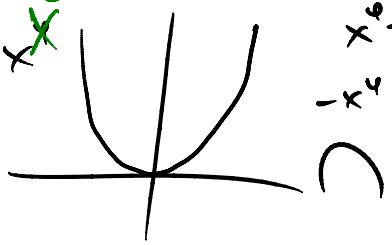
(Can check w/ table)

2. Set your viewing window to $x \in [-200,200]$ and $y \in [-80000,80000]$. Then graph $y = x^3$ and $y = x^3 - 20x$. Explain what you see.

① All cubics have roughly the same graph at a large scale.



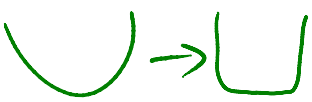
② $y = x^4$ even



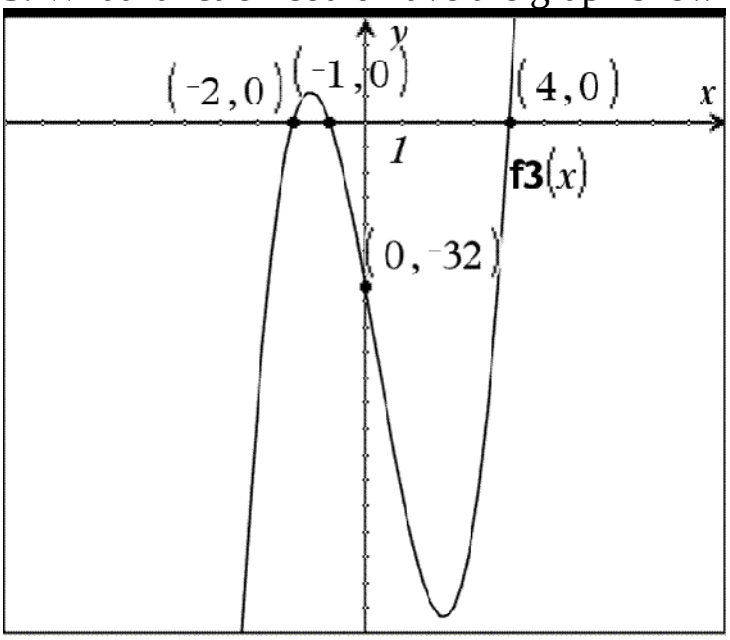
$x^4 - 6x^3 + 23x + 5$

$-x^4$

As exp increases, sides move in y increases faster small values closer to x-axis



3. What function could have the graph shown below?




$x^{2n+1} + \quad -32$

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

$x^3 - x^2 - 10x - 8$

Not - 24

4. Consider the graph of $x^3 - 6x + c$, $c$ a constant. How does changing $c$ affect the number of $x$-intercepts?

translates graph vertically

5. Consider the graph of $(x - 4)(x + 2)(x - r)$. How does changing $r$ affect the number of $x$-intercepts? How does it affect the shape of the graph?