Graphs & Characteristics of Polynomials Functions (A)

1. Change window then graph in calc.
2. FACTOR & solve to get zeros/x-int., then plot on x-axis

for zeros/x-int keep in simplfied radical form, to plot on x-axis you will need the decimal value.

3. **Plot y-int if possible (constant)**
4. Use graphing calc to find the ordered pairs of the vertices, plot them and LABEL them
5. NOW draw form!!

$$f(x) = 3x^4 - 9x^2 - 12$$

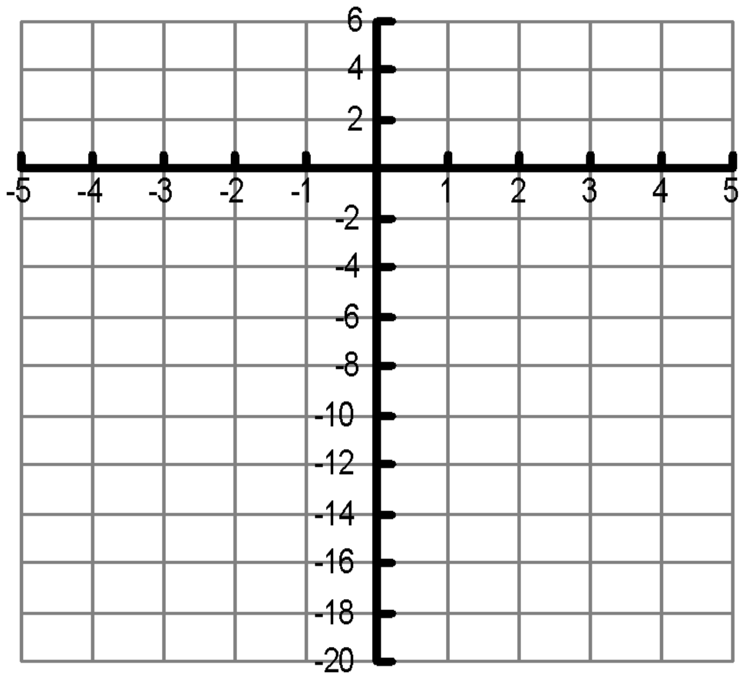
$$3(x^2+1)(x-2)(x+2) = 0$$

ODD or EVEN degree? LC: Positive or Negative?

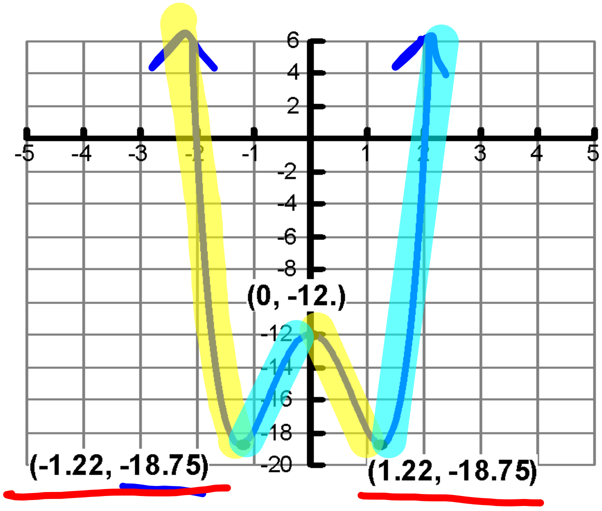
Determine the possible number of vertices.

Follow directions to graph!

chunkie calc: use y-min -24



$f(x) = 3x^4 - 9x^2 - 12$



Domain: $-\infty < x < \infty$
$(-\infty, \infty)$

Range: $-18.75 \leq y < \infty$
$[-18.75, \infty)$

x - intercepts:
$(-2, 0)\ (2, 0)$

y - intercepts: $(0, -12)$

zeros:
$x = \pm 2, \pm i$

end behavior:
$x \to -\infty \quad y \to +\infty$
$x \to +\infty \quad y \to +\infty$

intervals of increasing:
$(-1.22, 0) \cup (1.22, \infty)$

$-\infty$ D | I | D | I ∞
$-1.22 \quad 0 \quad 1.22$
x-values

intervals of decreasing:
$(-\infty, -1.22) \cup (0, 1.22)$

maximums:

Extrema: none

Relative: $(0, -12)$

minimums:

extrema: $y = -18.75$ $(\pm 1.22, -18.75)$

Relative: none

$$f(x) = -\cancel{x^3} - 5\cancel{x^2} + 12\cancel{x} + 60$$

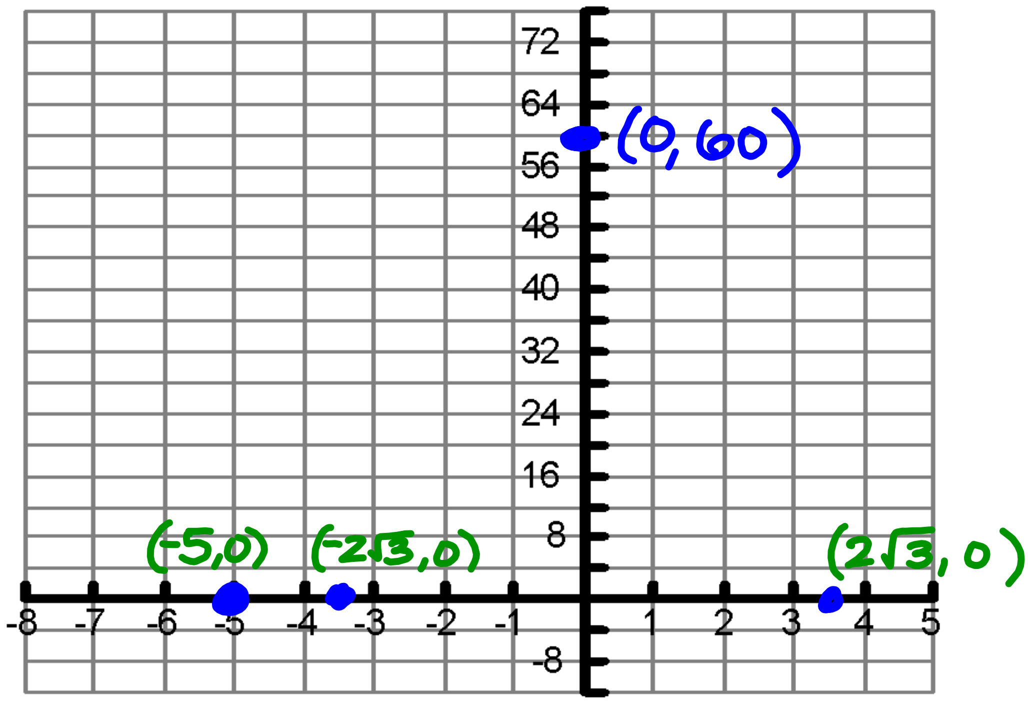
Odd: 3
Negative
Possible: 2, 0

$-(x^3+5x^2-12x-60)=0$

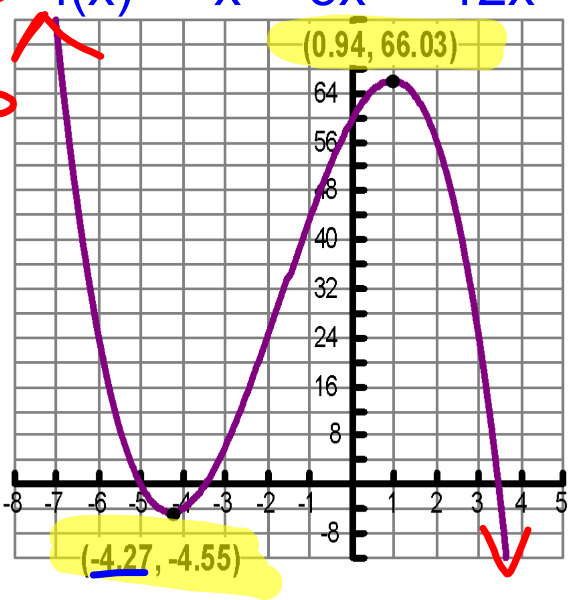
FF: $-(x^2-12)(x+5)=0$

$x^2-12=0$
$\quad +12 \quad +12$
$\sqrt{x^2}=\sqrt{12}$
$x=\pm 2\sqrt{3} \approx \pm 3.47$

$x+5=0$
$x=-5$



$f(x) = -x^3 - 5x^2 + 12x + 60$



Domain: $-\infty < x < \infty$
$(-\infty, \infty)$

Range: $-\infty < y < \infty$
$(-\infty, \infty)$

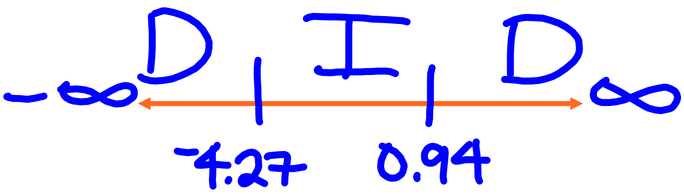
x - intercepts:
$(-5, 0)$ $(\pm 2\sqrt{3}, 0)$

y - intercepts:
$(0, 60)$

zeros:
$x = -5, \pm 2\sqrt{3}$

end behavior:
$x \to -\infty \; y \to +\infty$
$x \to +\infty \; y \to -\infty$

intervals of increasing:
$(-4.27, 0.94)$



intervals of decreasing:
$(-\infty, -4.27) \cup (0.94, \infty)$

maximums: global none local $(0.94, 66.03)$
extreme

minimums: global none local $(-4.27, -4.55)$
extreme