

Sketching Polynomials in Factored Form

Recall: if $f(x) = (x + 2)(x - 2)$, the zeros of the function are -2 & 2 . These numbers indicate what about the graph? **Where they cross the x-axis (x-intercepts)**

Now that we have the x-intercepts, we need to know the basic shape of the graph. For that we look at 2 things, the lead coefficient and the degree.

If lead coefficient is positive and degree is odd:

$1x^3$

If lead coefficient is positive and degree is even:

$1x^4$

If lead coefficient is negative and degree is odd:

$-1x^3$

If lead coefficient is negative and degree is even:

$-1x^4$

Then we need to look at the multiplicity to see what is happening at each root.

Multiplicity of zeros: **when a root/zero repeats.**

Multiplicity of One:

Cross X-axis

Even Multiplicity:

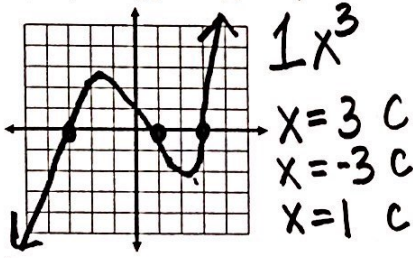
Bounces X-axis

Odd Multiplicity:

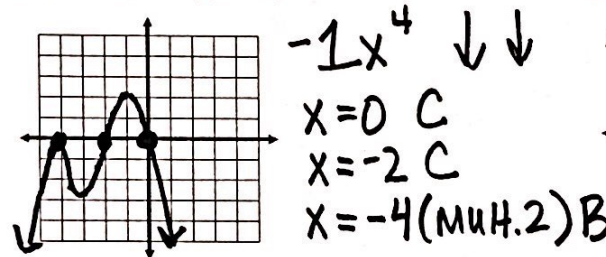
Crosses X-axis

Examples: Graph

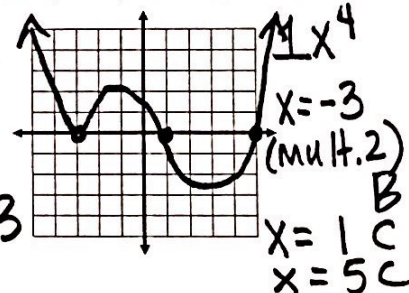
1. $y = (x - 3)(x + 3)(x - 1)$



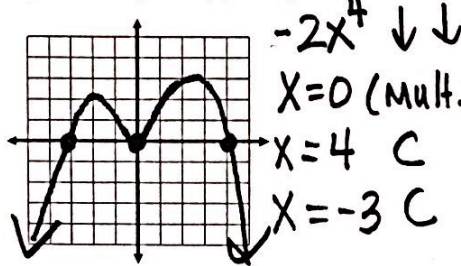
2. $y = -x(x + 2)(x + 4)^2$



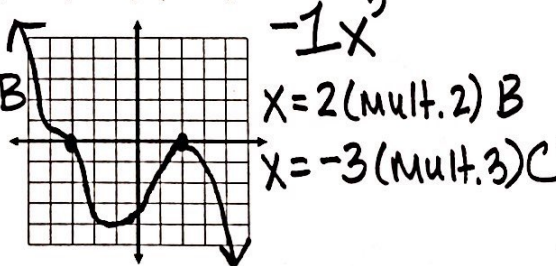
3. $y = (x + 3)^2(x - 1)(x - 5)$



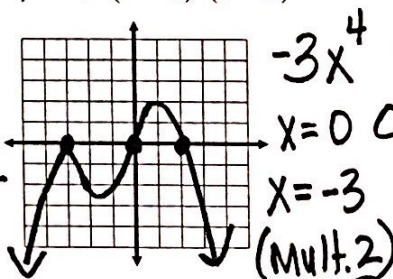
4. $y = -2x^2(x - 4)(x + 3)$



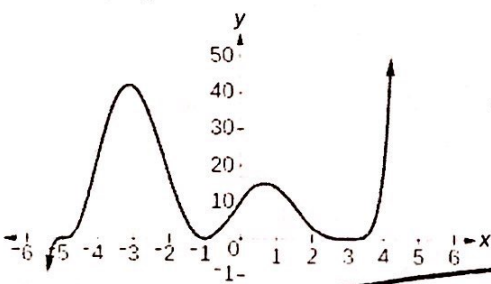
5. $y = -(x - 2)^2(x + 3)^3$



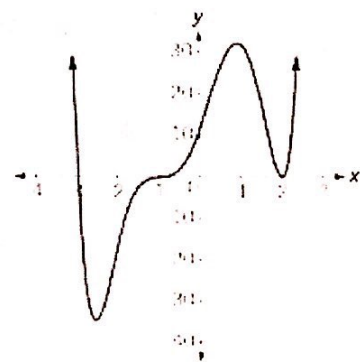
6. $y = -3x(x + 3)^2(x - 2)$



Write a polynomial in standard form for the curve graphed.



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



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