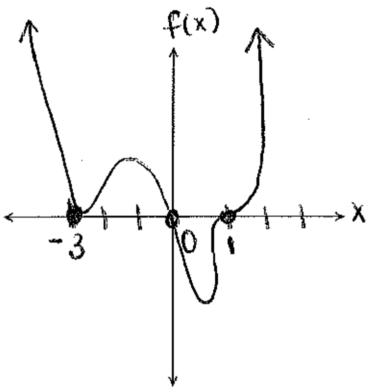
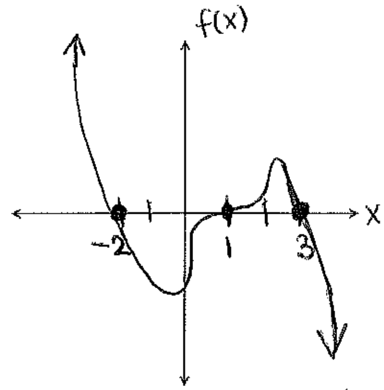
Name: ______________________________ **2.4 HW #2** Sketching Polynomials. Understanding Zeros Behavior.

Sketch the following polynomials. Consider the overall degree to determine end behavior. Use the factored form of the polynomial to find the zeros (x-intercepts) …and sketch the correct zero behavior.

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



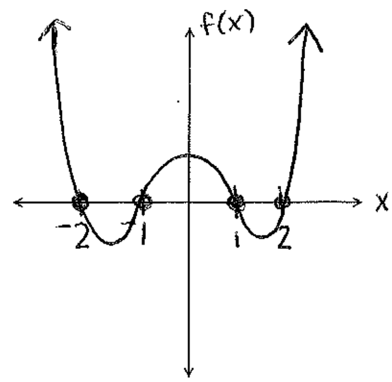
$g(x) = -(x-1)^3(x+2)(x-3)$



$g(x) = x^4 - 5x^2 + 4$

$(x^2-4)(x^2-1)$

$(x-2)(x+2)(x-1)(x+1)$



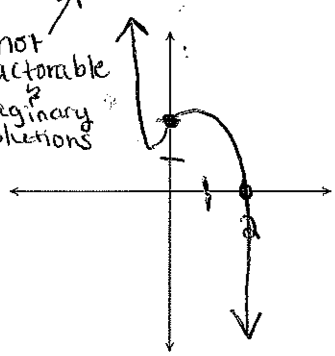
$f(x) = -x^3 + 2x^2 - x + 2$

$-x^2(x-2) - 1(x-2)$

$(-x^2-1)(x-2)$

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

not factorable & imaginary solutions

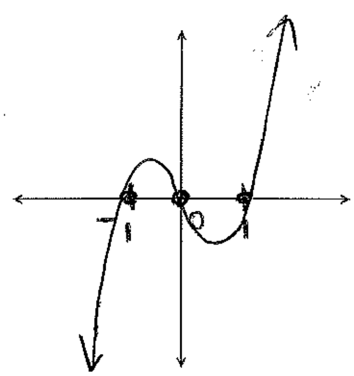


$f(x) = x^5 - x$

$x(x^4-1)$

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

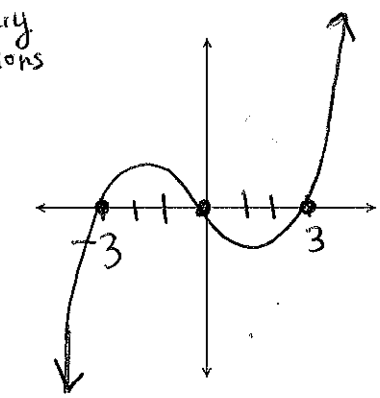
$x(x-1)(x+1)$ not factorable & imaginary solutions



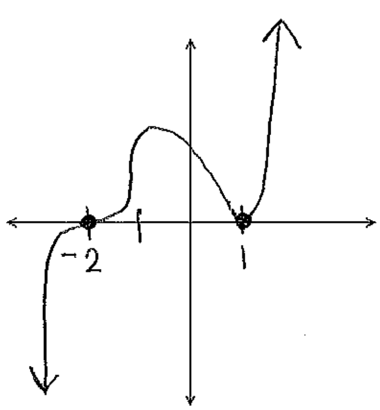
$f(x) = x^3 - 9x$

$x(x^2-9)$

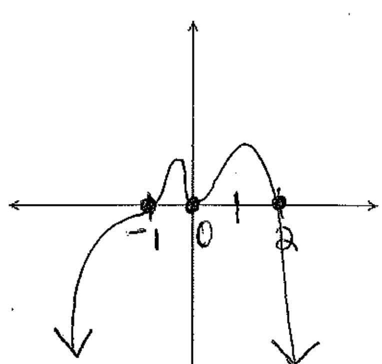
$x(x-3)(x+3)$



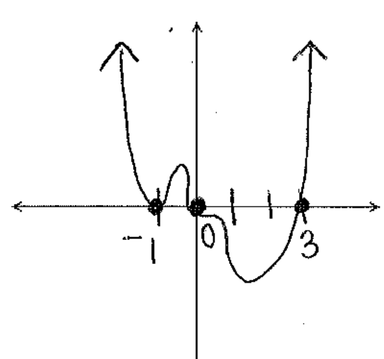
$f(x) = (x+2)^3(x-1)^2$



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



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

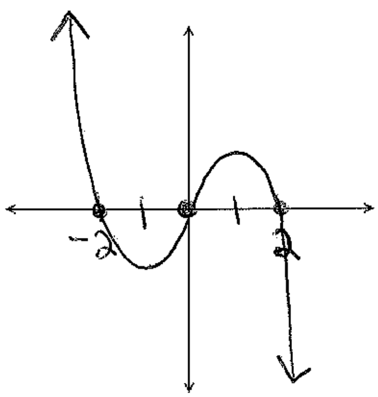


$f(x) = -x^5 + 16x$

$-x(x^4-16)$

$-x(x^2-4)(x^2+4)$

$-x(x-2)(x+2)$ not factorable & imaginary solutions



$f(x) = x^4 - 25$

$f(x) = (x^2-5)(x^2+5)$

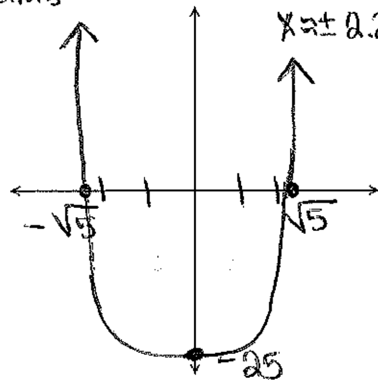
$x^2-5=0$

$x^2=5$

$x=\pm\sqrt{5}$

$x\approx\pm 2.2$

not factorable/ imaginary solutions

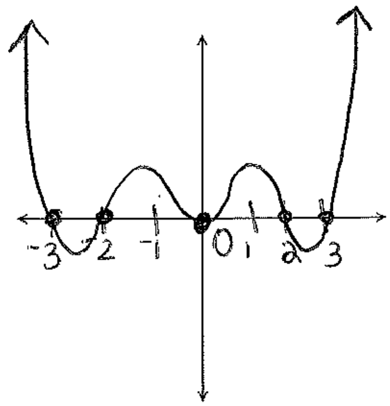


$f(x) = x^6 - 13x^4 + 36x^2$

$x^2(x^4-13x^2+36)$

$x^2(x^2-9)(x^2-4)$

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



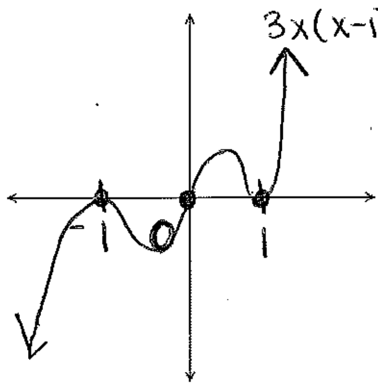
$f(x) = 3x^5 - 6x^3 + 3x$

$3x(x^4-2x^2+1)$

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

$3x(x-1)(x+1)(x-1)(x+1)$

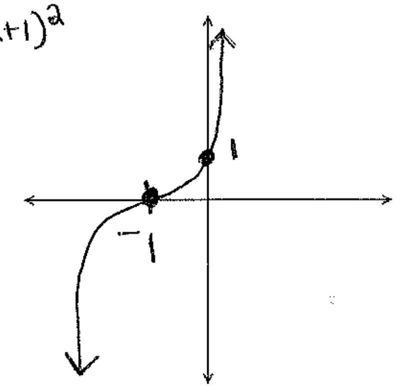
$3x(x-1)^2(x+1)^2$



(Hint – Think about reversing Pascal's Δ to achieve factored form)

$f(x) = x^3 + 3x^2 + 3x + 1$

$f(x) = (x+1)^3$

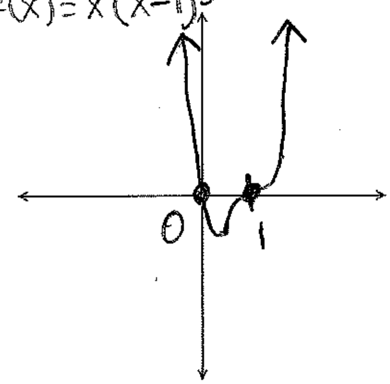


(Hint – Take out GCF, think about reversing Pascal's Δ to get factored form)

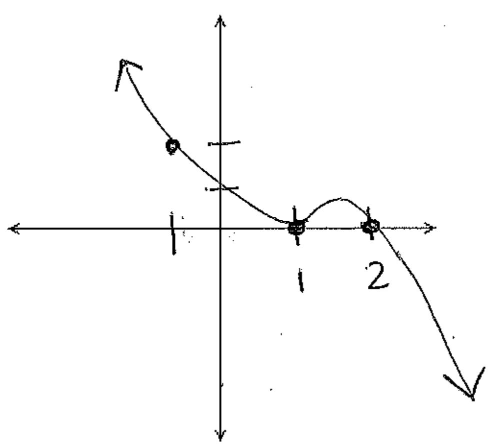
$f(x) = x^4 - 3x^3 + 3x^2 - 1x$

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

$f(x) = x(x-1)^3$



The cubic polynomial $p(x)$ has a zero of multiplicity two at $x = 1$ and a zero of multiplicity one at $x = 2$. Also $p(-1) = 2$. Determine $p(x)$ and sketch the graph.



$p(x) = a(x-1)^2(x-2)^1$

$2 = a(-1-1)^2(-1-2)$

$2 = a(-2)^2(-3)$

$2 = 4a(-3)$

$\frac{2}{-12} = \frac{\cancel{-12}a}{\cancel{-12}}$

$-\frac{1}{6} = a$

$p(x) = -\frac{1}{6}(x-1)^2(x-2)$