ICM Functions Worksheet #5

1. Complete the chart for each polynomial.

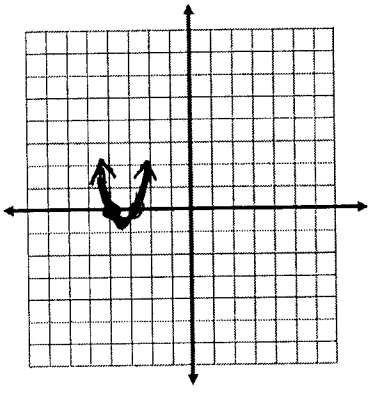
polynomial	name	degree	a graph of the general shape	end behavior
$f(x) = -x^2 - 5x + 3$	quadratic	2		$\lim_{x\to-\infty} f(x) = -\infty$ $\lim_{x\to\infty} f(x) = -\infty$
$g(x) = x^3 + 6$	cubic	3		$\lim_{x\to-\infty} f(x) = -\infty$ $\lim_{x\to\infty} f(x) = \infty$
$h(x) = -4x^4 + 6x^3 - 3x^2 + 5$	quartic	4		$\lim_{x\to-\infty} f(x) = -\infty$ $\lim_{x\to\infty} f(x) = -\infty$
$p(x) = 7 + 5x^2 + 9x^4$	quartic	4		$\lim_{x\to-\infty} f(x) = \infty$ $\lim_{x\to\infty} f(x) = \infty$
$f(x) = 6x^5 - 3x^3 + 1$	quintic	5		$\lim_{x\to-\infty} f(x) = -\infty$ $\lim_{x\to\infty} f(x) = \infty$

2. Algebraically find the zeros of each function and sketch a graph.

a. $y = x^2 + 7x + 12$

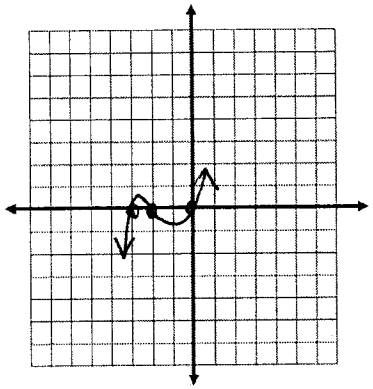
$(x+4)(x+3) = 0$

$x = -4, -3$



b. $y = x^3 + 5x^2 + 6x$

$x = 0, -2, -3$



c. $y = 2x^3 + 3x$

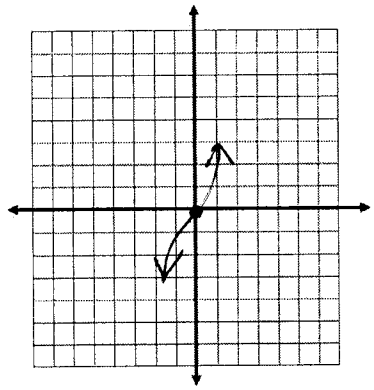
$x = 0$

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

$x = 0 \quad 2x^2 + 3 = 0$

$x^2 = -\frac{3}{2}$

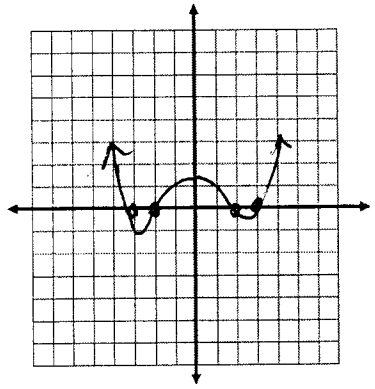
$x = \pm\sqrt{-\frac{3}{2}}$



d. $y = (x^2 - 4)(x^2 - 9)$

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

$x = -3, 3, -2, 2$

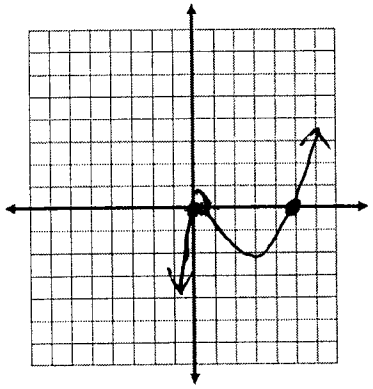


e. $y = 2x^3 - 11x^2 + 5x$

$x(2x^2 - 11x + 5)$

$x(2x - 1)(x - 5)$

$x = 0, 1/2, 5$



f. $y = x^4 - x^3 - 12x^2$

$x^2(x^2 - x - 12)$

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

$x = 0, 4, -3$