MATH ANALYSIS I HONORS
POLYNOMIAL FUNCTIONS
2.2-2.3 REVIEW

NAME _____
DATE _____
PERIOD _____

1. What is the quotient and the remainder when $x^4 - 8x^3 + 5x - 1$ is divided by $(x+2)$

You must be able to do this by long division and synthetic division

$x^3 - 10x^2 + 20x - 35$ R 69

$x+2 \overline{)\, x^4 - 8x^3 + 0x^2 + 5x - 1}$

$x^4 + 2x^3$

$-10x^3 + 0x^2$

$-10x^3 - 20x^2$

$20x^2 + 5x$

$20x^2 + 40x$

$-35x - 1$

$\frac{69}{x+2}$

2. Two roots of $P(x) = 4x^4 - 4x^3 - 25x^2 + x + 6 = 0$ are $x = -2$ and $x = 3$

Find the two remaining roots.

$(4x^2 - 1)$

$x = -\frac{1}{2}, \frac{1}{2}$

	4	-4	-25	1	6
	↓	-8	24	2	-6
3 →	4	-12	-1	3	
	↓	12	0	-3	
	4	0	-1	0	

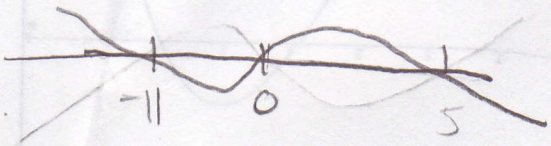
3. Factor the polynomial function and sketch its graph

$F(x) = -x^3 + 4x^2 + 5x$

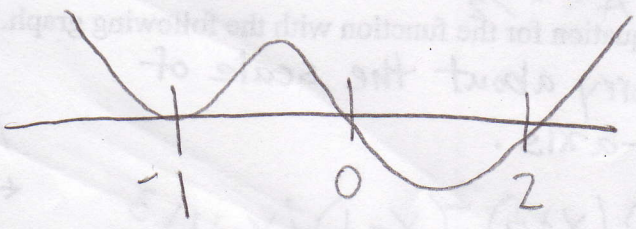
$x^3 - 4x^2 - 5x$

$x(x^2 - 4x - 5)$

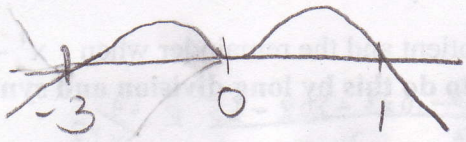
$P(x) = x(x-5)(x+1)$



4. Sketch a graph of the function $f(x) = x(x - 2)(x + 1)^2$



5. Sketch the graph of $y = -x^2(x + 3)(x - 1)$.



6. Determine **algebraically** where the graphs intersect.

$y = x^3 - 4x$ and $y = -3x$

$x^3 - 4x = -3x$

$x^3 - x = 0$

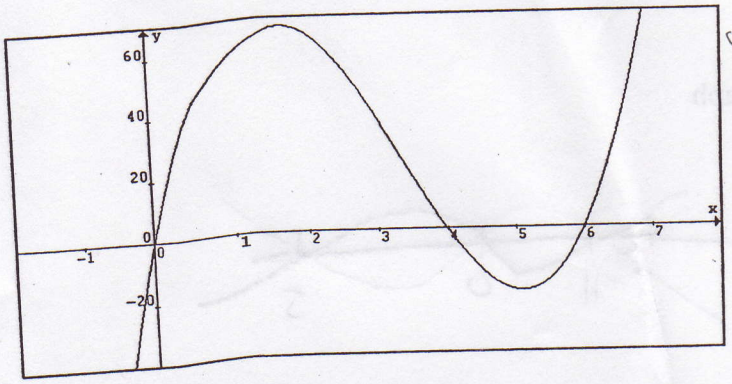
$x(x+1)(x-1) = 0$

(0, 0)

(-1, 3)

(1, -3)

7. Write the equation of the following function. Don't worry about the scale of the y-axis.



$y = x(x-4)(x-6)$

8. Write an equation for the polynomial with roots at x= -3, 2, 3 and the y-intercept at (0, -9).

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

$-9 = A(3)(-2)(-3)$

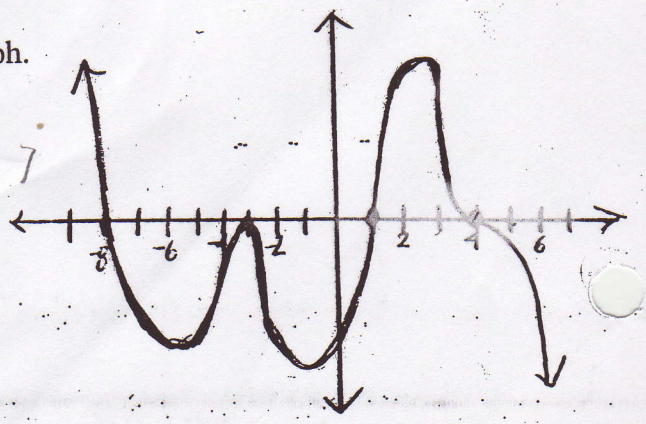
$-9 = A18$

$A = -1/2$

$y = -\frac{1}{2}(x+3)(x-2)(x-3)$

9. Write an equation for the function with the following graph.

Don't worry about the scale of the y-axis.



$y = (x+8)(x+3)^2(x-1)(x-4)^3$