Math 3 Hon: Unit 3 Review

Name: KEY

I. Use the function $f(x) = -3x^4 + 2x^3 + 9x^2 - 2x - 8$

a. What is the leading coefficient? a. -3

b. What is the degree of the polynomial? b. 4

c. Find $f(-2)$ c. -32

d. Find all maximums and minimums: d. rel. max: $(-1.06, -1.93)$

(label each as relative or absolute) rel. min: $(.11, -8.11)$ abs. max $(1.45, .86)$

e. Describe the end behavior: e. As $x \to \infty$, $y \to -\infty$

$x \to -\infty$, $y \to -\infty$

II. Find if each binomial is a factor of the given polynomial.

1. Polynomial= $x^3 - x^2 - 10x - 8$
   Binomial = x + 1

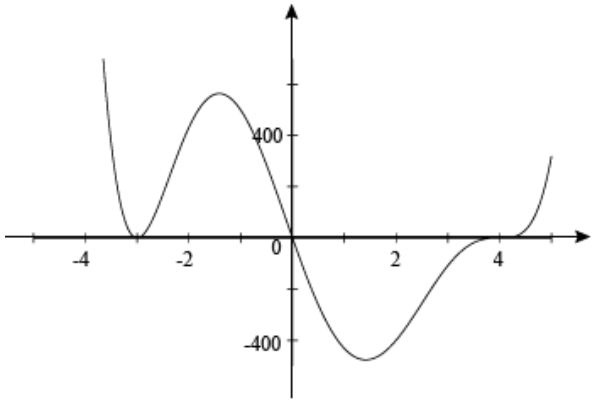
   Yes b/c remainder = 0

2. Polynomial= $2x^3 - 5x^2 - 28x + 15$
   Binomial = x – 5

   Yes b/c remainder = 0

III. Graph Interpretation

GRAPH #1:



a. State the number of REAL zeroes: 6

b. State the number of COMPLEX zeroes: 0

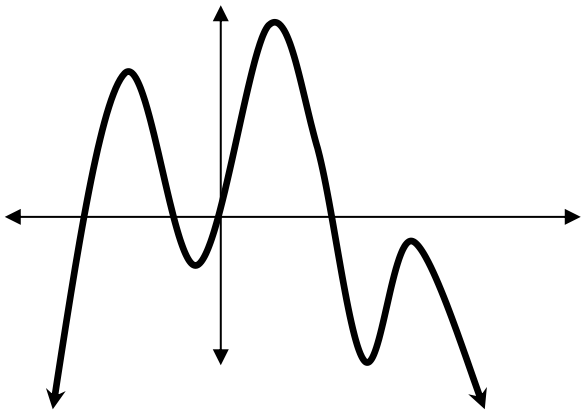
c. What is the possible degree? 6

d. Is the leading coefficient positive or negative?

e. What is the End Behavior? $x \to \infty$, $y \to \infty$

$x \to -\infty$, $y \to \infty$

GRAPH #2:



a. State the number of REAL zeroes: 4

b. State the number of COMPLEX zeroes: 2

c. What is the possible degree? 6

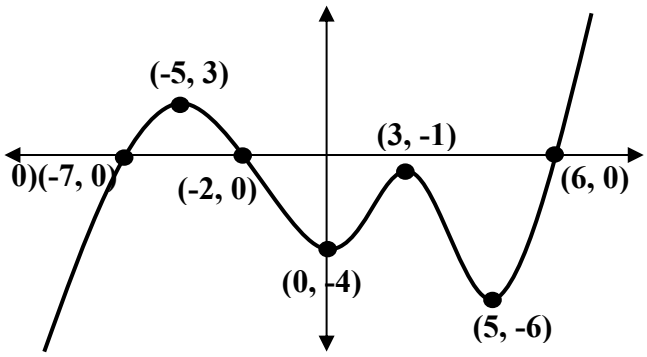
d. Is the leading coefficient positive or negative?

e. What is the End Behavior?

$x \to \infty$, $y \to -\infty$

$x \to -\infty$, $y \to -\infty$

GRAPH #3:



a. Degree? 5

b. Leading Coefficient? pos.

c. Identify all Maximums: (-5, 3) (3, -1)

d. Identify All Minimums: (0, -4) (5, -6)

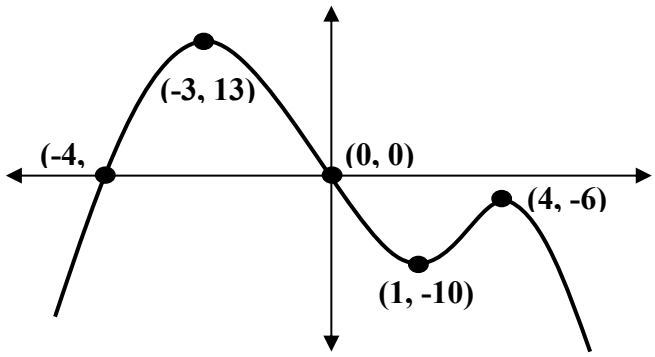
Use Interval Notation:

e. Where is the graph INCREASING? $(-\infty, -5)\ (0, 3)\ (5, \infty)$

f. Where is the graph DECREASING? $(-5, 0)\ (3, 5)$

g. What is the RANGE of this graph? $(-\infty, \infty)$

GRAPH #4:



a. Degree? 4

b. Leading Coefficient? neg

c. Identify all Maximums: (-3, 13) (4, -6)

d. Identify All Minimums: (1, -10)

Use Interval Notation:

e. Where is the graph INCREASING? $(-\infty, -3)\ (1, 4)$

f. Where is the graph DECREASING? $(-3, 1)\ (4, \infty)$

g. What is the RANGE of this graph? $(-\infty, 13]$

IV. Find exact values of all zeroes.

1. $x^4 + 3x^2 + 2 = 0$

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

$x^2 = -2 \quad x^2 = -1$

$x = \pm i\sqrt{2}$ $x = \pm i$

2. $6x^4 + 7x^2 - 3 = 0$

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

$x^2 = \frac{1}{3} \quad x^2 = -\frac{3}{2}$

$x = \pm\sqrt{\frac{1}{3}}$ $x = \pm i\sqrt{\frac{3}{2}}$

3. $x^3 - 6x^2 + 10x - 8 = 0$ $x=4$

4	1	-6	10	-8
	↓	4	-8	8
	1	-2	2	0

$x^2 - 2x + 2 = 0$

$x = \frac{2 \pm \sqrt{4-4(1)(2)}}{2}$

$x = \frac{2 \pm \sqrt{-4}}{2}$

$x = \frac{2 \pm 2i}{2} = 1 \pm i$

4. $x^3 + 3x^2 - 26x - 8 = 0$ $x=4$

4	1	3	-26	-8
	↓	4	28	8
	1	7	2	0

$x^2 + 7x + 2 = 0$

$x = \frac{-7 \pm \sqrt{49-4(1)(2)}}{2}$

$x = \frac{-7 \pm \sqrt{41}}{2}$

V. Sketch a possible graph of $f(x) = -4(x-3)(x-1)^2(x+5)^3$