1. $f(x) = 2x^3 + 3x^2 - 36x + 12$

DOMAIN: $(-\infty, \infty)$

X-INTERCEPT(S)

$0 = 2x^3 + 3x^2 - 36x + 12$

$x = -5.2,\ 0.3,\ 3.3$

Y-INTERCEPTS

$y = 2(0)^3 + 3(0)^2 - 36(0) + 12$

$y = 12$

ASYMPTOTES

VA, HA, SA — NONE

LEADING COEFFICIENT TEST

	DEGREE IS EVEN	DEGREE IS ODD
COEFF IS POS.	UP TO LEFT, UP TO RIGHT	DOWN TO LEFT, UP TO RIGHT
COEFF IS NEG.	DOWN TO LEFT, DOWN TO RIGHT	UP TO LEFT, DOWN TO RIGHT

L.C.T. — DOWN TO LEFT, UP TO RIGHT

INC/DEC

$f'(x) = 6x^2 - 6x - 36$

$6x^2 - 6x - 36 = 0$

GCF $6(x^2 - x - 6) = 0$

PSD $6(x-3)(x+2) = 0$ ←

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

$x = 3 \quad x = -2$

$-\infty$	$x=-2$	$x=3$	∞
$x=-3$	$x=0$	$x=4$	
$(x-3)(x+2)$	$(x-3)(x+2)$	$(x-3)(x+2)$	
$(-)(-)$	$(-)(+)$	$(+)(+)$	
$+$	$-$	$+$	
	MAX	MIN	

INC $(-\infty, -2)$

DEC $(-2, 3)$

INC $(3, \infty)$

$x = -2$

$y = 2x^3 + 3x^2 - 36x + 12$

$y = 2(-2)^3 + 3(-2)^2 - 36(-2) + 12$

$y = 80$

REL MAX: $(-2, 80)$

$x = 3$

$y = 2x^3 + 3x^2 - 36x + 12$

$y = 2(3)^3 + 3(3)^2 - 36(3) + 12$

$y = -15$

REL MIN: $(3, -15)$

CONCAVITY

$f''(x) = 12x - 6$

$12x - 6 = 0$

$12x = 6$

$x = \frac{6}{12}$

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

$-\infty$	$x=\frac{1}{2}$	∞
$x=0$	$x=1$	
$12x-6$	$12x-6$	
$-$	$+$	
	POI	

CONC DOWN $(-\infty, \frac{1}{2})$

CONC UP $(\frac{1}{2}, \infty)$

POINTS OF INFLECTIONS

$y = 2x^3 + 3x^2 - 36x + 12$

$y = 2(\frac{1}{2})^3 + 3(\frac{1}{2})^2 - 36(\frac{1}{2}) + 12$

$= \frac{1}{4} + \frac{3}{4} - 18 + 12$

$= -5$

POI: $(\frac{1}{2}, -5)$