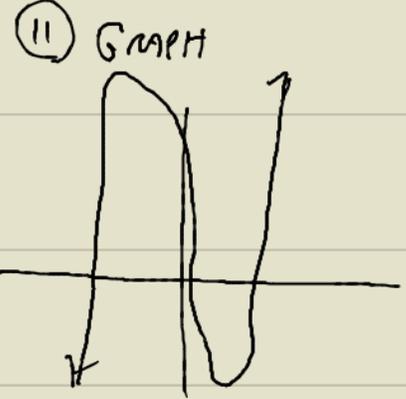


1.  $f(x) = 2x^3 + 3x^2 - 36x + 12$

① DOMAIN  $(-\infty, \infty)$

INC  $(-\infty, -3)$   
 DEC  $(-3, 2)$   
 INC  $(2, \infty)$



② X-INT

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

$x = -5.19$

$x = 0.35$

$x = 3.34$

⑧ RELATIVE EXTREMA

REL MAX  
 $x = -3$

REL MIN  
 $x = 2$

$f(2) = 2(2)^3 + 3(2)^2 - 36(2) + 12$   
 $= 16 + 12 - 72 + 12$   
 $= -32$

REL MIN:  $(2, -32)$

③ Y-INT

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

$y = 12$

REL MAX  
 $(-3, 93)$

④ VA: NONE

⑤ HA: NONE

⑥ SA: NONE

⑦ INC/DEC INTERVALS

$f'(x) = 2 \cdot 3x^2 + 3 \cdot 2x - 36$   
 $= 6x^2 + 6x - 36$

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

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

PSD  $6(x+3)(x-2) = 0$

$x+3=0$     $x-2=0$

$x = -3$     $x = 2$

⑨ CONCAVITY

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

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

$12x + 6 = 0$

$12x = -6$

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

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

	$-\infty$	$x = -2$	$x = 0$	$\infty$
T.C.				
PLUG INTO		$12x+6$	$12x+6$	
$f''(x)$		$12(-2)+6$	$12(0)+6$	
		NEG	POS	
		⌒	⌒	

$-\infty$	$x = -3$	$x = 2$	$\infty$
$x = -4$	$x = 0$	$x = 3$	
$(x+3)(x-2)$	$(x+3)(x-2)$	$(x+3)(x-2)$	
$(-4+3)(-4-2)$	$(0+3)(0-2)$	$(3+3)(3-2)$	
POS	NEG	POS	
↙	↘	↙	
	MAX	MIN	

DO TEST CASES  
 PLUG INTO  $f'(x)$

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

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

⑩ POINTS OF INFLECTION  
 $x = -\frac{1}{2}$

POI  $(-\frac{1}{2}, 30.5) = (-\frac{1}{2}, \frac{61}{2})$