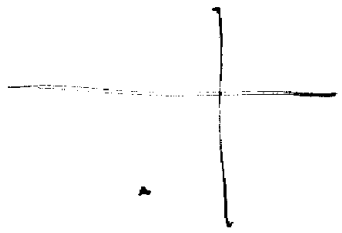
$y = x^3 + 6x^2$

$y = x^2 (x+6)$

roots $x = 0$ $x = 0$ $x = -6$



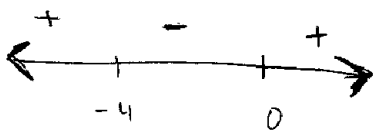
$y' = 3x^2 + 12x$

$3x^2 + 12x = 0$

$3x(x+4) = 0$

$3x = 0$ $x = -4$ P.T.P.

$x = 0$



Graph increasing $(-\infty, -4] \cup [0, \infty)$

Graph decreasing $[-4, 0]$

Turning Point into original

$(-4)^3 + 6(-4)^2$ 0,0

$-64 + 6(16)$

$-64 + 96$

32

Turning Points

$(-4, 32)$ $(0, 0)$

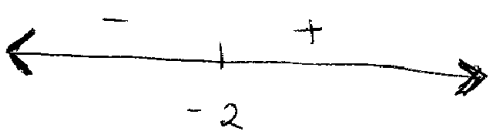
$y' = 3x^2 + 12x$

$y'' = 6x + 12$

$6x + 12 = 0$

$6x = -12$

$x = -2$



Graph concave down $(-\infty, -2)$

Graph concave up $(-2, \infty)$

Point of Inflection into original

$(-2)^3 + 6(-2)^2$

$-8 + 6(4)$

$-8 + 24$

16

Point of Inflection

$(-2, 16)$

$y = x^3 - 9x^2 + 24x - 7$

Roots can be done by synthetic division

$y' = 3x^2 - 18x + 24$

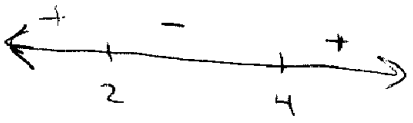
$3x^2 - 18x + 24 = 0$

$3(x^2 - 6x + 8) = 0$

$x^2 - 6x + 8 = 0$

$(x-4)(x-2) = 0$

$x = 4 \quad x = 2$



Increasing from $(-\infty, 2] \cup [4, \infty)$

Decreasing from $[2, 4]$

Turning Points into original

$(2)^3 - 9(2)^2 + 24(2) - 7$

$8 - 36 + 48 - 7$

13

$(4)^3 - 9(4)^2 + 24(4) - 7$

$64 - 144 + 96 - 7$

9

$(2, 13)$ and $(4, 9)$

Turning Points

y''

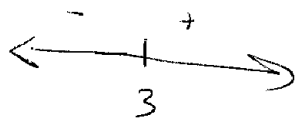
$y'' = 3x^2 - 18x + 24$

$y'' = 6x - 18$

$6x - 18 = 0$

$6x = 18$

$x = 3$



Concave down $(-\infty, 3)$

Concave up $(3, \infty)$

Point of Inflection into orginal

$(3)^3 - 9(3)^2 + 24(3) - 7$

$27 - 81 + 72 - 7$

$-88 + 99$

11

$(3, 11)$ Point of Inflection.