Quiz 12 MTH229H Fall 2023

Saturday, October 14, 2023 1:10 AM

$f(x) = 2x^3 + 3x^2 - 36x + 5$

$f'(x) = \boxed{6x^2 + 6x - 36 \overset{\text{set}}{=} 0}$

↓ factor out

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

↓ div by 6

$x^2 + x - 6 = 0$

↓ factor

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

↓

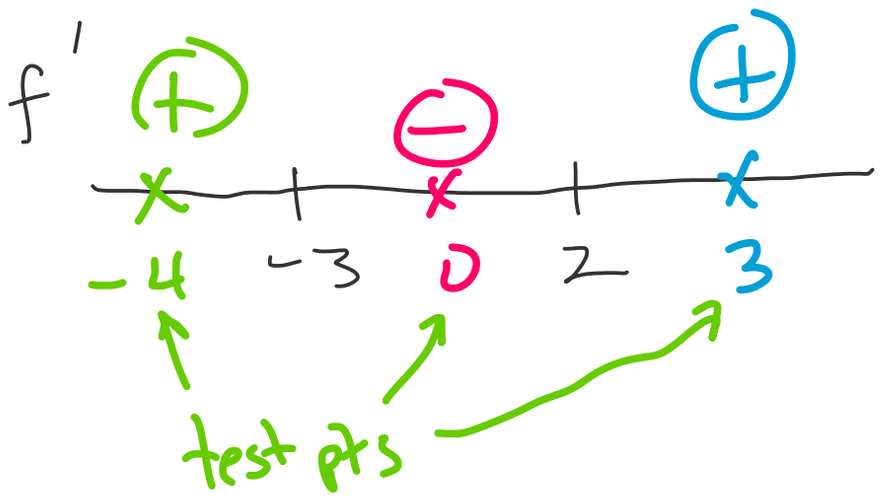
$x = 2, -3$

316
6
96

$f'(-4) = 6(16) - 6(4) - 36$
$= 96 - 24 - 36 > 0$

$f'(0) = 6(0)^2 + 6(0) - 36$
$= -36 < 0$

$f'(3) = 6(3^2) + 6(3) - 36$
$= 6(9) + 18 - 36$
$= 54 + 18 - 36 > 0$



Value of f at crit pts:

$f(-3) = 2(-3)^3 + 3(-3)^2 - 36(-3) + 5$
$= 2(-27) + 3(9) + 3(36) + 5$
$= -54 + 27 + 108 + 5 = 86$

$f(2) = 2(2^3) + 3(2^2) - 36(2) + 5$
$= 2(8) + 3(4) - 72 + 5$
$= 16 + 12 - 72 + 5$
$= 33 - 72$
$= -39$

27 × 2 = 54 ; 36 × 3 = 108 ; 108 − 54 = 54 ; 54 + 27 = 81 ; 81 + 5 = 86

6 12
72
33
39

Thus, $\begin{cases} f \text{ has local max of } 86 \text{ at } x = -3 \\ f \text{ has local min of } -39 \text{ at } x = 2 \end{cases}$