

Calculus I - Quiz 4

Name: Solutions.

(All work must be shown clearly to get full credit. Calculators are *not* allowed in this quiz.)

1. [10 pts] Sketch the curve of the function $f(x) = x^4 + 8x^3 + 200$ on the interval $[-10, 10]$. Find and classify all critical points.

x-intercept: not easy to find here.

y-intercept: put $x=0$ to get $y=200$

Note $f(x)$ has no symmetry and asymptotes.

$$f'(x) = 4x^3 + 24x^2 = 4x^2(x+6) \quad ; \quad f''(x) = 12x^2 + 48x = 12x(x+4)$$

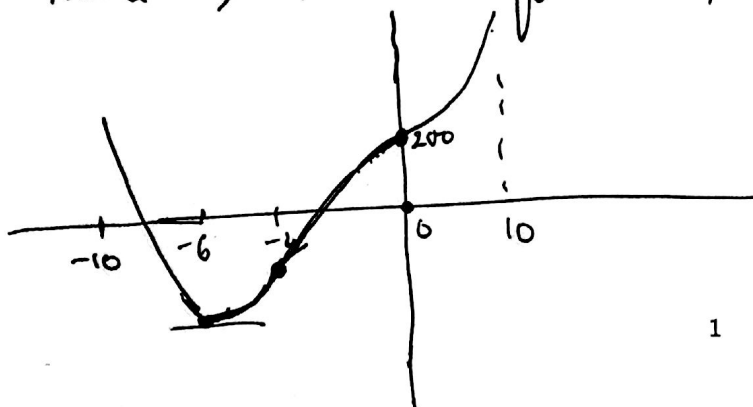
Critical points = $\{0, -6\}$ possible inflection pts = $\{0, -4\}$

$f''(0) = 0$; hence no conclusion

$f''(-6) > 0$; hence $x = -6$ is a local minima

Also f'' : $\begin{array}{c} + \quad - \quad + \\ \hline \quad -4 \quad 0 \\ \hline \end{array}$
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Hence $0, -4$ are inflection points.



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Hence $x = -6$ is a global min

$x = -4, 0$ are inflection points

$x = 10$ is a global max