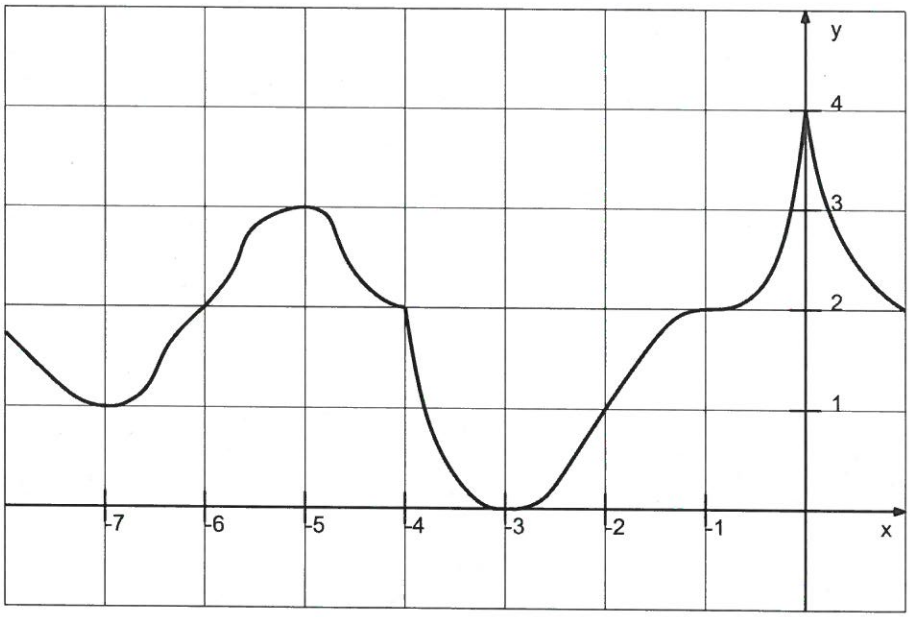
Math 1210: Quiz #6 **Fall 2017**

Name: ANSWERS	A#:	Section: C/D

[8] 1. Let f be a function whose graph of $y = f(x)$ is given below.



Fill in the following.

(a) The critical values of f are: $-7, -5, -4, -3, -1, 0$

(b) f has local minima at: $-7, -3$ [possibly 1]

(c) f has local maxima at: $-5, 0$ [possibly -8]

$f'(-1) = 0$, not > 0

(d) On the following intervals we have $f'(x) > 0$: $(-7, -5), (-3, -1), (-1, 0)$

(e) The global maximum of f on $(-8, 1)$ is 4 (at 0)

(f) The global minimum of f on $(-8, 1)$ is 0 (at -3)

(g) The global maximum of f on $[-7, -6]$ is 2 (at -6)

(h) The global minimum of f on $[-2, 0]$ is 1 (at -2)

[3] 2. List and classify critical points of f, if its **derivative** is given by

$$f'(x) = \frac{(x-2)^3 x^2}{\sqrt[3]{x+2}}$$

$x=2$ (local min) ∪ (− just below, + just above)

$x=0$ (inflection point) ∩ (− " , − ")

$x=-2$ (local max, nondifferentiable cusp (+ " , − " , unbdd.)

[4] 3. Let x, y be functions of t related by $4x^2y^2 = x^4 + y^4$. Compute $\frac{dy}{dt}$ in terms of $x, y, \frac{dx}{dt}$.

$$4 \cdot 2x \frac{dx}{dt} y^2 + 4 \cdot x^2 \cdot 2y \frac{dy}{dt} = 4x^3 \frac{dx}{dt} + 4y^3 \frac{dy}{dt}$$

$$(2xy^2 - x^3)\frac{dx}{dt} = (y^3 - 2x^2y)\frac{dy}{dt}$$

$$\frac{dy}{dt} = \frac{2xy^2 - x^3}{y^3 - 2x^2y}\frac{dx}{dt}$$

[5] 4. Find the global (absolute) maximum and the global minimum of $f(x) = x^3 + 6x^2$ on $[-5, -1]$.

$f'(x) = 3x^2 + 12x = (3x+12)x$

$f'(x) = 0$ at $x = 0, x = -4$

$f(-5) = 25$

$f(-4) = 32$ max

~~$f(0) = 0$~~ out of range

$f(-1) = 5$ min.