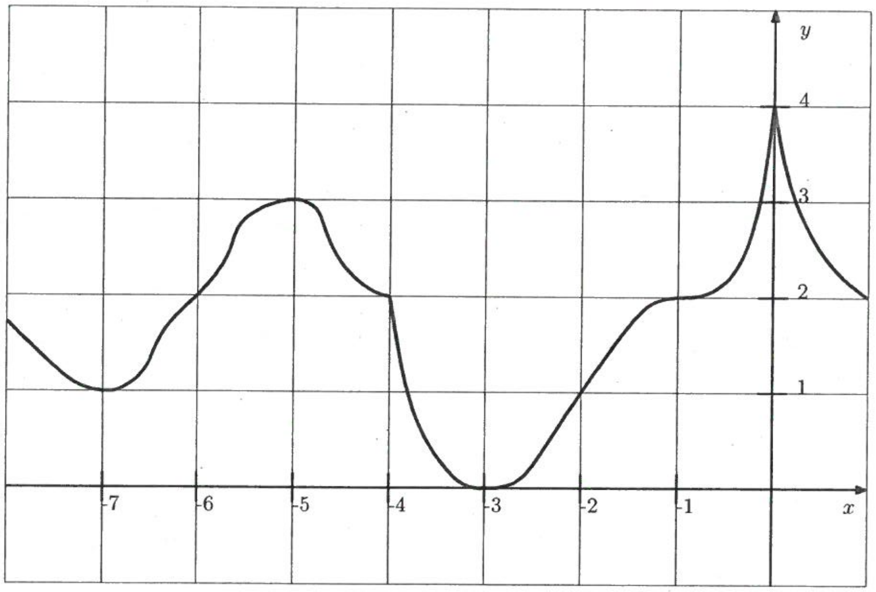
Math 1210: Quiz #6 Solution **Fall 2017**

Name:	A#:	Section: F

[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: $-7, -3$

(c) f has local maxima at: $-5, 0$

(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 $f(0) = 4$

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

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

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

v6.EF

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

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

$f'(x)$	$+$		$-$		$-$		$+$
$f(x)$	$\nearrow$	-2	$\searrow$	0	$\searrow$	2	$\nearrow$

$f'(x) = 0 \longrightarrow x = 0,\ x = 2$

$f'(x)$ is undefined $\rightarrow x = -2$

local max at $x = -2$

local min at $x = 2$

no extrema at $x = 0$

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

$$\frac{d}{dt}(4x^2y^4) = \frac{d}{dt}(x^4 + y^2)$$

$$4y^4 \cdot 2xx' + 4x^2 \cdot 4y^3y' = 4x^3x' + 2yy'$$

$$y'(4x^2 \cdot 4y^3 - 2y) = 4x^3x' - 4y^4 \cdot 2xx'$$

$$y'(16x^2y^3 - 2y) = 4x^3x' - 8y^4xx' \longrightarrow y' = \frac{4x^3x' - 8y^4xx'}{16x^2y^3 - 2y}$$

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

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

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

$f'(x) = 0 \longrightarrow 3x^2 + 12x = 0$

$3x(x+4) = 0 \quad \Rightarrow \begin{cases} x = 0 \\ x = -4 \end{cases}$

$f(-1) = -1 + 6 = 5$

$f(-4) = 32$

$f(-5) = 25$

abs. max : $f(-4) = 32$

abs. min : $f(-1) = 5$