Quiz 5

Name: key

1. [2 pts each] Compute the derivatives of each of the following functions.

(a) $f(x) = (3x^5 + x^{1/5})(x^4 - 7x)$

$f'(x) = \left(15x^4 + \frac{1}{5}x^{-4/5}\right)(x^4 - 7x) + (3x^5 + x^{1/5})(4x^3 - 7)$

(b) $s(t) = \dfrac{1}{1+t^2}$

$s'(t) = \dfrac{0\cdot(1+t^2) - (2t)\cdot 1}{(1+t^2)^2}$

$s'(t) = \dfrac{-2t}{(1+t^2)^2}$.

(c) $F(x) = (x+1)\cdot\sqrt{x}$

$F'(x) = 1\cdot\sqrt{x} + (x+1)\cdot\frac{1}{2}x^{-1/2}$

$= \frac{3}{2}x^{1/2} + \frac{1}{2}x^{-1/2}$

(d) $L(x) = \dfrac{\sqrt{x}}{x+1} = \dfrac{x^{1/2}}{x+1}$

$L'(x) = \dfrac{(x+1)\frac{1}{2}x^{-1/2} - \sqrt{x}(1)}{(x+1)^2}$

$= \dfrac{\frac{1}{2}(x+1)\sqrt{x} - \sqrt{x}}{(x+1)^2}$

$=$

2. [2 pts] Find a value of x for which $|x|$ is not differentiable. Explain your answer in a sentence or two.

$x = 0$

$|x|$ is not differentiable at 0 since it has a cusp there.