Questions on Derivatives:

1. Use the limit definition of the derivative to exactly evaluate the derivative.

a. $f(x) = \sqrt{x+4}$

b. $f(x) = \frac{3}{x}$

2. Find the derivatives of the following functions.

a. $f(x) = 3x^3 - \frac{4}{x^2}$

b. $f(x) = (4 - x^2)^3$

c. $f(x) = e^{\sin(x)}$

d. $f(x) = \ln(x+2)$

e. $f(x) = x^2\cos(x) + xtan(x)$

f. $f(x) = \sqrt{3x^2+2}$

g. $f(x) = \frac{x}{4}\sin^{-1}(x)$

h. $x^2y = (y+2) + xysin(x)$

3. The following questions consider the wind speeds of Hurricane Katrina, which affected New Orleans, Louisiana, in August 2005. The data are displayed in a table.

Hours after Midnight, August 26	Wind Speed (mph)
1	45
5	75
11	100
29	115
49	145
58	175
73	155
81	125
85	95
107	35

a. Using the table, estimate the derivative of the wind speed at hour 39. What is the physical meaning?

b. Estimate the derivative of the wind speed at hour 83. What is the physical meaning?