Math 131 - Quiz 6

February 27, 2023

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (3 points) Use derivative rules to determine each derivative. Do not simplify your answers.

(a) $\frac{d}{dw}(4w^2-1)^5$ $= 5(4w^2-1)^4(8w)$

$= 40w(4w^2-1)^4$

(b) $\frac{d}{dx}\cos(\sqrt{x})$ $= -\sin(\sqrt{x})\cdot\left(\frac{1}{2}x^{-1/2}\right) = \frac{-\sin\sqrt{x}}{2\sqrt{x}}$

$\sqrt{x} = x^{1/2}$

2. (3 points) Find $f''(x)$ when $f(x) = 2\sec x$.

$f'(x) = 2\sec x \tan x$

$f''(x) = 2\sec x(\sec^2 x) + (2\sec x \tan x)\tan x =$ $2\sec^3 x + 2\sec x \tan^2 x$

3. (4 points) A potato is fired upward from a potato gun in such a way that its height in feet after t seconds is given by $s(t) = -16t^2 + 80t + 96$.

(a) Determine the maximum height of the potato.

$s'(t) = -32t + 80$

$s'(t) = 0 \Rightarrow t = \frac{80}{32} = 2.5$ sec

$s(2.5) = -16(6.25) + 80(2.5) + 96$

$= 196$ FT

(b) Determine when the potato hits the ground.

$s(t) = 0 \Rightarrow -16t^2 + 80t + 96 = 0$

$-16(t^2 - 5t - 6) = 0$

$-16(t-6)(t+1) = 0$

$t = 6, \quad t = -1$

AFTER 6 SEC