Math 171 - Quiz 4

September 25, 2014

Name key

Score _____

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

1. (5 points) Determine each derivative. Do not simplify.

(a) $\frac{d}{dx}(2x^5 + x)\tan x$ = $(10x^4 + 1)\tan x + (2x^5 + x)\sec^2 x$

(b) $\frac{d}{dt}\left[\frac{5+\sqrt{t}}{\cos t}\right]$

$$= \frac{(\cos t)\left(\frac{1}{2}t^{-1/2}\right) - (5+\sqrt{t})(-\sin t)}{\cos^2 t}$$

2. (5 points) An object is launched upward with an initial speed of 96 ft/sec over the side of a 256-ft cliff. Find the object's maximum height and its speed when it hits the ground (at the bottom of the cliff).

$$s(t) = -16t^2 + 96t + 256$$

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

$$= -16(t-8)(t+2)$$

$s(t) = 0 \Rightarrow t = 8$

$s'(t) = -32t + 96 = 0$

$\Rightarrow t = 3$

$s(3) = -16(-5)(5) = 400$ FT

MAX HEIGHT = 400 FT

$s'(8) = -32(8) + 96 = -160$

IMPACT SPEED = 160 FT/S