

Worksheet 4

Math 251, Summer 2017

Name: _____

Directions

- This counts as your “attendance” for the day. You must give this to me today to get credit for it.
 - You may leave if you finish the packet.
 - You may work in groups, and you can ask me for assistance.
 - I grade this worksheet based on completion, not accuracy; however, you should strive for completely correct answers in order to make sure you understand the material.
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1. Find the derivatives of the functions shown below.

(a) $h(x) = (2 + x^3)(2x - 1)$

(c) $S(x) = \frac{x - \sqrt{x}}{x^{1/3}}$

(b) $r(t) = \tan(t)$ (hint: write down the definition of \tan). (d) $T(t) = (t + e^t)(3 - \sqrt{t})$

Worksheet 4

Math 251, Summer 2017

2. Find the equation of the tangent line to the function $\frac{1 + \sqrt{t}}{\sqrt{t}}$ at $t = 1$.
3. Suppose $h(x) = x^2 f(x)$, where f is a function with the property that $f(1) = 4$ and $f'(1) = 2$. Find the value of $h'(1)$.
4. Suppose that $f(2) = 3$, $f'(2) = 4$, $g(2) = 1$, and $g'(2) = -2$. Find $h'(x)$, where $h(x) = \frac{f(x)}{1 + g(x)}$.

Worksheet 4

Math 251, Summer 2017

5. Optimize (find max's and min's) of the functions below on the given intervals using the method outlined in class.

(a) $f(x) = xe^x$, on $[-2, 0]$.

(b) $g(x) = \frac{x}{e^x}$ on $[0, 3]$

6. Suppose that $u(x) = f(x)g(x)$ and $v(x) = f(x)/g(x)$, where $f(x)$ and $g(x)$ are the functions graphed below.

(a) Find $u'(1)$.

(b) Find $v'(5)$.

