Test Total

Name _____

Sample Test 2 Calculus I 3450:221 Dr. Norfolk
Show all of your work. Do not simplify more than necessary.

1. *Derivatives*

(a) Given $y = \dfrac{2}{x^{2/3}} + 11\sqrt{x} - 15x^4 + 37$, find y'.

6 Points

(b) Evaluate $\dfrac{d}{dx}\left(x^3 \sin x\right)$.

6 Points

(c) Evaluate $\dfrac{dy}{dx}$, where $y = \dfrac{\cos x}{x^2 - 10}$.

6 Points

(d) Find $f'(x)$, where $f(x) = (x^2 - 7\csc x)^3$.

6 Points

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(e) Given $g(x) = (4x^3 - 12)\ f(x)$, find an expression for $g'(x)$ in terms of $f'(x)$.

6 Points

(f) Given $k(x) = f(\cot x)$, find an expression for $Dk(x)$, in terms of $Df(x)$.

6 Points

(g) Given that $w(x) = (u\ o\ v)(x)$, $u'(1) = -3$, $u'(2) = 4$, $v(1) = 2$, $v'(1) = 6$, find $w'(1)$.

4 Points

(h) Find y'', where $y = \left(x^5 - 43\right)^{12}$.

10 Points

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2. (a) Find a function $f(x)$ and a value a such that

$$f'(a) = \lim_{h \to 0} \frac{\sec(2+h)^3 - \sec(8)}{h} \ .$$

5 Points

(b) **Bonus :** Use derivative rules to evaluate the limit in part 2a).

5 Points

3. For $t \geq 0$ seconds, the x-coordinate (in metres) of a particle moving along the x-axis is given by

$$s(t) = 4t^3 - 5t^2 - 2t + 96 \ .$$

(a) Find the time(s) when the particle is not moving.

5 Points

(b) Find the *average* velocity from $t = 0$ to $t = 4$ seconds, and compare it to the *instantaneous* velocity at $t = 2$ seconds.

10 points

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