Math 111, Section 01, Fall 2014

Worksheet 9, Tuesday, November 18, 2014

1. Compute each one of the following integrals. Simplify your answers.

   (a) $\displaystyle \int \frac{\sin x}{\cos^5 x}\, dx$

   (b) $\displaystyle \int_{\frac{\pi}{18}}^{\frac{\pi}{9}} \sec^2(3x)\, dx$

   (c) $\displaystyle \int \frac{1}{x^2}\sqrt{1-\frac{1}{x}}\, dx$

   (d) $\displaystyle \int_2^4 \frac{x}{(3x^2-8)^2}\, dx$

   (e) $\displaystyle \int \frac{1}{\sqrt{x}(1+\sqrt{x})^9}\, dx$

   (f) $\displaystyle \int_{\frac{2}{3}}^{\frac{14}{3}} \frac{1}{\sqrt{3x+2}}\, dx$

   (g) $\displaystyle \int \frac{\tan\sqrt{x}\,\sec^2\sqrt{x}}{\sqrt{x}}\, dx$

   (h) $\displaystyle \int x(1+x)^{\frac{2}{3}}\, dx$

2. Find a function f such that $f'(x) = \dfrac{\sec x \tan x}{\sqrt{\sec x + 8}}$ and $f(0) = 7$. Check your answer.

3. Compute $g''(x)$ where $g(x) = \displaystyle \int_x^9 \sqrt{1+\cos t}\, dt$.

Consider an object moving along a straight line with position function $s(t)$. The displacement of the object during the time period of t_1 to t_2 is given by

$$\text{Displacement} = \int_{t_1}^{t_2} v(t) \, dt$$

The total distance the object traveled during the time period t_1 to t_2 is given by

$$\text{Total Distance} = \int_{t_1}^{t_2} |v(t)| \, dt$$

4. Consider an object travelling with velocity given by $v(t) = t^2 - 3t + 2$ feet per second.

   (a) Graph $v(t)$.
   (b) Graph $|v(t)|$.
   (c) Write out the definition of $|v(t)|$.
   (d) Compute the **Displacement** for this object from time $t = 0$ to $t = 3$.
   (e) Compute the **Total Distance** for this object from time $t = 0$ to $t = 3$.

** CHALLENGE**   Compute $\int \sqrt{1 + \sqrt{x}} \, dx$

> **Turn in your own solutions.**