Discussion Problems for Math 180

Thursday, November 20, 2014

1. Calculate $\int_2^3 2x - 4\,dx$ by taking the limit of a Riemann sum.
2. What is
$$\int_0^{2\pi} \sin(x)?$$
Justify your answer completely without making use of the fundamental theorem of calculus. (Hint: start by drawing a graph.)
3. Find a function $z(t)$ such that $z'(t) = 3 \cdot 2^t$ and $z(1) = 0$.
4. Find a function $f(x)$ defined on $(0, \infty)$ such that $f'(x) = \sqrt{x} - 1$ on its domain and $f(9) = 0$.
5. (a) What is $\int_0^1 \frac{4}{1+x^2}\,dx$? (Use the Fundamental Theorem of Calculus.)
   (b) Write down an expression for an n-term left Riemann sum of this function on this interval.
   (c) Why might we be interested in the expression in part (b)?
6. What is $\int_0^1 e^{2t}\,dt$? (Use the Fundamental Theorem of Calculus.)
7. What is $\int_{-1}^3 3t^2 - 4t + 7\,dt$? (Use the Fundamental Theorem of Calculus.)