KEY

Math 125-Quiz 24
November 16, 2011

You have 10 minutes to complete this quiz.

1. Find the equation of the tangent line to $f(x) = \sqrt[3]{x}$ at $x = 8$ and use it to approximate $\sqrt[3]{8.1}$.

Point: $(8, \sqrt[3]{8}) = (8, 2)$

slope $= f'(1) = \frac{1}{3}x^{-2/3}\Big|_{x=8} = \frac{1}{12}$

line: $y - 2 = \frac{1}{12}(x-8)$

$f(8.1) \simeq 2 + \frac{1}{12}(8.1-8)$

$= 2 + \frac{1}{120}$

2. *Another snowballs chance....* A soccer ball with radius 5 inches is covered in a layer of ice that is .02 inches thick. Find the approximate volume of the ice using differentials. (Please express your answer as a multiple of π.)

$V = \frac{4}{3}\pi r^3$

$dV = 4\pi r^2 dr$ $\quad dr = .02$, $r = 5$

$dV = 4\pi(25)(.02)$

$= 2\pi$ in^3.