Quiz Questions 4 for Mathematics 224
Introductory Analysis II - Spring 2001
Material Covered: Sections 6.5, 6.6 of workbook and text
For: Friday, 9th March

This is a 15 minute quiz, worth 5% and marked out of 5 points.

Name (please print): _____ . **ID Number:** _____.
last first

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1. Consider the function $f(x) = \frac{1}{8}x$ defined on interval $[0, 4]$.

(a) [1 point] The mean is equal to (circle closest one)
$\mathbf{\frac{7}{3}}$ / $\mathbf{\frac{8}{3}}$ / $\mathbf{\frac{9}{3}}$ / $\mathbf{\frac{10}{3}}$ / $\mathbf{\frac{11}{3}}$

(b) [2 points] The variance is

equal to _____

2. [1 point] Let x be a continuous random variable that is normally distributed, where $\mu = -2$ and $\sigma = 2$.

$P(-2.5 \leq x \leq 4.5) =$ _____

3. [1 point] Find the volume generated by revolving about the x–axis bounded by the graphs of the following equations: $f(x) = x^{\frac{3}{2}}$, $x = 1$, $y = 4$

1.

(a) $\mathbf{\frac{8}{3}}$

$E(x) = \int_{-\infty}^{\infty} 2x^3 f(x)\,dx == \int_0^4 x\left(\frac{1}{8}x\right)\,dx = [\left(\frac{1}{24}x^3\right)]_0^4$

(b) $\mathbf{\frac{16}{3}}$

$$\begin{aligned}
\sigma^2 &= E(x^2) - [E(x)]^2 \\
&= \int_{-\infty}^{\infty} x^2 f(x)\,dx - \left[\int_{-\infty}^{\infty} x f(x)\,dx\right]^2 \\
&= \int_0^4 x^2\left(\left(\frac{1}{8}x\right)\right)\,dx - \left[\int_0^4 x\left(\left(\frac{1}{8}x\right)\right)\,dx\right]^2 \\
&= \int_0^4 \left(\frac{1}{8}x^3\right)\,dx - \left[\int_0^4 \left(\frac{1}{8}x^2\right)\,dx\right]^2 \\
&= 8 - \left[\frac{8}{3}\right]^2
\end{aligned}$$

2. 0.598

normalcdf$(-2.5, 4.5, -2, 2)$

3. $\mathbf{51.15\pi \approx 160.69}$

$$\begin{aligned}
\int_1^4 \pi\left[x^{\frac{3}{2}}\right]^2 dx &= \int_1^4 \left[\pi x^3\right]\,dx \\
&= \frac{\pi}{4}\left[x^4\right]_1^4
\end{aligned}$$