MATH 2320 Test 1

Name:_____

No calculators, no phones, no electronics allowed.

1. Use Reimann Sums to find the exact solution to

$$\int_0^1 x^3 \, dx.$$

2. Find the area bounded the parabola $x = y^2$, and the line $y = x - 2$.

3. Find the volume when the region in the first quadrant bounded by the line $y = 3x$, parabola $y = 4 - x^2$ and the x-axis is revolved about the y-axis.

4. $\int \frac{(\ln(x))^3}{x} dx$

5. $\int xe^{2x}dx$

6. $\int \sin^3(x)\cos^{1/2}(x)dx$

7. $\int \frac{1}{(9-x^2)^{3/2}} dx$

8. $\int \frac{3x^2 - 1}{x^3 - x} dx$

9. $\int_1^\infty \frac{1}{x^{1/2}} dx$

1. $\sum_{k=1}^{n} c = cn$
2. $\sum_{k=1}^{n} k = \frac{n(n+1)}{2}$
3. $\sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$
4. $\sum_{k=1}^{n} k^3 = \left(\frac{n(n+1)}{2}\right)^2$
5. $\cos^2(\theta) = \frac{1}{2}[1 + \cos(2\theta)]$
6. $\sin^2(\theta) = \frac{1}{2}[1 - \cos(2\theta)]$

Compute the following limits.
Write your answers clearly and show your work.

1. $\lim_{n\to\infty} \dfrac{(n^3-1)}{1-4n^3}$
2. $\lim_{n\to\infty} \dfrac{(n^3-1)\sqrt{n^2+1}}{n^{7/2}+1}$
3. $\lim_{n\to\infty} \dfrac{e^n}{n!}$
4. $\lim_{n\to\infty} \dfrac{e^n}{\ln(n)}$
5. $\lim_{x\to 0} \dfrac{1}{x}$
6. $\lim_{x\to 0} \dfrac{1}{x^2}$
7. $\lim_{n\to\infty} \dfrac{(2n+2)!}{(2n)!n^2}$
8. $\lim_{n\to\infty} (1+\dfrac{1}{n})^{-n}$
9. $\lim_{n\to\infty} \dfrac{n^n}{(n+1)^n}$