Math 2215 - Calculus 1

Exam #4 - 2017.11.13

Name: _____

Instructions: Please work out each problem in full detail. No points are given for a correct answer.

1. Using Riemann sums with right endpoints, compute the area between the curve and x-axis for $f(x) = x^3 - x^2 - 2x$ on the interval $[-1, 2]$.

2. Use the Fundamental Theorem of Calculus to compute the area between the curve and x-axis for $f(x) = x^3 - x^2 - 2x$ on the interval $[-1, 2]$.

3. Evaluate $\displaystyle\int x(x^2+1)^{1/4}\,\mathrm{d}x$.

4. Evaluate $\displaystyle\int x(x+1)^{1/4}\,\mathrm{d}x$.

5. Compute $\displaystyle\int_{-\pi}^{\pi/2} f(x)\,\mathrm{d}x$ if $f(x)$ is defined as follows:

$$f(x) = \begin{cases} 1 - \cos(x)\sin(x), & -\pi \le x < 0 \\ \sec^2(x/2), & 0 \le x \le \pi/2 \end{cases}$$

6. Evaluate $\displaystyle\int_{-4}^{4} x^3\cos^2(x^4) - x^2\sin(x^3)\,\mathrm{d}x$.

7. Find limits of integration a and b which make the following equation true:

$$\int_{-1}^{2} g(x)\,\mathrm{d}x + \int_{0}^{4} g(x)\,\mathrm{d}x + \int_{2}^{0} g(x)\,\mathrm{d}x = \int_{a}^{b} g(x)\,\mathrm{d}x$$

8. Compute $F'(x)$ if

$$F(x) = \int_{\sqrt{2x+1}}^{\sin^2(x)} \cos^2(t) + \csc(t) - 1\,\mathrm{d}t$$

Formulas that may be of use:

$$\sum_{k=1}^{n} k = \frac{n(n+1)}{2}, \qquad \sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}, \qquad \sum_{k=1}^{n} k^3 = \frac{n^2(n+1)^2}{4}$$