Review Problems for Test I

math 2423-001

1. Estimate the area under the graph $f(x) = x^3 + 2$ from $x = -1$ to $x = 2$ using three rectangles and right endpoints.

2. Find the limit

   a) $\lim_{n\to\infty} \sum_{i=1}^{n} \frac{10}{n} \sin(\frac{10\pi i}{n})$;

   b) $\lim_{n\to\infty} \sum_{i=1}^{n} \frac{6}{n}(7 + \frac{18i}{n})$.

3. Find the definite and indefinite integrals

   a) $\int_1^4 \sqrt{t} - \frac{2}{\sqrt{t}}dt$;

   b) $\int_0^2 (x^2 - |x - 1|)dx$;

   c) $\int \frac{\cos(\pi/x)}{x^2}dx$;

   d) $\int_0^4 x\sqrt{16 - 3x}dx$.

4. Find the area of the region bounded by the curves.

   a) $y = \sin x$, $y = -\cos x$, $x = 0$, $x = \pi$;

   b) $x - 2y + 7 = 0$, $y^2 - 6y - x = 0$.

5. Find the volume of a solid obtained by rotating the region bounded by the given curves about the specified axis.

   a) $x = y^2$, $x = 1$ about $x = 2$;

   b) $y = x^2$, $y^2 = x$ about x-axis;

   c) $y^2 - 6y + x = 0$, $x = 0$ about x-axis.

6. (problem 29 a) p.402) A tank full of water has the shape of a paraboloid of revolution, that is its shape is obtained by rotating a parabola about a vertical axis. If its height is 4ft and the radius at the top is 4ft, find the work required to pump the water out of the tank.