

# Exam 1

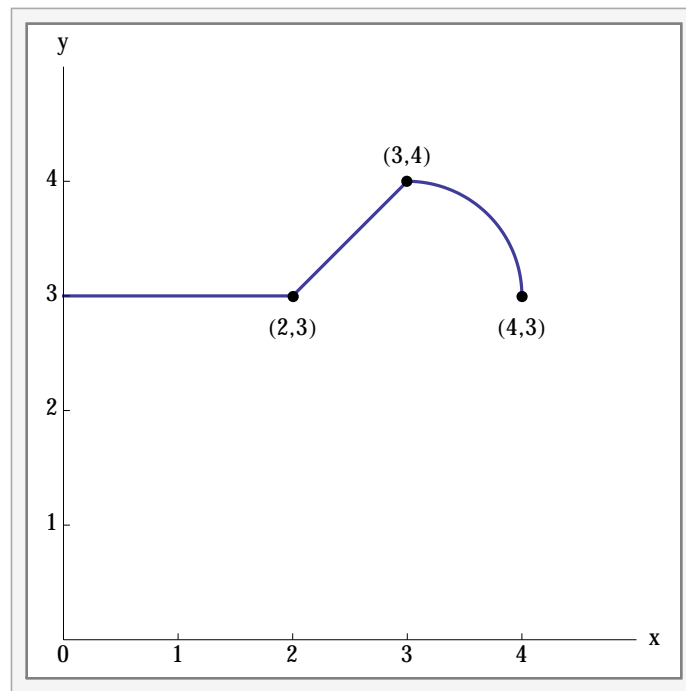
Name:

Date: July 16, 2015

**P 1.** [2 Points] State the Trapezoidal Rule and its assumptions.

**P 2.** [2 Points] State the Integration by Parts formula and its assumptions.

**P 3.** [4 Points] Consider the graph of  $f$  below.



Use the graph of  $f$  to answer the following. If a solution does not exist, state why.

(a) Find the area of the region bounded by

$$y = f(x), y = 1, x = 1, x = 3$$

(c) Find the volume of the solid of revolution obtained by revolving the region bounded by the graph of  $y = f(x)$ ,  $y = 0$ ,  $x = 0$ , and  $x = 2$ , about the  $x$ -axis.

(b) Find the length of the graph of  $y = f(x)$  on  $[2, 4]$ .

(d) Find the surface area of the surface of revolution obtained by revolving the part of the graph of  $y = f(x)$  from  $x = 2$  to  $x = 3$ , about the  $x$ -axis.

**P 4** (10 Points). Find

$$\int x^5 \ln 3x \, dx$$

**P 5** (10 Points). Find

$$\int x^3 e^x \, dx$$

**P 6** (10 Points). Find

$$\int e^x \sin x \, dx$$

**P 7** (10 Points). Find

$$\int \sin(5x) \cos(2x) \, dx$$

[Hint:  $\sin mx \cos nx = \frac{1}{2}(\sin[(m - n)x] + \sin[(m + n)x])$ ]

**P 8** (6 Points). Find the volume of the solid obtained by revolving the region bounded by

$$y = \sqrt{4 - x^2} \text{ and } y = 0$$

about the  $x$ -axis.

**P 9** (6 Points). Find the surface area of the surface of revolution obtained by revolving the graph of  $y = 2x$  defined on  $[0, 1]$ , about the  $x$ -axis.

**P 10** (10 Points). Find the area of the region bounded by the graphs of the equations

$$y = \sin^2 \pi x, y = 0, x = 0, x = 1.$$

**P 11** (10 Points). Find the volume of the solid obtained by revolving the region bounded by the graphs of

$$y = \ln x, y = 0, \text{ and } x = e$$

about the  $y$ -axis.

**P 12** (10 Points). Find

$$\int_0^1 \arctan x \, dx$$

**P 13** (10 Points). Find the volume of the solid obtained by revolving the region bounded by the graphs of

$$x = -y^2 + 2y \text{ and } x = 0$$

about the line  $x = -1$ .