# Exam 2

Name: Date: July 23, 2015

**P 1** (2 Points)**.** State L'Hospital's Rule.

**P 2** (2 Points)**.** Circle all items in the list that have indeterminate form.

(a) $1^{\infty}$

(b) $\infty \cdot \infty$

(c) $\infty - \infty$

(d) $\infty + \infty$

(e) $\infty - 3\infty$

(f) $0 \cdot \infty$

(g) $0/0$

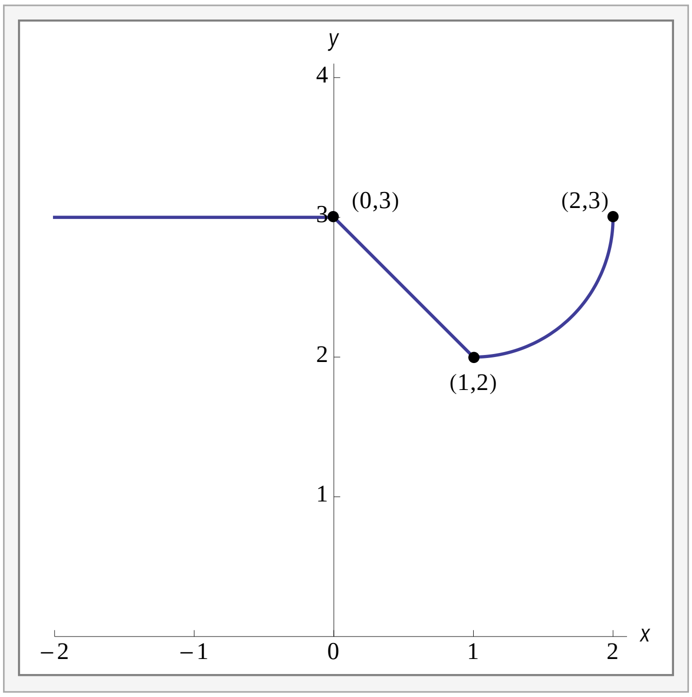
(h) $3/0$

(i) $\frac{\infty}{-\infty}$

(j) $\frac{500000}{\infty}$

(k) $0^0$

**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 between the graphs of

$$y = f(x) \text{ and } y = x + 1,$$

on $[0, 1]$.

(b) Find the arc length of the graph of $y = f(x)$ on $[-2, 0]$.

(c) Find the volume of the solid of revolution obtained by revolving the region between the graphs of $y = f(x)$ and $y = 3$, on $[1, 2]$ about the line $y = 3$.

(d) Find the surface area of the surface of revolution obtained by revolving the part of the graph of $y = f(x)$ from $x = 0$ to $x = 1$, about the $y$-axis.

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

$$\int_0^\infty xe^{-x}\,dx$$

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

$$\lim_{x\to 0^+} x^x$$

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

$$\int \frac{2x^2 - x + 7}{(x+1)\left(x^2+4\right)}\, dx$$

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

$$\int \frac{5}{\sqrt{1-4x^2}}\,dx$$

**P 8** (10 Points)**.** Find the volume of the solid of revolution obtained by revolving the region between by the graphs of

$$y = \sin x \text{ and } y = 0$$

on the interval $[0, \pi]$, about the $y$-axis.

**P 9** (10 Points)**.** Find the area of the region bounded by

$$y = \frac{1}{x^2 - 4}, \; y = 0, \; x = -1, \quad \text{and } x = 1.$$

**P 10** (10 Points)**.** Evaluate

$$\lim_{x \to 2^+} \left( \frac{8}{x^2 - 4} - \frac{2}{x - 2} \right)$$

**P 11** (10 Points)**.** Find

$$\int \sin^2 x \cos^2 x \; dx$$

**P 12** (6 Points)**.** Determine if the improper integral converges or diverges. If it converges, find its value.

$$\int_0^8 \frac{3}{\sqrt{8-x}}\,dx$$

**P 13** (6 Points)**.** Find

$$\int_0^\pi x\cos x\;dx$$