Mathematics for Political Science

Lecture 4: Calculus II

Exercise Solutions

1.

$$f(x) = 3x^2 - 7x + 2 \qquad g(x) = 8x^3 - 46x^2 + 73x - 35$$

- f(x): minimum at $x = \frac{7}{6}$
- g(x): maximum at $x = \frac{23-\sqrt{91}}{12}$, minimum at $x = \frac{23+\sqrt{91}}{12}$

2.

1. $0 = \frac{2}{x} + 1 - \frac{2}{2x+1}$
2. $-2x^2 + x + 2 = 0$
3. Zeroes at approximately -.78 and 1.28.

3.

- $\frac{\partial(.)}{\partial e} = h(eR(\frac{f}{f+g}))^{h-1} R \frac{f}{f+g}$
- $\frac{\partial(.)}{\partial f} = h(eR(\frac{f}{f+g}))^{h-1} eR \frac{g}{(f+g)^2}$

4.

a. $y^4 + C$ b. $\frac{1}{3}x^3 - 2x^{\frac{1}{2}} + C$ c. $\frac{360}{7}t^7 + C$

5.

a. 700 b. $\frac{531440}{3}$ c. 0

d. $28\frac{2}{3}$ e. $e^4 - e^2$ f. $\frac{16}{3} - \frac{4}{3}\sqrt{2}$

6. $2306\frac{2}{3}$