

# Mathematics for Political Science

## Day 4: Calculus II

### Exercise Solutions

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1.

$$f(x) = 3x^2 - 7x + 2$$

$$g(x) = 8x^3 - 46x^2 + 73x - 35$$

- $f(x)$ : 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.

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

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