Mathematics for Political Science

Exercise 2 Solutions: Calculus

August 19th, 2020

(b)
$$-5$$

a.
$$x^{-\frac{2}{3}}$$
 b. 14

c.
$$3y^2 + 6y$$

3. d.
$$5x^4 + 3x^2 - 2x$$
 e. $1 + 3y^2 + \frac{14}{y^3}$ f. $2y + y^{-2} - 3y^{-4}$

e.
$$1 + 3y^2 + \frac{14}{y^3}$$

f.
$$2y + y^{-2} - 3y^{-4}$$

g.
$$\frac{12x^2 - 8x + 16}{x^4 - 8x^3 + 16x^2}$$

h.
$$e^{y^2-3y+2}(2y-3)$$
 i. $\frac{2}{x}$

i.
$$\frac{2}{x}$$

4.
$$4(8(x^4+2)-1)*8*4x^3$$

5.

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

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

•
$$f(x)$$
: minimum at $x = \frac{7}{6}$

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

6. (a)
$$0 = \frac{2}{x} + 1 - \frac{2}{2x+1}$$

(b)
$$-2x^2 + x + 2 = 0$$

(c) Zeroes at approximately -.78 and 1.28.

7. •
$$\frac{\partial(.)}{\partial e} = h(eR(\frac{f}{f+g}))^{h-1}R\frac{f}{f+g}$$

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

8. a.
$$y^4 + C$$

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

c.
$$\frac{360}{7}$$
t⁷ + C

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

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

10. $2306\frac{2}{3}$

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