Universidade Federal de Viçosa
Centro de Ciências Exatas
Departamento de Matemática

Gabarito da Lista da Unidade II de MAT 147 - Cálculo II

2020-4

1. (a) $I_c = \left(-\frac{1}{3}, \frac{1}{3},\right)$, $R_c = \frac{1}{3}$
   (b) $I_c = \left(-\frac{1}{3}, \frac{1}{3},\right)$, $R_c = \frac{1}{3}$
   (c) $I_c = (1, 3]$, $R_c = 1$
   (d) $I_c = (-\infty, +\infty)$, $R_c = +\infty$
   (e) $I_c = (1, 3)$, $R_c = 1$
   (f) $I_c = [-2, 2)$, $R_c = 2$
   (g) $I_c = [-1, 1]$, $R_c = 1$
   (h) $I_c = [-1, 1]$, $R_c = 1$
   (i) $I_c = (-\infty, +\infty)$, $R_c = +\infty$
   (j) $I_c = (0, 2]$, $R_c = 1$
   (k) $I_c = [-4, 0)$, $R_c = 2$
   (l) $I_c = [-6, -4]$, $R_c = 1$
   (m) $I_c = \left(-\frac{1}{2}, \frac{1}{2},\right)$, $R_c = \frac{1}{2}$
   (n) $I_c = \{2\}$, $R_c = 0$
   (o) $I_c = (-\infty, +\infty)$, $R_c = +\infty$

2. VFVVVVV

3. (a) $D(f) = (1, 3)$
   (b) 2
   (c) $f'(x) = \displaystyle\sum_{n=1}^{+\infty} n(-1)^n(x-2)^{n-1}$
   (d) $D(f') = (1, 3)$

4. (a) $e^{-x} = \displaystyle\sum_{n=0}^{+\infty} (-1)^n \frac{x^n}{n!}$
   (b) $\ln(1+x) = \displaystyle\sum_{n=1}^{+\infty} (-1)^{n-1} \frac{x^n}{n}$
   (c) $\text{arctan}x = \displaystyle\sum_{n=0}^{+\infty} (-1)^n \frac{x^{2n+1}}{2n+1}$

5. (a) $\displaystyle\sum_{n=0}^{+\infty} (-1)^n (x-1)^n$
   (b) $\displaystyle\sum_{n=1}^{+\infty} (-1)^{n-1} \frac{(x-1)^n}{n}$
   (c) $2 + \dfrac{1}{4}x + 2\displaystyle\sum_{n=2}^{+\infty} \frac{(-1)^{n-1}1.3.5...(2n-3)(x-4)^n}{2.4.6...(2n)4^n}$
   (d) $\displaystyle\sum_{n=1}^{+\infty} (-1)^{n+1} \frac{x^{2n-1}}{(2n)!}$
   (e) $\dfrac{1}{2}\displaystyle\sum_{n=1}^{+\infty} (-1)^{n-1} \frac{(2x)^{2n}}{(2n)!}$
   (f) $\displaystyle\sum_{n=0}^{+\infty} \frac{(\ln 2)^n}{n!} x^n$

6. (a) $\displaystyle\sum_{n=0}^{+\infty} (-1)^n \frac{x^{2n+1}}{n!(2n+1)}$
   (b) $\displaystyle\sum_{n=1}^{+\infty} \frac{(-1)^{n+1}x^{2n-1}}{(2n-1)(2n)!}$
   (c) $\displaystyle\sum_{n=0}^{+\infty} \frac{(-1)^n x^{2n+1}}{4^{n+1}(2n+1)}$
   (d) $\displaystyle\sum_{n=1}^{+\infty} \frac{(-1)^{n-1}x^{n+1}}{n(n+1)}$

7. Multiplique a série de e^x por x.

8. Substitua x por x^3 na série da função $\dfrac{1}{1-x}$ e derive.

9.

(a) $y = ct + e^t$

(b) $y = \text{sen}t + ct$

(c) $y = ce^{-3t} + \frac{t}{3} - \frac{1}{9} + e^{-2t}$

(d) $y = \frac{c - t\cos t + \text{sen}\, t}{t^2}$

(e) $y = ce^{-t/2} + 3t^2 - 12t + 24$

10. (a) $y = 3e^t + 2(t-1)e^{2t}$

(b) $y = \dfrac{3t^4 - 4t^3 + 6t^2 + 1}{12t^2}$

(c) $y = \dfrac{(\pi^2/4) - 1 - t\cos t + \text{sen}t}{t^2}$

11. (a) $3y^2 - 2\ln|1 + x^3| = c$

(b) $y^{-1} + \cos x = c$

(c) $2\tan 2y - 2x - \text{sen}2x = c$

(d) $y^2 - x^2 + 2(e^y - e^{-x}) = c$

(e) $\tan y = c(1 - e^x)^3$

12. (a) $y = [2(1-x)e^x - 1]^{1/2}$

(b) $y = [3 - 2\sqrt{1+x^2}]^{-1/2}$

(c) $y = -\dfrac{3}{4} + \dfrac{1}{4}\sqrt{65 - 8e^x - 8e^{-x}}$

(d) $y = \dfrac{\pi - \text{arcsen}(3\cos^2 x)}{3}$

13. (a) $ct^2y^2 + ty^2 - 1 = 0$

(b) $y^2 = (2t + c)\cos^2 t$

(c) $x^2 = \dfrac{1}{y + cy^2}$

(d) $y^{1/2} = c(x-2)^{-1/2} + (x-2)^2$