



MTM3100 - Pré-cálculo

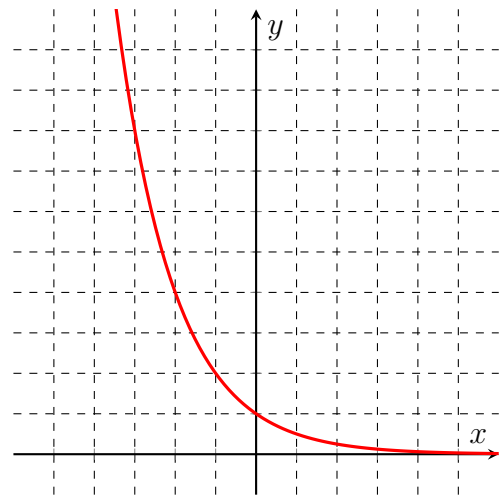
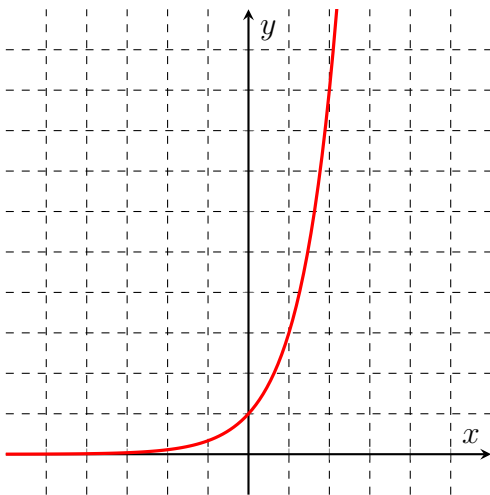
Gabarito Parcial da 12ª lista de exercícios

1. $f(1) = 5, f(2) = 25, f(3) = 125, f(0) = 1, f(-1) = \frac{1}{5}, f(-3) = \frac{1}{125}, f(1/2) = 5^{1/2}\sqrt{5}$ e $f(-3/5) = 5^{-3/5} = \frac{1}{\sqrt[5]{125}}$.

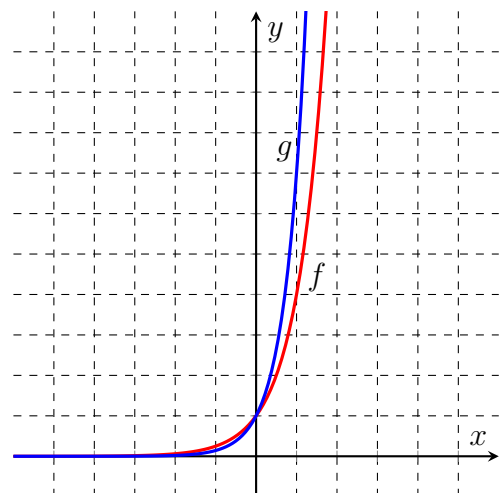
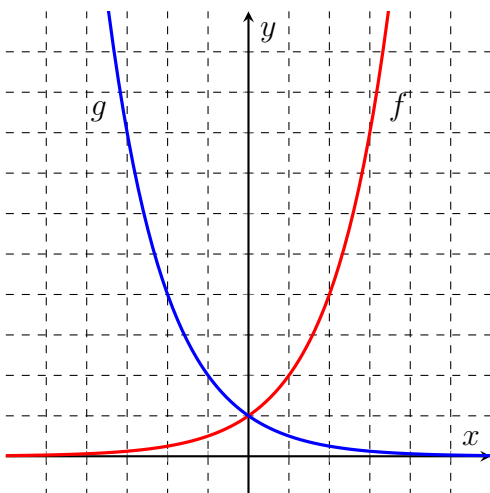
2. $f(\pi) \cong 31,54, f(\sqrt{2}) \cong 4,73, f(34/439) \cong 1,09$ e $f(-33/8) \cong 0,01$.

3. (a) (III). (b) (I). (c) (II). (d) (IV).

4. (a) (b)



5. (a) (b)

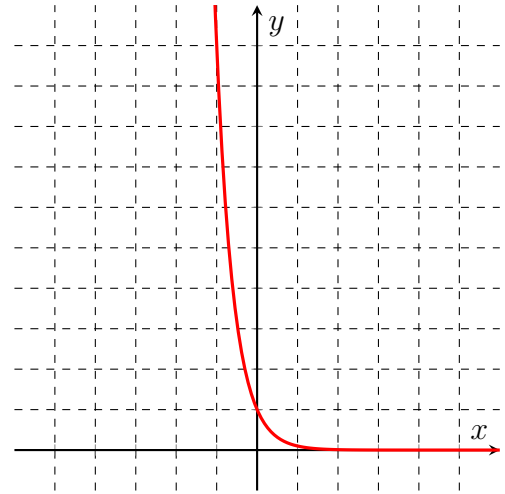
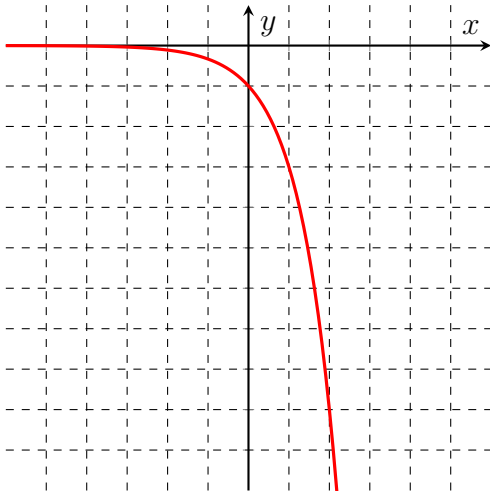


6. (a) $f(x) = 3^x$.

(b) $f(x) = \left(\frac{1}{4}\right)^x$.

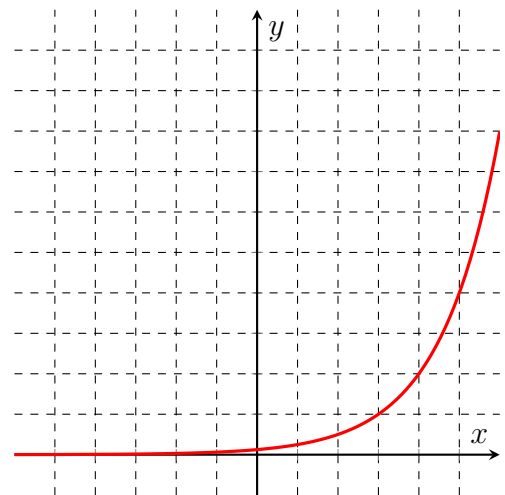
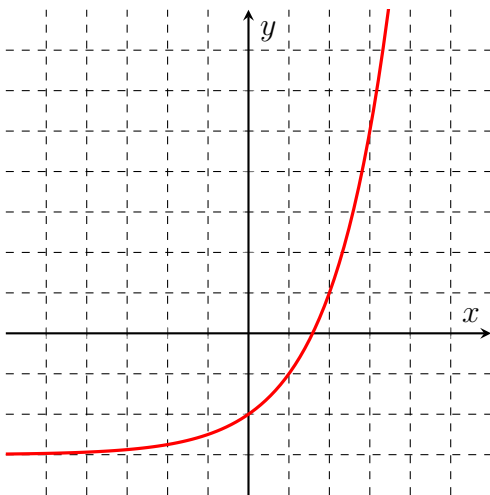
7. (a)

(b)



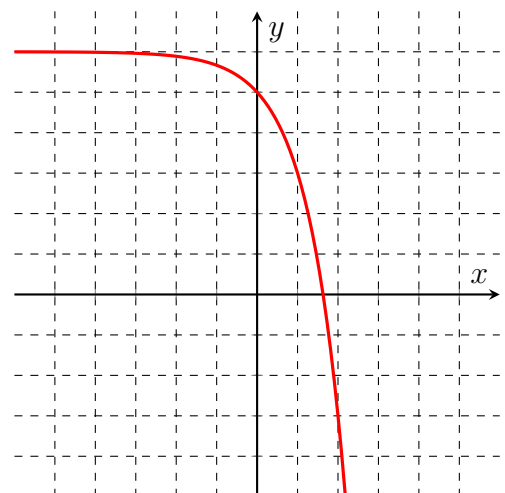
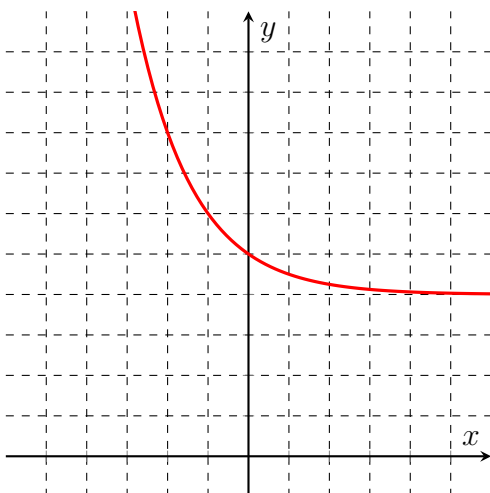
(c)

(d)



(e)

(f)



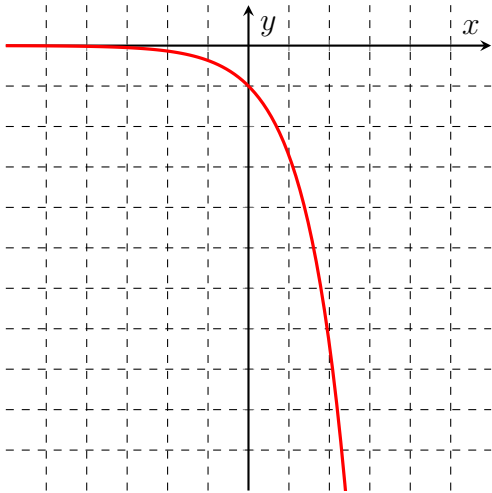
8. (a) $N(t) = 1500 \cdot 2^t$.

(b) $N(24) = 1500 \cdot 2^{24} = 25.165.824.000$.

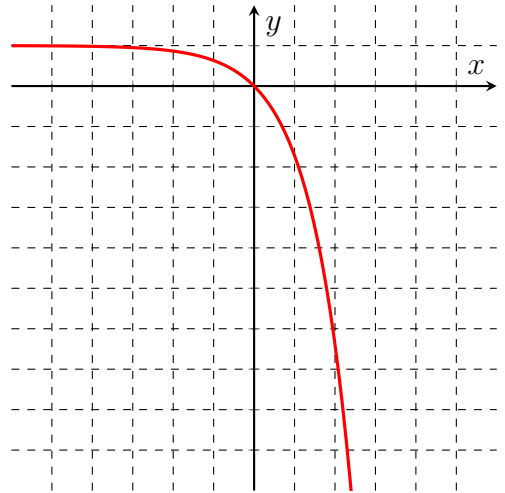
9. $4 \text{ cm} \times 1.100.000 \text{ km}$.

10. $f(3) = 20,086$, $f(0,23) = 1,259$, $f(-2) = 0,135$ e $f(1) = 2,718$.

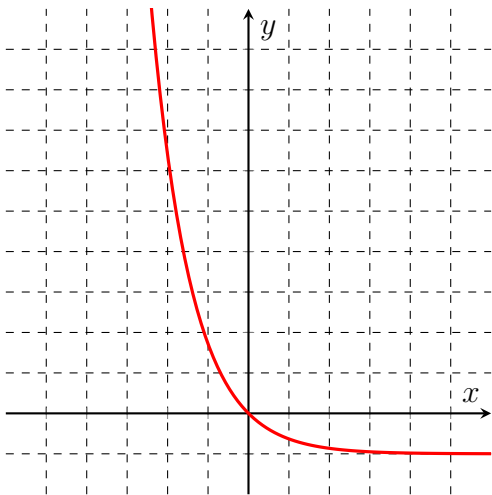
11. (a)



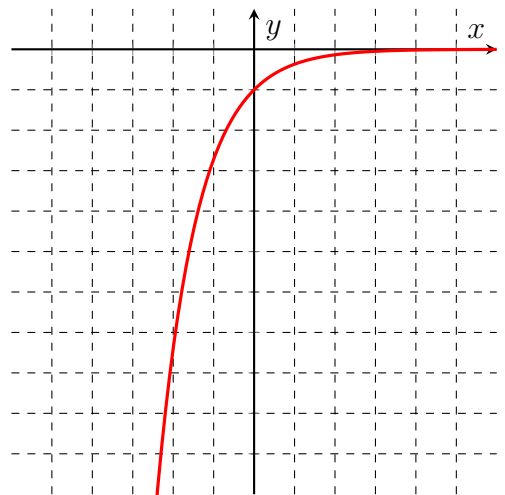
(b)



(c)



(d)



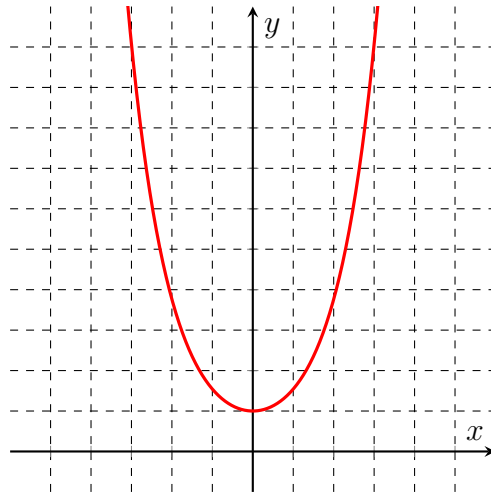
12. $D(3) = 50e^{-0,2 \cdot 3} \cong 27,44 \text{ mg}$.

13. (a) $\cosh 0 = 1$, $\cosh 1 = \frac{e + e^{-1}}{2} \cong 1,543$ e $\cosh(-2) = \frac{e^{-2} + e^2}{2} \cong 3,762$.

(b) \mathbb{R}

(c)

(d)

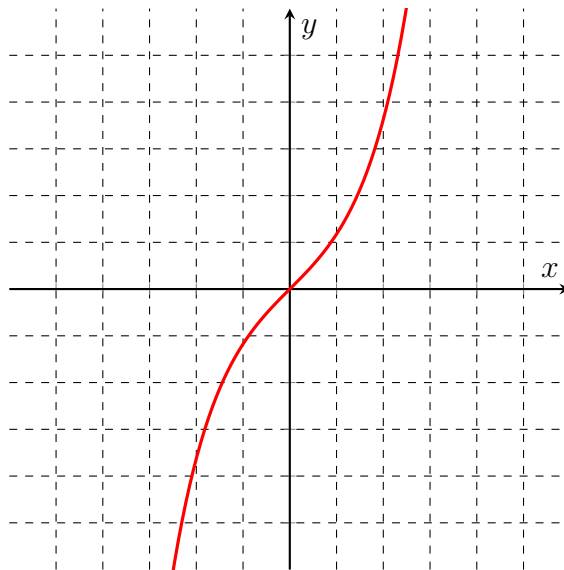


14. (a) $\sinh 0 = 0$, $\sinh 1 = \frac{e - e^{-1}}{2} \cong 1,175$ e $\sinh(-2) = \frac{e^{-2} - e^2}{2} \cong -3,627$.

(b) \mathbb{R}

(c)

(d)



15. (a) $\log_5 125 = 3$. (b) (c) $\log 1000 = 3$. (d) $\log_{81} 9 = \frac{1}{2}$.

(e) (f) $\log_2 \frac{1}{8} = -3$. (g) $\log_4 0,125 = -\frac{3}{2}$. (h)

(i) $\ln y = 3$. (j) (k) $\ln t = 0,5x$.

16. (a) $5^2 = 25$. (b) $5^0 = 1$. (c) $10^{-1} = 0,1$. (d)

(e) $8^{1/3} = 2$. (f) (g) $3^4 = 81$. (h)

(i) $e^x = 5$. (j) (k) $e^2 = x + 1$. (l) $e^4 = x - 1$.

17. (a) $\log_3 3 = 1$. (b) $\log_3 1 = 0$. (c) (d) $\log_6 36 = 2$.
 (e) (f) $\log_3 \frac{1}{27} = -3$. (g) $\log \sqrt{10} = \frac{1}{2}$. (h)
 (i) $\log_{49} 7 = \frac{1}{2}$. (j) $\log_9 \sqrt{3} = \frac{1}{4}$. (k) (l) $3^{\log_3 8} = 8$.
 (m) $e^{\ln \sqrt{5}} = \sqrt{5}$. (n) (o) $\ln e^4 = 4$. (p) $\ln \frac{1}{e} = -1$.
18. (a) $x = 32$. (b) $x = 4$. (c) (d) $x = -1$.
 (e) (f) $x = 10^{-2/3} = \frac{1}{\sqrt[3]{100}}$. (g) $x = e^3$. (h)
 (i) $x = 36$. (j) (k) $x = 27$. (l) $x = -\frac{1}{27}$.
19. (a) $\log 2 = 0,3010$. (b) (c) $\log \sqrt{2} = 0,1505$.
 (d) (e) (f) $\ln(1 + \sqrt{3}) = 1,0051$.
20. (a) F. (b) F.
 (c) V. (d) V.
 (e) F. (f) F.
 (g) F. (h) V.
 (i) F. (j) V.
21. (a) $\frac{3}{2}$. (b)
 (c) (d) $-\frac{3}{2}$.
 (e) 3. (f) 2.
22. (a) $\log_2(2x) = 1 + \log_2 x$.
 (b) $\log_3(5y) = \log_3 5 + \log_3 y$.
 (c) $\log_2(x(x-1)) = \log_2 x + \log_2(x-1)$.
 (d)
 (e) $\log_2(AB^2) = \log_2 A + 2 \log_2 |B|$.
 (f)
 (g) $\log_2(xy)^{10} = 10 \log_2 |x| + 10 \log_2 |y|$.
 (h)
 (i) $\ln \sqrt[3]{3r^2s} = \frac{1}{3} \ln 3 + \frac{2}{3} \ln |r| + \frac{1}{3} \ln s$.
 (j)
 (k) $\log \sqrt{\frac{x^2 + 4}{(x^2 + 1)(x^3 - 7)^2}} = \frac{1}{2} \log(x^2 + 4) - \frac{1}{2} \log(x^2 + 1) - \log |x^3 - 7|$.
 (l) $\ln \left(\frac{e^x}{x(x^2 + 1)(x^4 + 2)} \right)^3 = 3x - 3 \ln x - 3 \ln(x^2 + 1) - 3 \ln(x^4 + 2)$.

23. (a) $\log_3 5 + 5 \log_3 2 = \log_3 160$.

(b)

(c) $\log_2 A + \log_2 B - 2 \log_2 C = \log_2 \left(\frac{AB}{C^2} \right)$.

(d)

(e) $4 \log x - \frac{1}{3} \log(x^2 + 1) + 2 \log(x - 1) = \log \left(\frac{x^4(x - 1)^2}{\sqrt[3]{x^2 + 1}} \right)$.

(f) $\ln(a + b) + \ln(a - b) - 2 \ln c = \ln \left(\frac{a^2 - b^2}{c^2} \right)$.

24. (a) 2,3219.

(b) 0,4307.

(c)

(d) -3,4770.

25. (a) (III).

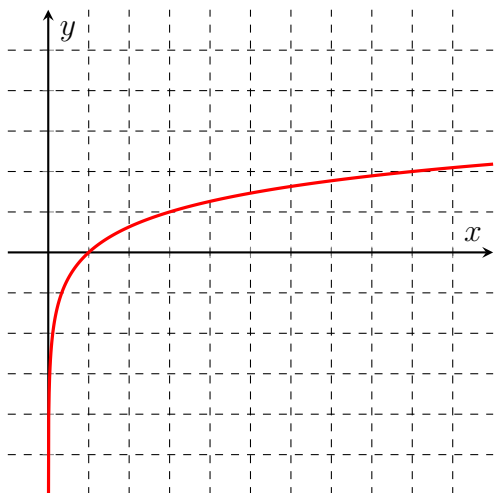
(b) (II).

(c) (I).

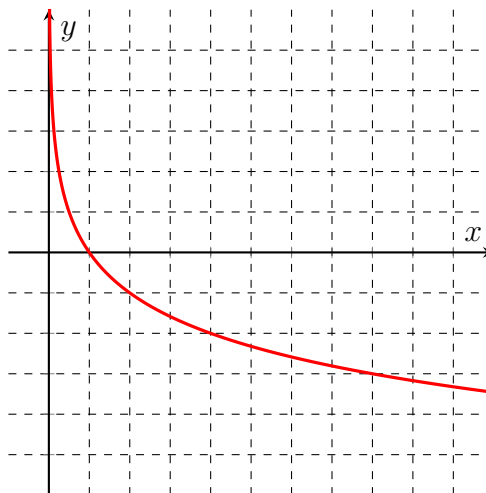
(d) (IV).

(e) (V).

26. (a)



(b)



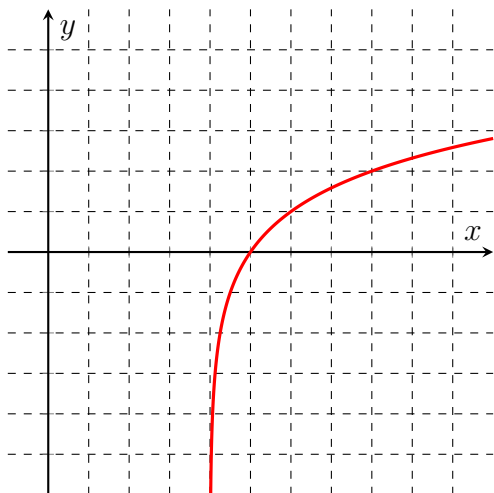
27. (a) $f(x) = \log_5 x$.

(c)

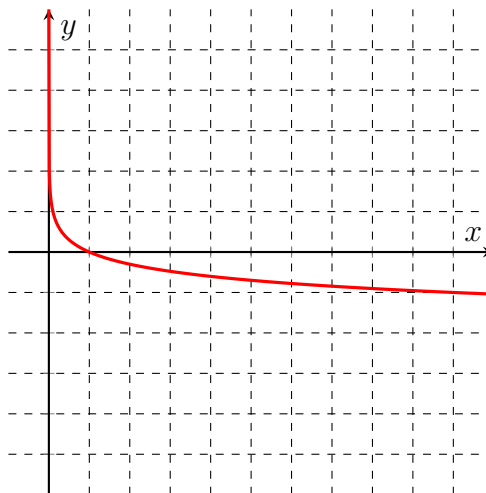
(b) $f(x) = \log_{1/2} x$.

(d) $f(x) = \log_9 x$.

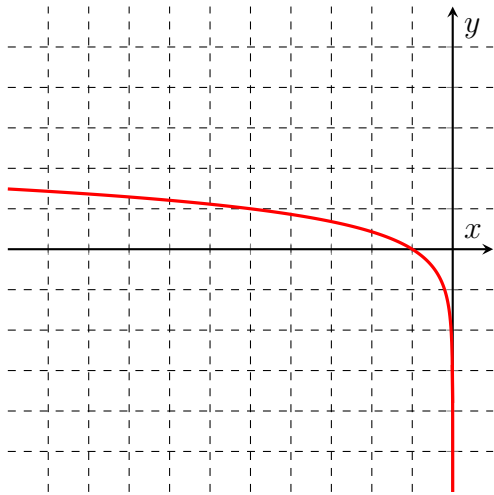
28. (a)



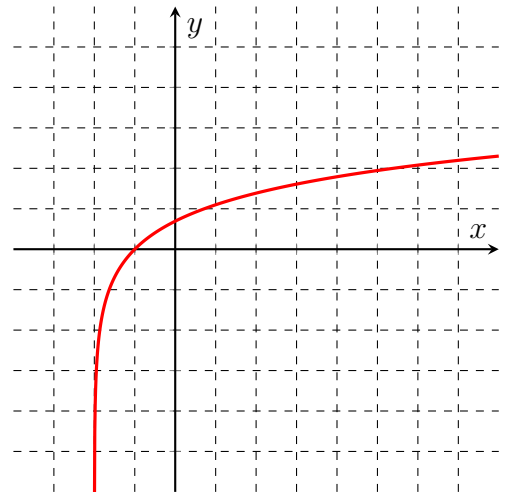
(b)



(c)



(d)



29. (a) $\text{Dom}(f) = (-3, \infty)$.

(c) $\text{Dom}(f) = (0, 2)$.

(b) $\text{Dom}(f) = (-\infty, -1) \cup (1, \infty)$.

(d) $\text{Dom}(f) = (3, 4) \cup (4, \infty)$.

30. $A = -8267 \ln \left(\frac{0,73D_0}{D_0} \right) \cong 2602$ anos.