teste 12

1) a) $x^2 - 9 > 0 \Leftrightarrow x^2 > 9 \Leftrightarrow x > 3$

$D_f =]3, +\infty[$

b) $2x - 6 > 0 \Leftrightarrow 2x > 6 \Leftrightarrow x > \frac{6}{2} \Leftrightarrow x > 3$

$D_g =]3, +\infty[$

2) a) $\lim_{x \to 2} \frac{x^2 - 4}{x^2 - 5x + 6} = \frac{\cancel{(x-2)}(x+2)}{\cancel{(x-2)}(x-3)} =$

$= \frac{(x+2)}{(x-3)} = \frac{2+2}{2-3} = \frac{4}{-1} = -4$

b) $\lim_{x \to +\infty} \frac{4x^3 - 2x + 1}{2x^3 + x^2 - 3} = \frac{4 - \frac{2}{x^2} + \frac{1}{x^3}}{2 + \frac{1}{x} - \frac{3}{x^3}} = \frac{4}{2} = 2$

$(/x^3)$

c) $\lim_{x \to 0} \frac{\sqrt{1+x} - 1}{x} \Leftrightarrow \frac{\sqrt{1+x}}{x} - 1 \Leftrightarrow \frac{0}{0} - 1 \Leftrightarrow 1$

3) $f(2) = \frac{x^2 - 4}{x - 2} = \frac{\cancel{(x-2)}(x+2)}{\cancel{x-2}} = x + 2 = 2 + 2 = 4$

$k = 4$

4) $f(0) = x^3 - 3x + 1 = (0)^3 - 3(0) + 1 = 1$

$f(1) = x^3 - 3x + 1 = (1)^3 - 3(1) + 1 = 1 - 3 + 1 = -1$

$f(0) = 1 > 0$

$f(1) = -1 < 0$

5) $x + 1 > 0 \Leftrightarrow x > 1$

$f(1^+) = \frac{2x^2 + 3x - 2}{x+1} = \frac{2(1^+)^2 + 3(1) - 2}{1+1} = \frac{2+3-2}{0^+} =$

$\frac{3}{0^+} = +\infty$

$f(1^-) = \frac{2x^2 + 3x - 2}{x+1} = \frac{2(1^-)^2 + 3(1^-) - 2}{1^- + 1} = \frac{3}{0^-} = -\infty$

$m = \frac{2x^2+3x-2}{x(x+1)} = \frac{2x^2+3x-2}{x^2+x} = \quad (/x^2)$

$= \frac{2 + \frac{3}{x} - \frac{2}{x^2}}{1 + \frac{1}{x}} = \frac{2}{1} = 2$

$b = \frac{2x^2+3x-2}{x-1} - 2x = \frac{2x^2+3x-2-2x(x-1)}{x-1}$

$= \frac{\cancel{2x^2} + 3x - 2 - \cancel{2x^2} - 2x}{x-1} =$

$= \frac{3x - 2 - 2x}{x-1} = \frac{x-2}{x-1} = \frac{x}{x} - \frac{2}{1} = -2$

Assimtota Vertical = 1

Assimtota horizontal = Não tem $\frac{\text{grau } 2}{\text{grau } 1}$

Assimtota Obliqua = -2

6) a) $4(3x^2 - 2x + 1)^3 \cdot (6x - 2)$

b) $\frac{x^2 - 6x - 1}{(x-3)^2}$

c) $e^{2x}\left(2\ln(x) + \frac{1}{x}\right)$

7)

$f(1) = x^3 - 2x = (1)^3 - 2(1) = -1$

$f'(1) = 3x^2 - 2 = 3(1)^2 - 2 = 3 - 2 = 1$

$y = x + (-1 - 1)$

$y = x - 2$

8) a) $\int 4x^3 - 6x + 2 \, dx = \frac{4x^4}{4} - \frac{6x^2}{2} + 2x + C, C \in \mathbb{R}$

b) $\int \frac{2x}{x^2+3} \, dx \Leftrightarrow \ln(x^2+3) + C, C \in \mathbb{R}$

c) $\int x \cdot e^{2x} \, dx \Leftrightarrow x \cdot e^{2x} - \int e^{2x} \Leftrightarrow x \cdot e^{2x} - e^{2x} + C, C \in \mathbb{R}$

d) $\int \ln(x) \, dx = x\ln(x) - \int x \cdot \frac{1}{x} \, dx = x\ln(x) - x + C, C \in$

9) a) $\int_1^3 x^2 - 2x + 1 \, dx = \left[\frac{x^3}{3} - \frac{2x^2}{2} + x\right]_1^3 =$

$= \frac{3^3}{3} - \frac{2(3)^2}{2} + 3 - \frac{1^3}{3} + \frac{2(1)^2}{2} + 1 = 3 - 9 + 3 - \frac{1}{3} - 1 + 1$

$= -3 - \frac{1}{3} = -\frac{9}{3} - \frac{1}{3} = -\frac{8}{3}$

5) $\cancel{\quad}$

$\int_1^e \frac{2}{x} = [2\ln(x)]_1^e = 2(\ln(e)) - 2(\ln(1)) = 2(1) - 2(0) = 2$

10) $F(x) = 6x - 4 + C =$

$F(1) = 6(1) - 4 + 0 = 2$

11)

12)

$f(1) = x^2 = 1^2 = 1$

$g(1) = 2x = 2 \cdot 1 = 2$

$A = \int 2x - x^2 \, dx = \frac{2x^2}{2} - \frac{x^3}{3} + c, \; c \in \mathbb{R}$