teste 11

1) $x^2 - 4 > 0 \Leftrightarrow x^2 > 4 \Leftrightarrow x > 2$

$D_f =]2, +\infty[$

2) $3 - x \geq 0 \Leftrightarrow -x \geq -3 \Leftrightarrow x \leq 3$

$x^2 - 4x + 3 = (x-1)(x-3)$

$x \neq 1$

$x \neq 3$

$D_g =]-\infty, 1[\cup]1, 3[\cup]3, +\infty[$

2) a) $\lim\limits_{x \to 2} = \dfrac{x^2 - 4}{x^2 - 3x + 2} \overset{\frac{0}{0}}{=} \dfrac{\cancel{(x-2)}(x+2)}{(x-1)\cancel{(x-2)}} = \dfrac{(x+2)}{(x-1)} = \dfrac{2+2}{2-1} = \dfrac{4}{1} = 4$

b) $\lim\limits_{x \to +\infty} = \dfrac{4x^2 + 3x - 1}{2x^2 - x + 5} = \dfrac{4 + \frac{3}{x} - \frac{1}{x^2}}{2 - \frac{1}{x} + \frac{5}{x^2}} = \dfrac{4 + 0 - 0}{2 - 0 + 0} = \dfrac{4}{2} = 2$

$1/x^2$

c) $\lim\limits_{x \to 0^+} \dfrac{x^2 - 1}{x} = \dfrac{0^+ - 1}{0^+} \quad \dfrac{-1}{0^+} = +\infty$

3) $f(3) = \dfrac{x^2 - x - 6}{x - 3} = \dfrac{(x+2)\cancel{(x-3)}}{\cancel{x-3}} = x + 2 = 3 + 2 = 5$

$k = 5$

4) $f(1) = x^3 + 2x - 5 = (1)^3 + 2(1) - 5 = -2$

$f(2) = x^3 + 2x - 5 = (2)^3 + 2(2) - 5 = 8 + 4 - 5 = 7$

$f(1) = -2 < 0$

$f(2) = 7 > 0$

5) $x+1\neq 0 \Leftrightarrow x\neq -1$

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

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

$(/x^2)$

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

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

Assimptotas verticais = Não tem

Assimptotas ~~hor~~ horizontais = Não tem ~~...~~ $\frac{\text{Grau } 2^{\circ}}{\text{Grau } 1^{\circ}}$

Assimptotas obliquas = -1

6)

a) ~~f~~ $4(6x^2-5)^3$

b)

c)

7)

a) $f(1) = x^3-6x^2+9x+2 = (1)^3-6(1)^2+9(1)+2 = -6+9+2 = 5$

$f'(1) = 3x^2-12x+9 = 3(1)^2-12(1)+9 = 3-12+9 = 0$

$y = 0x+(5-0\times 1) = y=5$

b) $f'(x) = 3x^2 - 12x + 9 = 0$

$f'(1) = 0$

$f''(1) = 6x - 12 = 6(1) - 12 = 6 - 12 = -6$

$f(1) = x^3 - 6x^2 + 9x + 2 = (1)^3 - 6(1)^2 + 9(1) + 2 = 5$

$f''(1) = -6 < 0$ → massimo

c)

	$-\infty$	0		1			$+\infty$
$f(x)$		2		5			
$f'(x)$		-3	$\nearrow$	0			

8) a) $\int 5x^4 - 3x^2 + 2 \, dx = \frac{5x^5}{5} - \frac{3x^3}{3} + 2x + c, \, c \in \mathbb{R}$

b) $\int \frac{4x}{x^2+3} = \ln(x^2+3) + c, \, c \in \mathbb{R}$

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

d) $\int \ln(x) \, dx = \frac{1}{x} + c, \, c \in \mathbb{R}$

9)

10) a) $\int_0^2 x^2 + 1 \, dx = \left[\frac{x^2}{2} + x\right]_0^2 = \frac{2^2}{2} + 2 - \frac{0^2}{2} + 0 =$

$2 + 2 = 4$

b) $\int_1^e \frac{1}{x} =$