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

$x < -3$

$D_f =]-\infty, -3[\cup]3, +\infty[$

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

$x + 1 \geq 0 \Leftrightarrow x \geq -1$

$D_g = [-1, \frac{3}{2}[\cup]\frac{3}{2}, +\infty[$

2a) $\frac{x^2 - 9}{x^2 - 5x + 6} = \frac{\cancel{(x-3)}(x+3)}{\cancel{(x-3)}(x-2)} = \frac{x+3}{x-2} = \frac{3+3}{3-2} = 6$

b) $\frac{3x^3 - 2x + 1}{6x^3 + x^2 - 4} \underset{(/x^3)}{=} \frac{3 - \frac{2}{x^2} + \frac{1}{x^3}}{6 + \frac{1}{x} - \frac{4}{x^4}} = \frac{3}{6} = \frac{1}{2}$

c) $\frac{\sqrt{1+x} - 1}{x} =$

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

$K = 4$

4)

$h(0) = x^3 - 3x + 1 = 0^3 - 3(0) + 1 = 1$

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

$h(0) = 1 > 0$
$h(1) = -1 < 0$

5) $x + 2 > 0 \Leftrightarrow x > -2$ $\quad D_f:]-\infty, -2[\cup]-2, +\infty[$

$f(2^+) = \frac{2x^2 + x - 1}{x + 2} = \frac{2(2^+)^2 + 2^+ - 1}{2 + 2} = \frac{8 + 2 - 1}{0^+} = \frac{9}{0^+} = +\infty$

$$f(2^-) = \frac{2x^2+x-1}{x+2} = \frac{2(2^-)^2+2^+-1}{2+2} = \frac{8+2-1}{0^-} = \frac{9}{0^-} = -\infty$$

$$m = \lim_{x \to +\infty} \frac{2x^2+x-1}{x^2+2} = \underset{(/x^2)}{=} \frac{2+\frac{1}{x}-\frac{1}{x^2}}{\frac{1}{x}+\frac{2}{x^2}} = \frac{2+0-0}{0} = 2$$

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

$$= \frac{5x-1}{x+2} \underset{(/x)}{=} \frac{5-\frac{1}{x}}{\frac{1}{x}+\frac{2}{x}} = \frac{5-0}{0+0} = 5$$

$$y = 2x - (2 - 2(2)) = 2x - (2-4) = 2x+2$$

AV = 2

AH = Não tem $\frac{\text{grau } 2^{\circ}}{\text{grau } 1^{\circ}}$

AO = $2x+2$

6a) $$f'(x) = \frac{3x(x^2-2) - 2x(3x+1)}{(x^2-2)^2} = \frac{3x^2-6-5x+2}{x^4-4}$$

b) $g'(x) = \ln(x^3+2x-1)$

c) $h'(x) = -\sin(x) \cdot e^{2x} + \cos(x) \times 2e^{2x}$

7 a) $\int 4x^3 - 6x + 5\,dx = \frac{4x^4}{4} - \frac{6x^2}{2} + 5x + c, c \in \mathbb{R}$

b) $\int \frac{6x^2}{x^3+4}\,dx = 2\ln(x^3+4) + c, c \in \mathbb{R}$

c) $\int x.\cos(x)\,dx = x.\sin(x) - \int \sin(x) = x.\sin(x) - \cos(x)$

$x.\sin(x) - \cos(x) + c, c \in \mathbb{R}$

8) $\int x^2 + 2x - 1\,dx = \left[\frac{x^3}{3} + \frac{2x^2}{2} - x\right]_{-1}^{2} =$

$\frac{2^3}{3} + \frac{2(2)^2}{2} - 2 - \frac{(-1)^3}{3} + \frac{2(-1)^2}{2} + 1 = \underset{(\times 2)}{\frac{8}{3}} - \underset{(\times 3)}{\frac{8}{2}} - \underset{(\times 6)}{\frac{2}{1}} - \underset{(\times 2)}{\frac{-1}{3}} + \underset{(\times 3)}{\frac{1}{2}} + \underset{(\times 6)}{\frac{1}{1}}$

$\frac{16}{6} - \frac{24}{6} - \frac{12}{6} - \frac{-2}{6} + \frac{3}{6} + \frac{6}{6} = \underset{(/3)}{\frac{-9}{6}} = \frac{-3}{2}$

9)

$F(1) = \underset{(/3)}{\frac{6x^3}{3}} - \underset{(/2)}{\frac{4x^2}{2}} + c = 2x^3 - 2x^2 + c = 3, c=3$

10) $x^2 = 3^2 = 9$

$2x + 3 = 9$

$A = \int_{-1}^{3} x^2 - (2x+3) = \left[\frac{x^3}{3} - \left(\frac{2x^2}{2} + 3x\right)\right]_{-1}^{3} =$

$A = \frac{3^3}{3} - \left(\frac{2(3)^2}{2} + 3(3)\right) - \frac{-1^3}{3} - \left(\frac{2(-1)^2}{2} + 3(-1)\right) =$

$A = \frac{27}{3} - \left(\frac{18}{2} + \underset{(\times 2)}{\frac{9}{1}}\right) - \frac{-1}{3} - \left(\frac{2}{2} - \underset{(\times 2)}{\frac{3}{1}}\right) =$

$$A = \frac{27}{3} - \left(\frac{18}{2} + \frac{18}{2}\right) - \frac{-1}{3} - \left(\frac{2}{2} - \frac{6}{2}\right) =$$

$$A = \underset{(\times 2)}{\frac{27}{3}} - \underset{(\times 3)}{\frac{36}{2}} - \underset{(\times 2)}{\frac{-1}{3}} + \underset{(\times 3)}{\frac{4}{2}} =$$

$$A = \frac{54}{6} - \frac{108}{6} - \frac{-2}{6} + \frac{12}{6} = -\frac{40}{6}$$

$$A = -\frac{40}{6}$$