Prova 2

1 $y = \sec(2x)$

$$\boxed{y' = \sec(2x) \cdot \operatorname{tg}(2x) \cdot 2}$$

2 $y = \operatorname{sen}(1 - x)$

$$y' = \cos(1-x) \cdot -1$$

$$\boxed{y' = -\cos(1-x)}$$

3 $y = x - \cancel{\operatorname{arcsen}}(\cancel{\operatorname{sen}}(x)) + x$

$$y = 2x - x$$

$$\boxed{y' = 1}$$

4 $y = 1 + x \cdot \operatorname{sen}(\cos(x))$

$$y' = 1 \cdot \operatorname{sen}(\cos(x)) + x \cdot \cos(\cos(x)) \cdot -\operatorname{sen}(x)$$

$$\boxed{y' = \operatorname{sen}(\cos(x)) - x \cdot \cos(\cos(x)) \cdot \operatorname{sen}(x)}$$

5 $y = \operatorname{arcsen}(e^x) - \ln(\cos(x))$

$$y' = \frac{1}{\sqrt{1 - (e^x)^2}} \cdot e^x - \frac{1}{\cos(x)} (-\operatorname{sen}(x))$$

$$\boxed{y' = \frac{e^x}{\sqrt{1 - e^{2x}}} + \frac{\operatorname{sen}(x)}{\cos(x)}}$$

6 $y = \cancel{\sec}(\cancel{\operatorname{arcsec}}(x^2)) - \dfrac{3x^2}{x}$

$$y = x^2 - \frac{3x^2}{x}$$

$$y' = 2x - \left(\frac{6x \cdot x - 3x^2 \cdot 1}{x^2} \right)$$

$$y' = 2x - \frac{3x^2}{x^2}$$

$$y'(2) = 2 \cdot 2 - \frac{3 \cdot \cancel{2^2}}{\cancel{2^2}}$$

$$\boxed{y'(2) = 1}$$

7 $y = 2e^{4x^2 - 5x}$

$$y' = 2e^{4x^2 - 5x} \cdot (4 \cdot 2x - 5)$$

$$y'(0) = 2e^{4 \cdot 0^2 - 5 \cdot 0} \cdot (8 \cdot 0 - 5)$$

$$y'(0) = 2(0 - 5)$$

$$\boxed{y'(0) = -10}$$

8 $y = x^{\ln(x)}$

$$y = e^{\ln(x)^{\ln(x)}}$$

$$y = e^{\ln(x) \cdot \ln(x)}$$

$$y' = e^{\ln(x) \cdot \ln(x)} \cdot (\ln(x) \cdot \ln(x))'$$

$$y' = x^{\ln(x)} \cdot \left(\frac{1}{x} \cdot \ln x + \ln(x) \cdot \frac{1}{x} \right)$$

$$y' = x^{\ln(x)} \left(2 \frac{\ln(x)}{x} \right)$$

$$y' = e^{\ln(e)} \cdot 2 \left(\frac{\ln(e)}{e} \right)$$

$$y' = \cancel{e} \cdot 2 \cdot \frac{1}{\cancel{e}}$$

$$\boxed{y' = 2}$$

9 $x^2 \cdot y^2 + \cos(x) - 2y^4 = x^3 - x + 1$

$$\frac{d}{dx}\left(x^2 \cdot y^2 + \cos(x) - 2y^4 \right) = \frac{d}{dx}\left(x^3 - x + 1 \right)$$

$$2x \cdot y^2 + x^2 \cdot 2y \cdot y' - \operatorname{sen}(x) - 8y^3 \cdot y' = 3x^2 - 1$$

$$x^2 \cdot 2y \cdot y' - 8y^3 \cdot y' = 3x^2 - 1 - 2x \cdot y^2 + \operatorname{sen}(x)$$

$$y'(x^2 \cdot 2y - 8y^3) = 3x^2 - 1 - 2xy^2 + \operatorname{sen}(x)$$

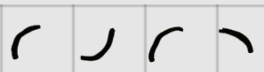
$$\boxed{y' = \frac{3x^2 - 1 - 2xy^2 + \operatorname{sen}(x)}{2x^2 \cdot y - 8y^3}}$$

10

$$\lim_{x \to 0} \frac{2 \cdot \operatorname{sen}(x) + \cos(5x) - e^x - 3x}{2 \cdot \operatorname{sen}(x) - x} \overset{L.H}{=}$$

$$\lim_{x \to 0} \frac{2 \cdot \cos(x) - \operatorname{sen}(5x) \cdot 5 - e^x - 3}{2 \cdot \cos(x) - 1} =$$

$$\frac{2 \cdot 1 - 0 - 1 - 3}{2 \cdot 1 - 1} = \boxed{-2}$$

11 

13

$$y = x + \frac{1}{x}$$

1°) Domínio $= \mathbb{R} - \{0\}$

2°) $\lim\limits_{x \to \pm\infty} x + \frac{1}{x} = \pm\infty$

$\lim\limits_{x \to 0^+} x + \frac{1}{x} = +\infty$

$\lim\limits_{x \to 0^-} x + \frac{1}{x} = -\infty$

3) $y' = 1 - x^{-2}$

$\boxed{y' = 1 - \frac{1}{x^2}}$

$0 = 1 - \frac{1}{x^2}$

$x^2 = \pm 1$

1ª ordem

$y'' = 2x^{-3}$

$\boxed{y'' = \frac{2}{x^3}}$

$0 = \frac{2}{x^3}$

$\nexists$

função ímpar

(inverte)

$y' = 1 - \frac{1}{x^2}$

	-1		0		1	
y'	+		−	−		+
y''	−		−	+		+

$y'(-2) = \frac{3}{4}$ | $y'(-\frac{1}{2}) = -4$ |

$y'' = \frac{2}{x^3}$

$x < 0 = -$

$x > 0 = +$

) Pontos

$y = x + \frac{1}{x}$

$(-1) = -2$

$(1) = 2$

14 Maior volume

(1) $V = 3 \cdot (a \cdot b \cdot 1)$

(2) $P = 20m$

$20 = 6b + 2a$

$10 = 3b + a$

$b = \frac{10 - a}{3}$

$b = \frac{10 - 5}{3}$

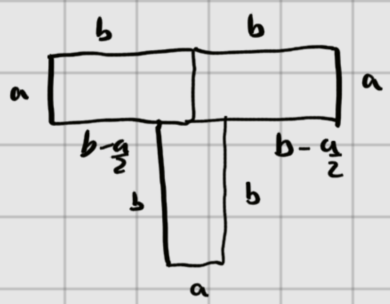
$\downarrow$

$b = \frac{5}{3}$

$V = 3 \cdot a \cdot b$

$V = \cancel{3} \cdot 5 \cdot \frac{5}{\cancel{3}}$

$\underline{V = 25m^3}$



$P = 4b + 3a + 2\left(b - \frac{a}{2}\right)$

$P = 4b + 3a + 2b - a$

$\boxed{P = 6b + 2a}$

$V = \cancel{3} \cdot a \cdot \frac{(10 - a)}{\cancel{3}}$

$V = 10a - a^2$

$\boxed{V' = 10 - 2a}$

$0 = 10 - 2a$

$2a = 10$

$a = 5$

$V(0) = 0$

$V(5) = 10 \cdot 5 - 5^2 = 25$

$V(10) = 10 \cdot 10 - 10^2 = 0$