

Correccion TE2 MAT1-A 23-24

Ex1 a) $f(x) = \frac{x + \ln(x)}{x+1}$

$$f'(x) = \frac{1+2x - x \ln(x)}{x(1+x)^2}$$

b) $g(t) = \arctan\left(\frac{1}{t}\right)$

$$g'(t) = -\frac{1}{1+t^2}$$

c) $h(u) = \frac{\sqrt{u^2+1} + u}{\sqrt{u^2+1} - u}$

$$h'(u) = \frac{2 + 4u^2 + 4u\sqrt{1+u^2}}{\sqrt{1+u^2}}$$

d) $\lambda(x) = x^2 e^{-x} \ln(x)$

$$\lambda'(x) = e^{-x} (x + 2x \ln(x) - x^2 \ln(x))$$

Ex2 a) $\lim_{x \rightarrow -1} \frac{\ln(2-x^2)}{x+1} = \frac{0}{0}$

B-H $\lim_{x \rightarrow -1} \frac{-2x}{2-x^2} = \frac{2}{1} = 2$

b) $\lim_{x \rightarrow 0} \frac{1 - (\cos(x))^3}{x \sin(x)} = \frac{0}{0}$

B-H $\lim_{x \rightarrow 0} \frac{3 \cos^2(x) \sin(x)}{\sin(x) + x \cos(x)} = \lim_{x \rightarrow 0} \frac{3 \cos^2(x) \frac{\sin(x)}{x}}{\frac{\sin(x)}{x} + \cos(x)} = \frac{3}{2}$

c) $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\sqrt{1+2\cos(x)} - 1}{2 - \frac{\pi}{2}} = \frac{0}{0}$

B-H $\lim_{x \rightarrow \frac{\pi}{2}} \frac{-2 \sin(x)}{2\sqrt{1+2\cos(x)}} = -1$

d) Vari Cor TE2 - MAT1-B

Ex3



$$V = \pi r^2 h$$

$$V = 24\pi \text{ cm}^3$$

$$P = 0,15 \pi r^2 + 0,05 \cdot 2 \pi r h$$

$$P = 10^{-2} (15 \pi r^2 + 10 \pi r h)$$

$$V = 24\pi = \pi r^2 h$$

$$h = \frac{24}{r^2} \quad r > 0$$

$$P = 5 \cdot 10^{-2} \pi \left(3r^2 + \frac{48}{r} \right)$$

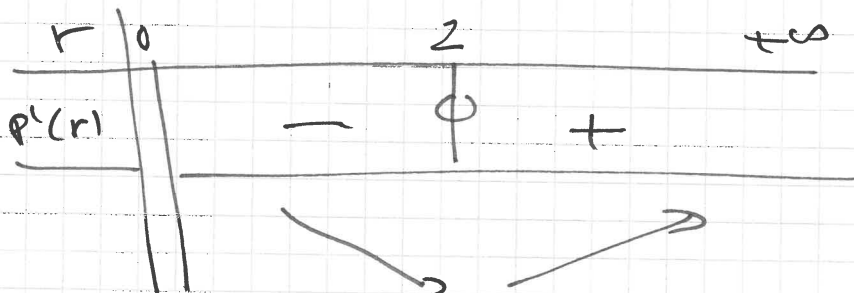
$$\begin{aligned} P'(r) &= 5 \cdot 10^{-2} \pi \left(6r - \frac{48}{r^2} \right) \\ &= \frac{5 \cdot 10^{-2} \pi (6r^3 - 48)}{r^2} \end{aligned}$$

$$P'(r) = 0$$

$$6r^3 - 48 = 0$$

$$r^3 = 8$$

$$\boxed{r = 2}$$



en $r = 2$ on a un minimum

$$h = \frac{24}{4} = 6$$

$$\boxed{h = 6}$$

Ex 4

a) $D(f) = \mathbb{R}$

b) $f'(x) = e^{-x} (x-3) (1-x)$

x	$-\infty$		1		3		$+\infty$
$f'(x)$		-		+		-	
BG							

c) $f''(x) = e^{-x} (x^2 - 6x + 7)$

$f''(x) = 0 \quad x_1 = 3 - \sqrt{2} \quad x_2 = 3 + \sqrt{2}$

x	$-\infty$		$3 - \sqrt{2}$		$3 + \sqrt{2}$		$+\infty$
$f''(x)$		+		-		+	
BG		U		∩		U	

pts d'inflexion aux pts d'extremes

$x_1 = 3 - \sqrt{2}$

$x_2 = 3 + \sqrt{2}$