

H03A 4

(1) Halla  $a, b$  para que sea deriv.

$$f(x) = \begin{cases} ax^3 & \text{si } x \leq 2 \\ x^2 + b & \text{si } x > 2 \end{cases}$$

→ Primero ver si es continua en  $x=2$

$$\lim_{x \rightarrow 2^+} x^2 + b = \lim_{x \rightarrow 2^-} ax^3$$

$$[4 + b = 8a]$$

→ ver cuando es deriv.

$$f'(x)_{x=2} = f'(x)_{x>2} \text{ en } x=2$$

$$[4 = 12a]$$

②

e.)  $f(x) = (x^2 + 1)^{(3/2)x} \Rightarrow y = (x^2 + 1)^{3/2x}$

$$\ln y = 3/2x \ln(x^2 + 1)$$

Deriv  $\hookrightarrow \frac{1}{y} y' = 3/2 \ln(x^2 + 1) + (3/2)x \cdot \frac{2x}{x^2 + 1}$

$$y' = y \left( (3/2) \ln(x^2 + 1) + (3/2)x \cdot \frac{2x}{x^2 + 1} \right)$$

3d)  $f(x) = \frac{x + e^{-x^2}}{\ln^2 x} = \frac{x + e^{-x^2}}{(\ln x)^2} \rightarrow f'(x) = \frac{-2x(1 + e^{-x^2})(\ln^2 x) + ((2 \ln x) \frac{1}{x})(x + e^{-x^2})}{(\ln x)^4}$

4c)  $(x^2 + y^2)^2 = 4x^2 y \rightarrow 2(x^2 + y^2)(2x + 2yy') = 8xy + 4x^2 y'$

$$4(x^2 + y^2)(x + yy') = 4(2xy + x^2 y')$$

~~$$y^2 + 2xy' = 2xy + x^2 y'$$~~

4d)  $x^3 + y^3 + 6xy = 0 \rightarrow 3x^2 + 3y^2 + 6y' = 0$

$(y^3 - 8/3)$



~~$$y^3 - 8/3 = 0$$~~

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5)  $\frac{dy}{dt} = 4000 - 0.0001 y^2$

Reason

$y = 2000$

a)  $\frac{dy}{dt} = 0$

b)  $\frac{dy}{dt} = 0$

$\frac{dy}{dt} = 4000 - 0.0001 y^2$

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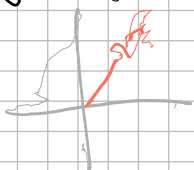
$\frac{dy}{dt} = 4000 - 0.0001 y^2$

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6)  $\frac{ds}{dt} = 1000 - 0.0001 s^2$

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7)  $\frac{dx}{dt} = x(1-x)$



$x = 1$

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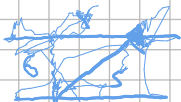
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8)  $\frac{dx}{dt} = x(1-x)$



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