

A1

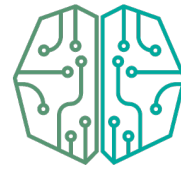
preguntas 90

(x) Acierto $\rightarrow$ 6 puntos

(y) Fallo $\rightarrow$ -2'5 puntos

(z) no contestar $\rightarrow$ -1'5 puntos

Aprobar $\rightarrow$ 210 puntos



C2 ACADEMIA
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$$\begin{cases} x + y + z = 90 \\ 6x - 2'5y - 1'5z = 210 \\ z + x = 2y \end{cases}$$

$$\begin{cases} x + y + z = 90 & E_1 \\ 6x - 2'5y - 1'5z = 210 & \rightsquigarrow E_2 = E_2 - 6E_1 \\ x - 2y + z = 0 & E_3 = E_3 - E_1 \end{cases}$$

$$x + y + z = 90 \quad (*_1)$$

$$-8'5y - 7'5z = -330 \rightsquigarrow -8'5(30) - 7'5(z) = -330 \quad (*)$$

$$-3y = -90 \rightsquigarrow y = 30$$

$$(*) \quad z = 10$$

$$(*_1) \quad x + y + z = 90 \rightarrow x = 90 - y - z \rightarrow x = 50$$

Tienes que contestar bien 50 preguntas

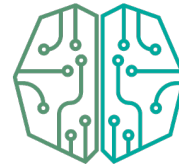
B1

$$\begin{cases} A + B \leq 120 \\ 100.000 A + 300.000 B \leq 15.000.000 \\ A \geq 0 \\ B \geq 0 \end{cases}$$

$$F(A, B) = 20.000 A + 40000 B$$

$$A = x \quad B = y$$

$$\begin{cases} x + y \leq 120 \rightarrow y \leq 120 - x & (1) \\ x + 3y \leq 150 \rightarrow y \leq \frac{150 - x}{3} & (2) \\ x \geq 0 \\ y \geq 0 \end{cases}$$



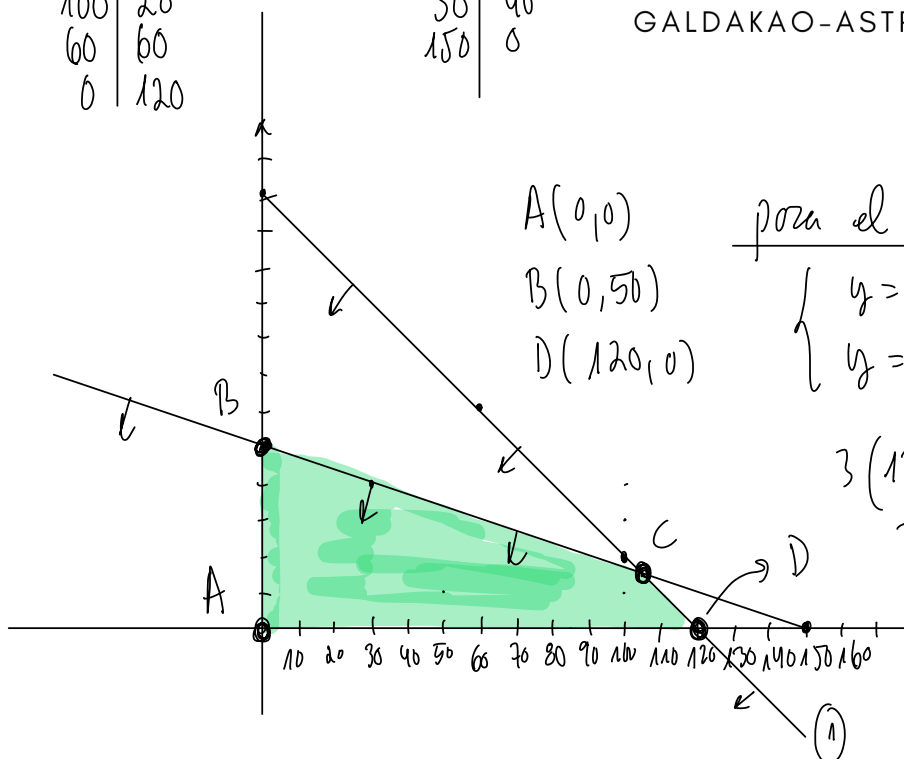
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(1)

x	y
100	20
60	60
0	120

(2)

x	y
30	40
150	0



$$\begin{aligned} A(0,0) \\ B(0,60) \\ D(120,0) \end{aligned}$$

para el punto C

$$\begin{cases} y = 120 - x \\ y = \frac{150 - x}{3} \end{cases}$$

$$3(120 - x) = 150 - x$$

$$360 - 3x = 150 - x$$

$$-2x = -210$$

$$x = 105$$

$$y = 15$$

$$C(105, 15)$$

$$F(0,0) = 0 \quad // \quad F(0,50) = 20000(0) + 40.000(50) = 2.000.000$$

$$F(120,0) = 20.000(120) + 40.000(0) = 2.400.000$$

$$F(105,15) = 20.000(105) + 40.000(15) = 2.700.000$$

A2

$$f(x) = \begin{cases} \frac{2x+1}{1-2x} & x < 0 \\ x^2 - x - a & x \geq 0 \end{cases}$$

Continuidad en $x=0$

$$\left. \begin{aligned} f(0) &= (0)^2 - (0) - a = -a \\ \lim_{x \rightarrow 0^-} \frac{2x+1}{1-2x} &= \frac{1}{1} = 1 \\ \lim_{x \rightarrow 0^+} x^2 - x - a &= -a \end{aligned} \right\} -a = 1 \rightarrow a = -1$$

para $a=2$

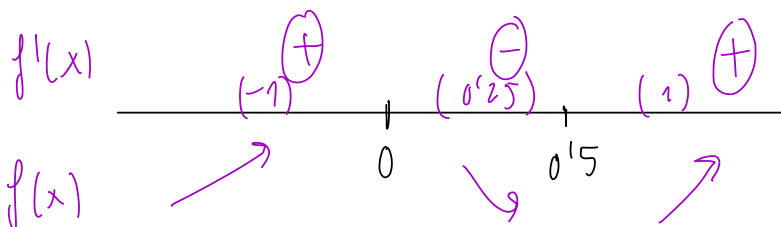
$$f(x) = \begin{cases} \frac{2x+1}{1-2x} & x < 0 \\ x^2 - x - 2 & x \geq 0 \end{cases}$$

$$f'(x) = \begin{cases} \frac{2(1-2x) - (2x+1)(-2)}{(1-2x)^2} & x < 0 \\ 2x - 1 & x > 0 \end{cases}$$

$$f'(x) = \begin{cases} \frac{2-4x+4x+2}{(1-2x)^2} & x < 0 \\ 2x - 1 & x > 0 \end{cases}$$

$$f'(x) = \begin{cases} \frac{4}{(1-2x)^2} & x < 0 \\ 2x - 1 & x > 0 \end{cases}$$

$$f'(x) = 0 \rightsquigarrow 2x - 1 = 0 \rightsquigarrow x = 1/2$$



①

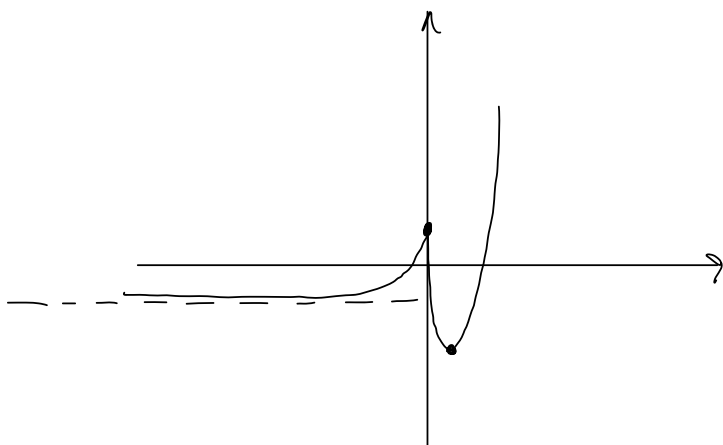
x	y
0	1

②

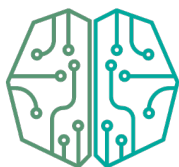
x	y
0	1

min

minimum at $x = 0.5 \rightarrow y = -2.25$



para $\frac{2x+1}{1-2x}$ calculo A.H $\left\{ \begin{array}{l} \lim_{x \rightarrow \infty} f(x) = -1 \\ \lim_{x \rightarrow -\infty} f(x) = -1 \end{array} \right.$



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B2

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

$$f'(x) = 2x(3x^3 + 5x)^3 + (x^2 - 1)3(3x^3 + 5x)^2 \cdot 9x^2$$

$$f'(x) = (3x^3 + 5x)^2 \left[2x(3x^3 + 5x) + (x^2 - 1) \cdot 27x^2 \right]$$

$$f'(x) = (3x^3 + 5x)^2 \left[6x^4 + 10x^2 + 27x^3 - 27x^2 \right]$$

$$f'(x) = (3x^3 + 5x)^2 \left[6x^4 + 27x^3 - 17x^2 \right]$$

$$g(x) = \frac{\ln(3x)}{e^{2x}}$$

$$g'(x) = \frac{\frac{1}{x} \cdot e^{2x} - \ln(3x) \cdot 2e^{2x}}{(e^{2x})^2}$$

$$g'(x) = \frac{e^{2x} \left(\frac{1}{x} - 2\ln(3x) \right)}{(e^{2x})^2}$$

$$g'(x) = \frac{\frac{1}{x} - 2\ln(3x)}{e^{2x}}$$



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$$y = y_0 + m(x - x_0)$$

$$f(x) = \frac{3x + 6}{2x + 1}$$

$$x_0 = 1$$

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

$$f(1) = \frac{9}{3} = 3$$

$$f'(1) = \frac{9 - 18}{9} = -1$$

$$y = 3 - 1(x - 1) \rightsquigarrow y = 3 - x + 1 \rightsquigarrow y = -x + 4$$

$$h(x) = \frac{3x+6}{2x+1}$$

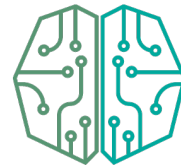
$$2x+1=0 \rightarrow x = -1/2$$

$$\lim_{x \rightarrow -1/2} \frac{3x+6}{2x+1} = \frac{-3/2+6}{0} = \frac{4.5}{0} \quad \text{A.V en } x = -1/2$$

$$\lim_{x \rightarrow \infty} \frac{3x+6}{2x+1} \rightarrow \frac{\infty}{\infty} \rightarrow 3/2$$

$$\text{A.H} \rightarrow 3/2$$

$$\lim_{x \rightarrow -\infty} \frac{3x+6}{2x+1} \rightarrow \frac{\infty}{\infty} \rightarrow 3/2$$

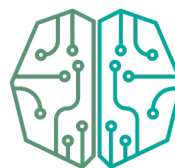
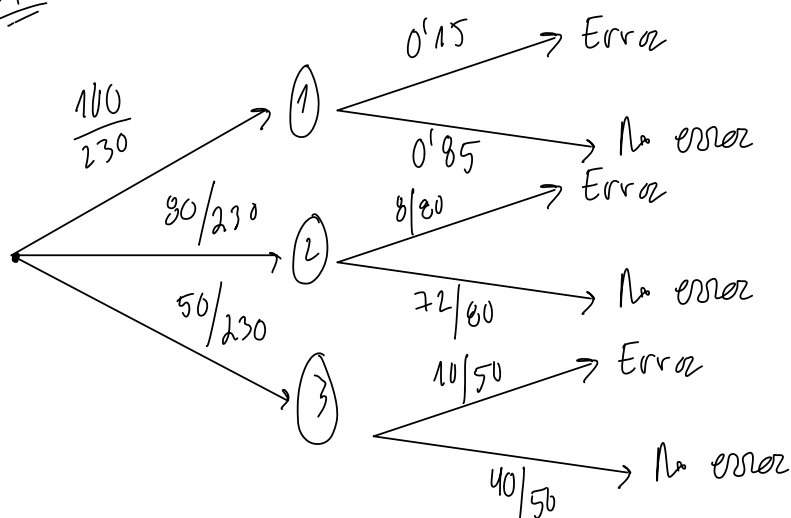


$$\int e^{3x} - 3x^2 + \frac{2}{(x+2)} - \frac{4}{(x+2)^2} dx =$$

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$$= \frac{e^{3x}}{3} - x^3 + 2 \ln(x+2) + \frac{4}{(x+2)} + C$$

A3



C2 ACADEMIA
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a) $P(2 \text{ capítulos}) = \frac{80}{230}$

b) $P(\text{error} \cap 3 \text{ capítulos}) = \frac{50}{230} \cdot \frac{10}{50}$

c) $P(\text{no error}) = \frac{100}{230} \cdot 0.85 + \frac{80}{230} \cdot \frac{72}{80} + \frac{50}{230} \cdot \frac{40}{50}$

d) $P(3 / \text{error}) = \frac{P(3 \cap \text{Error})}{P(\text{error})} =$
$$= \frac{\frac{50}{230} \cdot \frac{10}{50}}{\frac{100}{230} \cdot 0.15 + \frac{80}{230} \cdot \frac{8}{80} + \frac{50}{230} \cdot \frac{10}{50}}$$

B3

$$P(A) = 0.4$$

$$P(B) = 0.3$$

$$P(A \cup B) = 0.5$$

$$\begin{aligned} P(A \cap B) &= P(A) + P(B) - P(A \cup B) \\ &= 0.4 + 0.3 - 0.5 \\ &= 0.2 \end{aligned}$$

$$P(C) = 0.15$$

$$P(D) = 0.16$$

$$P(C \cup D) = 0.17$$

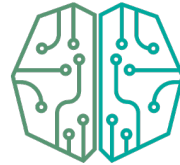
$$P(C/D) = \frac{P(C \cap D)}{P(D)} = \frac{0.14}{0.16}$$

$$P(C \cap D) = P(C) + P(D) - P(C \cup D)$$

$$0.15 + 0.16 - 0.17$$

$$0.11 - 0.17$$

$$0.14$$



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$$P(A) = 0.14$$

$$P(E) = 0.16$$

$$P(A \cap E) = P(A) \cdot P(E) = 0.14 \cdot 0.16 = 0.0224$$

$$P(A \cup E) = P(A) + P(E) - P(A \cap E)$$

$$0.14 + 0.16 - 0.0224 = 0.2776$$

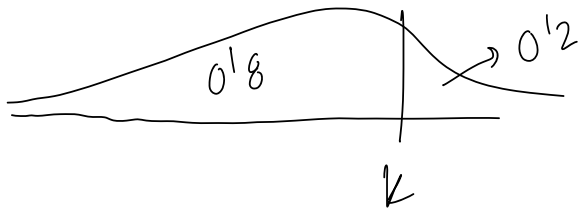
B4

$$P(X \geq 7.6) = 0.3 \rightarrow P(X < 7.6) = 0.7$$

$$N(6.8, \sigma)$$

$$\frac{7.6 - 6.8}{\sigma} = 0.525$$

$$\sigma = 1.52$$



$$P(X > k) = 0.2$$

$$P(X < k) = 0.8$$

$$\frac{k - 6.8}{1.5} = 0.845$$

$$\underline{k = 8.0675}$$

$$P(X > 5) = P\left(Z > \frac{5 - 6.8}{1.5}\right) = P(Z > -1.2) = P(Z < 1.2) = 0.8849 \rightsquigarrow 88.49\%$$

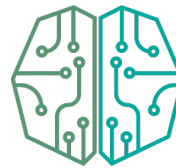
34

1000 personas

860 $\rightarrow$ si

140 $\rightarrow$ no

$$0.95 \rightsquigarrow 2\alpha/2 = 1.96$$



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$$\left(p_r - 2\alpha/2 \cdot \sqrt{\frac{p \cdot q}{n}}, p_r + 2\alpha/2 \cdot \sqrt{\frac{p \cdot q}{n}} \right)$$

$$\left(0.86 - 1.96 \cdot \sqrt{\frac{0.86 \cdot 0.14}{1000}}, 0.86 + 1.96 \cdot \sqrt{\frac{0.86 \cdot 0.14}{1000}} \right)$$

$$(\underline{0.838}, 0.881)$$

$$\text{Error} = z_{\alpha/2} \cdot \sqrt{\frac{p \cdot q}{n}} = \underline{\underline{0.021}}$$