A1

preguntas → 90

(x) acierto → 6 puntos

(y) Fallo → -2'5 puntos

(z) no contestar → -1'5 puntos

Aprobar → 210 puntos

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

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

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

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

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

$(*)$ $z = 10$

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

Tienes que contestar bien 50 preguntas

B1

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

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

$A = x \qquad B = y$

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

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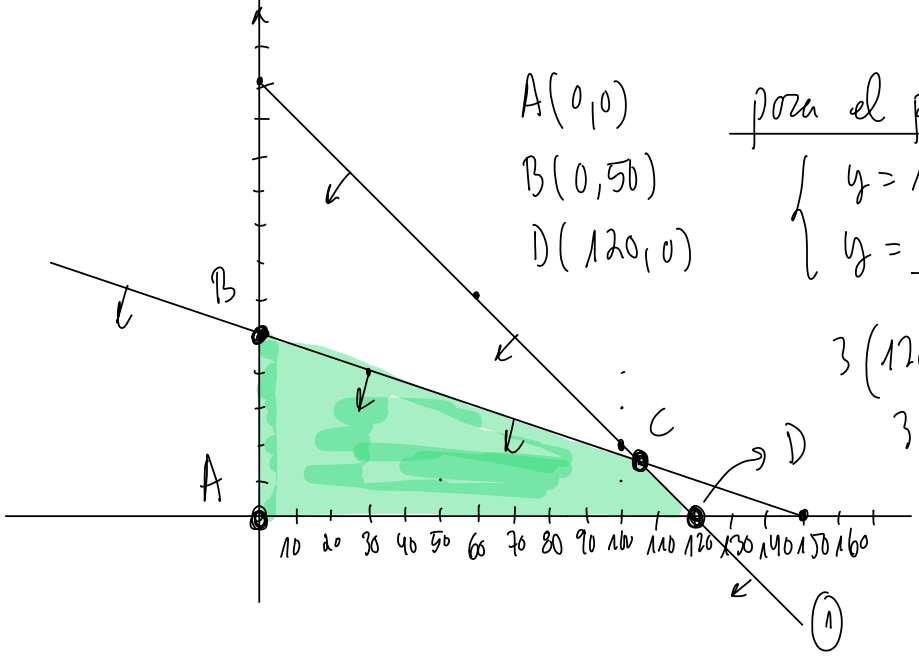
(1)

x	y
100	20
60	60
0	120

(2)

x	y
30	40
150	0



A(0,0)
B(0,50)
D(120,0)

para el punto C

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

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

$360 - 3x = 150 - x$

$-2x = -210$

$x = 105$

$y = 15$

$C(105, 15)$

$F(0,0) = 0$ // $F(0,30) = 20000(0) + 40.000(50) = 2.000.000$

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

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

A2

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

Continuidad en $x = 0$

$$\left.\begin{array}{l} f(0) = (0)^2 - (0) - a = -a \\ \lim\limits_{x \to 0^-} \dfrac{2x+1}{1-2x} = \dfrac{1}{1} = 1 \\ \lim\limits_{x \to 0^+} x^2 - x - a = -a \end{array}\right\} \quad -a = 1 \rightsquigarrow a = -1$$

para $a = 2$

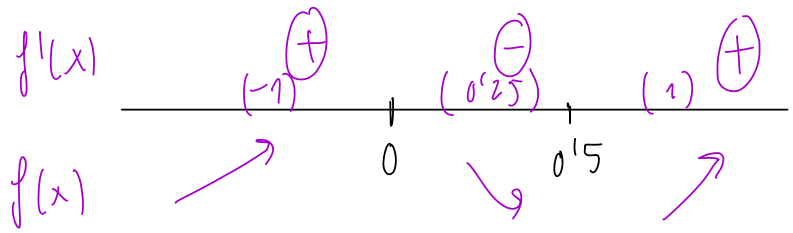
$$f(x) = \begin{cases} \dfrac{2x+1}{1-2x} & x < 0 \\ x^2 - x - 2 & x \geq 0 \end{cases} \quad (1) \quad (2)$$

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

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

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

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



min

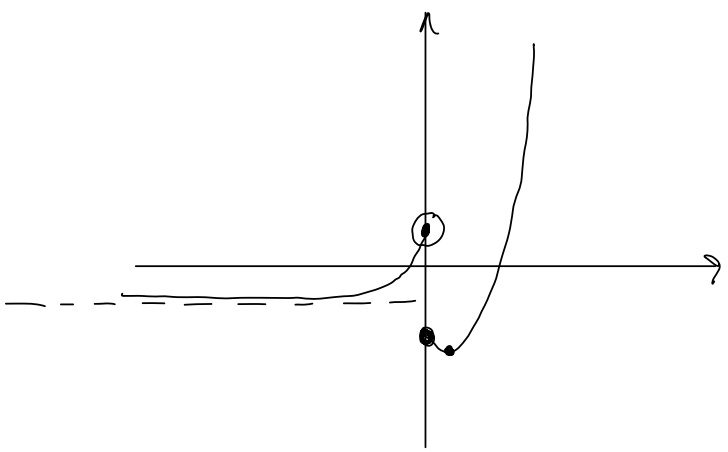
①

x	y
0	1

②

x	y
0	1

mínimo en $x = 0'5 \rightarrow y = -2'25$



para $\frac{2x+1}{1-2x}$ calculo A.H $\begin{cases} \lim_{x \to \infty} f(x) = -1 \\ \lim_{x \to -\infty} f(x) = -1 \end{cases}$

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B2

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

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

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

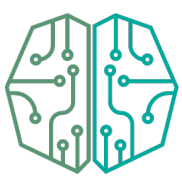
$$f'(x) = (3x^3+5x)^2\left[6x^4+10x^2+27x^3-27x^2\right]$$

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

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

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

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



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

$$f(x) = \frac{3x+6}{2x+1} \qquad x_0 = 1 \qquad f'(x) = \frac{3(2x+1)-(3x+6)\cdot 2}{(2x+1)^2}$$

$$f(1) = \frac{9}{3} = 3 \qquad f'(1) = \frac{9-18}{9} = -1$$

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

$$h(x) = \frac{3x+6}{2x+1} \qquad 2x+1=0 \rightarrow x = -1/2$$

$$\lim_{x \to -1/2} \frac{3x+6}{2x+1} = \frac{-3/2+6}{0} = \frac{4'5}{0}$$ A.V en $x = -1/2$

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

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

A.H $\rightarrow 3/2$

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

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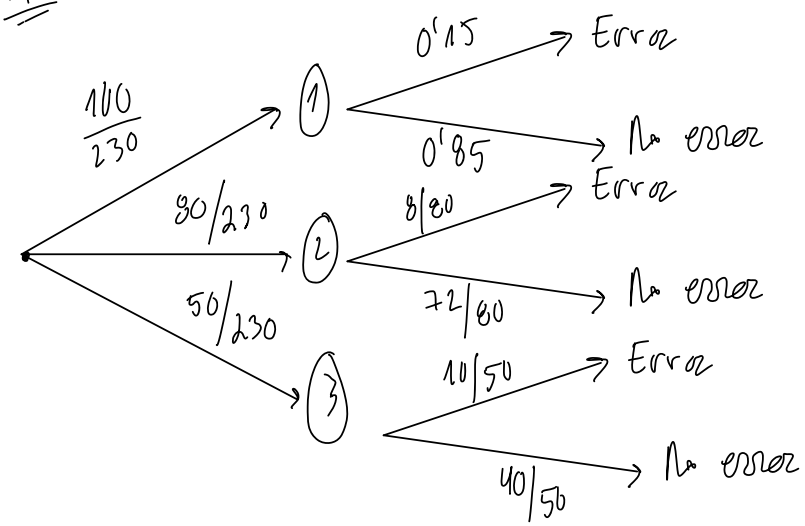
$$= \frac{e^{3x}}{3} - x^3 + 2\ln(x+2) + \frac{4}{(x+2)} + C$$

A3



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a) $P(\text{2 capítulo}) = \frac{80}{230}$

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

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) $P(3 \mid \text{error}) = \frac{P(3 \cap \text{Error})}{P(\text{error})} =$

$$= \frac{\frac{50}{230} \cdot \frac{10}{50}}{\frac{100}{230} \cdot 0'15 + \frac{80}{230} \cdot \frac{8}{80} + \frac{50}{230} \cdot \frac{10}{50}}$$

B3

$P(A) = 0'4$

$P(B) = 0'3$

$P(A \cup B) = 0'5$

$$P(A \cap B) = P(A) + P(B) - P(A \cup B)$$
$$= 0'4 + 0'3 - 0'5$$
$$= 0'2$$

$P(C) = 0'5$

$P(D) = 0'6$

$P(C \cup D) = 0'7$

$$P(C/D) = \frac{P(C \cap D)}{P(D)} = \frac{0'4}{0'6}$$

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

$$0'5 + 0'6 - 0'7$$

$$0'11 - 0'7$$

$$0'4$$

C2 ACADEMIA

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$P(A) = 0'4$

$P(E) = 0'6$

$$P(A \cap E) = P(A) \cdot P(E) = 0'4 \cdot 0'6 = 0'24$$

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

$$0'4 + 0'6 - 0'24 = 0'76$$

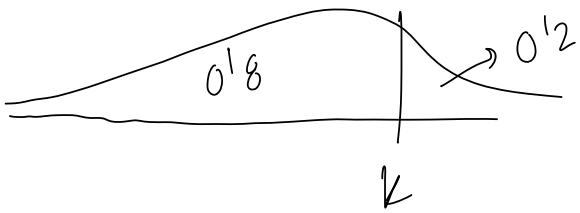
<u>By</u>

$$P(X \geq 7'6) = 0'3 \rightarrow P(X < 7'6) = 0'7$$

$N(6'8, \sigma)$

$$\frac{7'6 - 6'8}{\sigma} = 0'525$$

$$\sigma = 1'52$$



$P(X > k) = 0'2$

$P(X < k) = 0'8$

$\frac{k - 6'8}{1'5} = 0'845$

$k = 8'0675$

$P(X > 5) = P\left(Z > \frac{5 - 6'8}{1'5}\right) = P(Z > -1'2) = P(Z < 1'2) =$

$= 0'8849 \rightsquigarrow 88'49\%$

B4

1000 personas

860 → sí

140 → no

$95\% \rightsquigarrow z_{\alpha/2} = 1'96$

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

$\left(0'86 - 1'96 \cdot \sqrt{\frac{0'86 \cdot 0'14}{1000}},\ 0'86 + 1'96 \cdot \sqrt{\frac{0'86 \cdot 0'14}{1000}}\right)$

$(0'838,\ 0'881)$

$$Error = z_{\alpha/2} \cdot \sqrt{\frac{p \cdot q}{n}} = 0{,}021$$