1) $x>0$
$y>0$

$x+y=36$

$x\cdot y^2$ Max

$f(x,y)=xy^2$ Máx
$x+y=36 \Rightarrow y=36-x$

$f(x)=x(36-x)^2=1296x-72x^2+x^3$

$f'(x)=0 \quad 1296-144x+3x^2=0$

$x^2-48x+438=0$

$x=\frac{48\pm 24}{2}$ $\cancel{36}$ 12

$f(x,y)=xy^2$
$x=36-y$
$f(y)=(36-y)y^2$
$f(y)=36y^2-y^3$
$f'(y)=72y-3y^2=0$
$3y(24-y)=0$
$\cancel{y=0}$ $y=24$

+ max −
0 12
$f'(1)$ $f'(13)$

$1^\circ \to 12$
$2^\circ \to 24$

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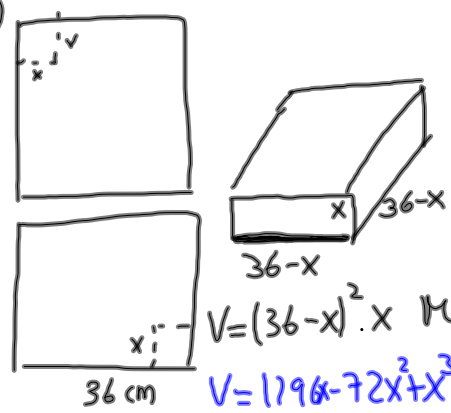
2)



$V=(36-x)^2\cdot x$ Máx

$V=1296x-72x^2+x^3$ Máx

$V'(x)=1296-144x+3x^2=0$

$\to x$ $\cancel{x=36}$ $x=12$

+ −
0 12 MAX
$V'(1)$ $V'(13)$

12cm

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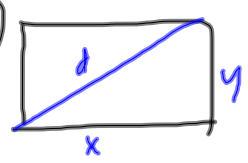
3)



$P=12m=2x+2y \to x+y=6$

diag menor.

$d=\sqrt{x^2+y^2}$ Min

$y=6-x$

$d=\sqrt{x^2+(6-x)^2}$

$d=\sqrt{2x^2-12x+36}$ Min $\to D=2x^2-12x+36$ min

$D'=4x-12=0$

$x=3$

$d'=\frac{4x-12}{2\sqrt{2x^2-12x+36}}=0$

$x=3$

− + Min
0 3 6
$d'(1)$ $d'(5)$

Cuadrado de lado 3m

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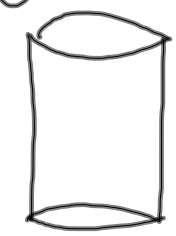
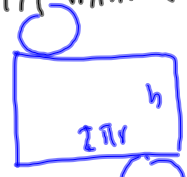
4)



$V=6'28\ell=Ab\cdot h$
$6'28$ " dm^3

A_T mínima



$V=\pi r^2 h=6'28 \Rightarrow r^2h=2$
$h=2/r^2$

$A_T=2\pi r^2+2\pi r h$ min

$A_T=2\pi r^2+2\pi r\frac{2}{r^2}$

$A_T=2\pi r^2+\frac{4\pi}{r}$ min

$A'=4\pi+\frac{0\cdot r-4\pi 1}{r^2}$

$A'=\frac{4\pi r^2-4\pi}{r^2}=0$

$r=\pm 1 \to r=1$

− + Min
0 1
$A'(0'5)$ $A'(2)$

$r=1$ dm
$h=2$ dm

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PAG 304 (4)

$x^y \cdot y^x = 1 \quad (1,1)$

$y - f(1) = f'(1)(x-1)$

$f(1) = 1$

$f'(1) \Rightarrow$

$\ln(x^y \cdot y^x) = \ln 1$

$\ln x^y + \ln y^x = 0$

$y \ln x + x \ln y = 0$

$\left[y' \ln x + y \frac{1}{x}\right] + \left[1 \ln y + x \frac{y'}{y}\right] = 0$

$x=1 \quad y=1$

$y' \ln 1 + 1 \frac{1}{1} + 1 \ln 1 + 1 \frac{y'}{1} = 0$

$1 + y' = 0 \Rightarrow y' = -1$

$y - 1 = -1(x-1)$

$y = -x + 2$

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CALCULO DE PARAMETROS

$y = ax^3 + bx^2 + cx + d$

Pasa por $P(x_0, y_0)$ $f(x_0) = y_0$

E. R (Mín o máx) en $x = x_0 \Rightarrow f'(x_0) = 0$

E. R (Mín o máx) en $P(x_0, y_0)$ $\begin{cases} f(x_0) = y_0 \\ f'(x_0) = 0 \end{cases}$

PI en $x = x_0 \rightarrow f''(x_0) = 0$

PI en $P(x_0, y_0)$ $\begin{cases} f(x_0) = y_0 \\ f''(x_0) = 0 \end{cases}$

R.T. hace en $x = x_0$ $m = 0$ $f'(x_0) = 0$

R.T '' en $P(x_0, y_0)$ $\begin{cases} f(x_0) = y_0 \\ f'(x_0) = 0 \end{cases}$

R.T Paralela a $y = mx + n$ en $x = x_0$ $m = f'(x_0)$

R.T '' '' en $P(x_0, y_0)$ $\begin{cases} f(x_0) = y_0 \\ f''(x_0) = m \end{cases}$

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(17) $\longrightarrow$ (22)

(19) $f(x) = ax^3 + bx \quad f'(x) = 3ax^2 + b$

Para $(1,1) \Rightarrow f(1) = 1$

En (1,1) RT $\parallel 3x + y = 0 \quad -3 = f'(1)$

$m = -3$

$f(1) = 1 \rightarrow \quad a + b = 1$

$f'(1) = -3 \Rightarrow \quad 3a + b = -3$

$2a = -4 \quad a = -2$

$b = 3$

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