(17) $y = ax^4 + 3bx^3 - 3x^2 - ax$

2 PI $\begin{cases} x=1 & f''(1)=0 \\ x=1/2 & f''(1/2)=0 \end{cases}$

$y' = 4ax^3 + 9bx^2 - 6x - a$

$y'' = 12ax^2 + 18bx - 6$

$f''(1)=0 \quad 12a+18b-6=0$

$f''(1/2)=0 \quad 3a+9b-6=0$

$\begin{cases} 2a+3b=1 \\ a+3b=2 \end{cases}$

$\boxed{a=-1 \quad b=1}$

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(18) $f(x) = ax^3 + bx^2 + cx + d$

$f'(x) = 3ax^2 + 2bx + c$

$f(1)=0$

$f'(0)=2$

E.R $\begin{cases} x=1 & f'(1)=0 \\ x=2 & f'(2)=0 \end{cases}$

$\begin{cases} a+b+c+d=0 \\ c=2 \\ 3a+2b+c=0 \quad {}^{-2} \quad 3a+2b=-2 \\ 12a+4b+c=0 \quad 12a+4b=-2 \end{cases}$

$6a=2 \quad a=1/3$

$1+2b+2=0 \quad b=-3/2$

$d = -\frac{1}{3} + \frac{3}{2} - 2 = \frac{-2+9-12}{6} = -5/6 = d$

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(20) $y = x^3 + ax^2 + bx + c$

$y' = 3x^2 + 2ax + b \qquad y'' = 6x + 2a$

Cale OX $x=-1$ $(-1,0)$ $f(-1)=0$

PI $(2,1)$ $\begin{cases} f(2)=1 \\ f''(2)=0 \end{cases}$

$f(-1)=0 \quad -1+a-b+c=0$

$f(2)=1 \quad 8+4a+2b+c=1$

$f''(2)=0 \quad 12+2a=0 \rightarrow a=-6$

$-1-6-b+c=0 \quad -b+c=7$

$8-24+2b+c=1 \quad 2b+c=17$

$3b=10 \quad b=10/3$

$c = 7 + \frac{10}{3} = \frac{31}{3} = c$

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(10) $x>0$

$y>0$

(10) $x+y=10 \quad y=10-x$

$P(x,y) = x^2 \cdot y^2$ Max

$P(x) = x^2(10-x)^2$

$P(x) = 100x^2 - 20x^3 + x^4$ Max

$P'(x) = 200x - 60x^2 + 4x^3 = 0$

$50x - 15x^2 + x^3 = 0$

$x(x^2 - 15x + 50) = 0 \quad \cancel{x=0} \quad x = \frac{15 \pm 5}{2} \quad \cancel{10} \quad 5$

$+ \quad -$

$0 \quad 1 \quad 5 \quad P'(1) \quad P'(6)$

MAX $x=5$, $y=5$

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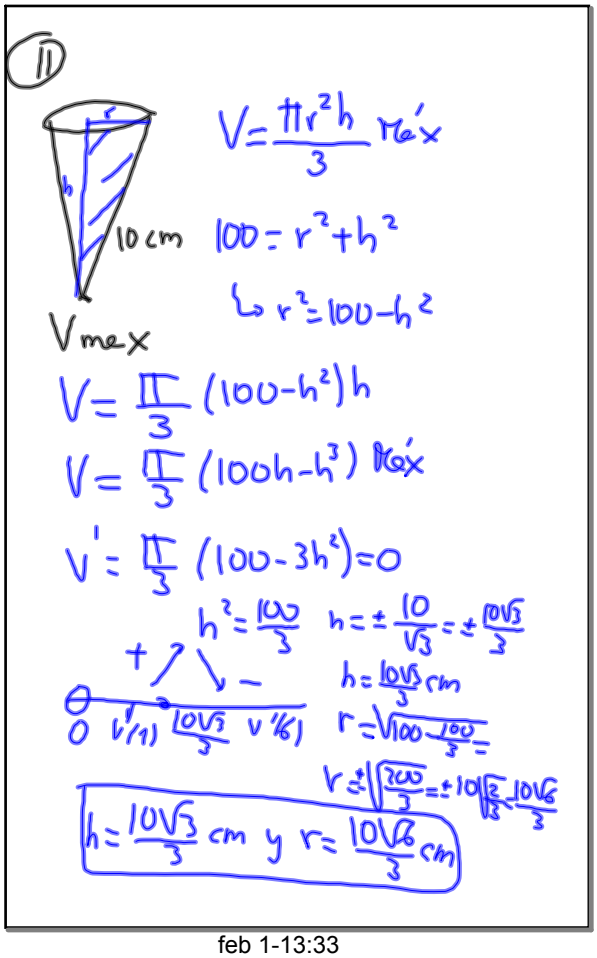

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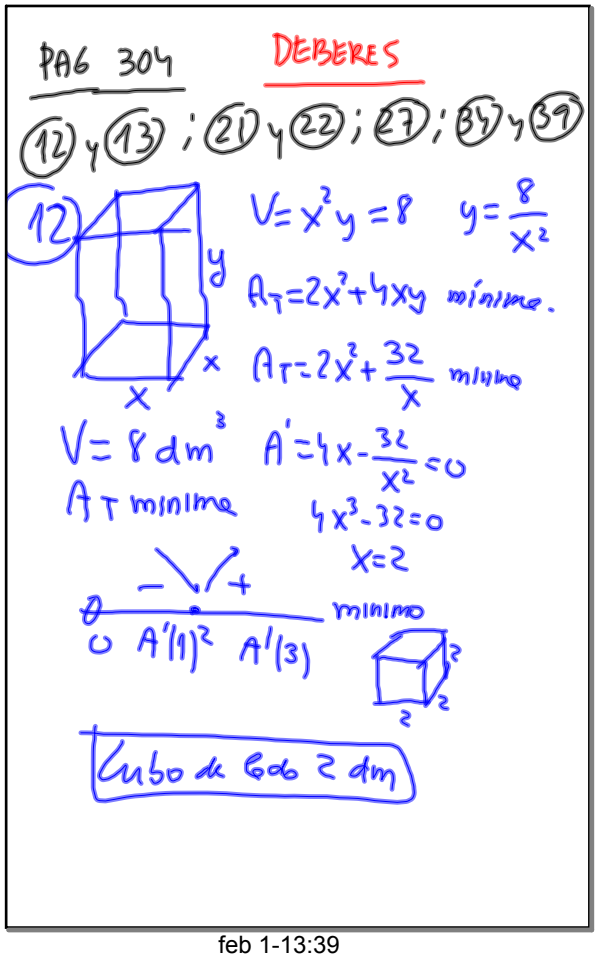

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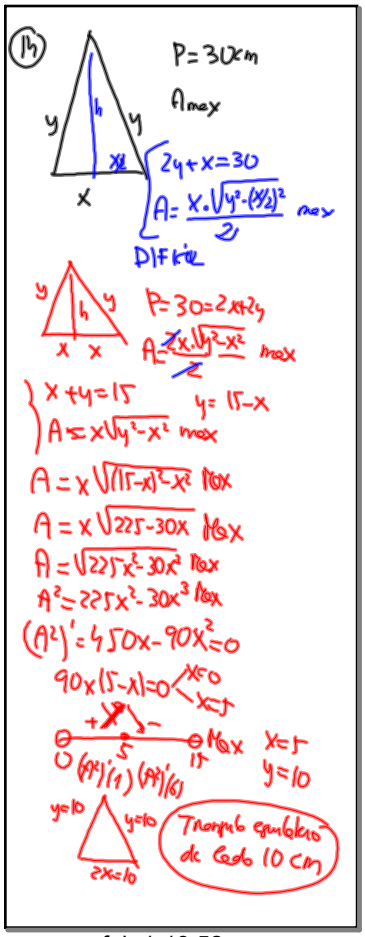

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