started at 12:46 (34m)
First left at 1:12 (26)
last at 1:28

MATH 131
Quiz IV
October 22, 1993

Name Key

1. A triangle with sides 6 and 8 with an included angle θ will have area 24 sin θ. What is the maximum area possible?

10 right proof A=

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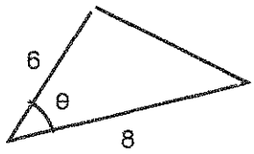
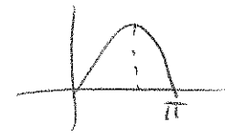


$A = 24\sin\theta \qquad 0 \le \theta \le \pi$

$\frac{dA}{d\theta} = 24\cos\theta = 0$

$\theta = \frac{\pi}{2}$



$A = (24) = \frac{1}{2}\, 6 \cdot 8$

9 7

2. If tickets for a concert are priced at $20, it is estimated that 1500 tickets can be sold. However it is believed that in order to sell more, the ticket prices must be reduced by one cent for each ticket above 1500. How many tickets, and at what price, will maximize revenue?

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x = no of tickets

$R = x(20 - .01(x - 1500))$

$= x(20 - .01x + 15) = x(35 - .01x)$

$= 35x - .01x^2$

$\frac{dR}{dx} = 35 - .02x = 0$

$x = \frac{35}{.02} = 1750$

$p = 20 - (.01)(250) = \$17.50$

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3. For the function f, draw a complete graph, find relative maxima, minima, points of inflection, and intervals on which the function is increasing, decreasing, concave up, concave down. Give asymptotes.

$f(x) = \frac{8}{x^2+4} = 8(x^2+4)^{-1}$

$f'(x) = -8(x^2+4)^{-2}(2x)$

$= \frac{-16x}{(x^2+4)^2}$

C.P. $x = 0$

$f''(x) = \frac{(x^2+4)^2(-16) - (-16x)(2(x^2+4)(2x))}{(x^2+4)^2}$

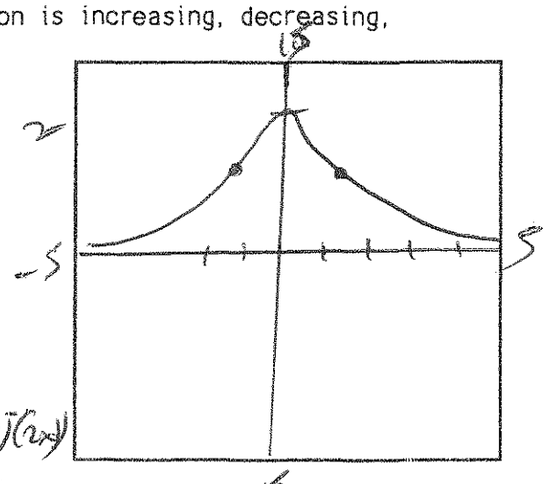
$= \frac{-16(x^2+4)[(x^2+4) - 4x^2]}{(x^2+4)^2}$

$= \frac{-16(x^2+4)(4-3x^2)}{(\quad)^2} = 0$

$x^2 = \frac{4}{3}$

$x = \pm\sqrt{\frac{4}{3}} = \pm 1.15$

P.I



I $y = 0$ HA

I $(-\infty, 0)$

D $(0, \infty)$

CC↑ $(-\infty, -\sqrt{\frac{4}{3}})$ $(\sqrt{\frac{4}{3}}, \infty)$

CC↓ $(-\sqrt{\frac{4}{3}}, \sqrt{\frac{4}{3}})$

MAX at $x = 0$ P ± 1.15