

Math 110-004: Calculus I



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Lab Test # 2, Oct. 5, 1999.

Name:

1- A farmer with 400 meters of fencing wants to enclose a rectangular area and then divide it into three pens with fencing parallel to one side of the rectangle. What is the largest possible area of the three pens?

$$400 = 2L + 4w$$

$$200 = 2L + 2w$$

$$L = 100 - w \quad \checkmark$$

$$A = L \cdot w \quad \checkmark$$

$$A = (100 - w) \cdot w$$

$$A = 100w - w^2$$

$$A' = 100 - 2w = 0$$

$$= 4(25 - w) = 0 \quad \checkmark$$

when $w > 25$ $A' < 0$, $w = 50 \quad \checkmark$
 when $w < 25$ $A' > 0$
 $\therefore 25$ is a max

$$\therefore A = 200(25) - 2(25)^2$$

$$= 5000 \text{ m}^2 \quad \checkmark$$

2- Given that the graph of f passes through the point $(2,7)$ and that the slope of its tangent line at $(x, f(x))$ is $3x^2 - 1$, find $f(3)$.

$$f'(x) = 3x^2 - 1$$

$$f(x) = \frac{3x^3}{3} - x + C$$

$$= x^3 - x + C \quad \checkmark$$

$$\therefore f(x) = x^3 - x + 1 \quad \checkmark$$

$$f(3) = (3)^3 - (3) + 1$$

$$= 25 \quad \checkmark$$

$$f(2) = 7 = (2)^3 - (2) + C \quad \checkmark$$

$$7 = 8 - 2 + C$$

$$7 = 6 + C$$

$$1 = C \quad \checkmark$$

good!

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