



# Office Hours!

## Instructor:

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## Office Hours:

Mondays 2–3PM

Tuesdays 10:30–11:30AM

Thursdays 1–2PM

or by appointment

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South Hall 6510

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# How To Find A Max / Min

- (1) Find  $f'(x)$
- (2) Solve  $f'(x) = 0$ . This is the  $x$  value that gives the max / min.
- (3) To find the maximum / minimum plug the value of  $x$  found in (2) back into  $f(x)$ .

**Example:** Use this method to find the  $x$ -value where maximum of the function  $f(x) = 5x - e^{2x}$  occurs.

$$A = 0 \quad B = \ln(5) \quad C = 2\ln(5) \quad D = 2\ln(5/2) \quad E = \ln(5/2)/2$$

**Answer:** E

# Word Problem #1 (a re-run!)

A fenced garden with an area of  $1000 \text{ m}^2$  will be made in the shape of a rectangle. It will be surrounded on all four sides by a fence. Three sides are wood fence, and the remaining side is a brick wall.

- The wood fence costs \$5 per meter length.
- The brick wall costs \$20 per meter length.
- $C$  = total cost of the fence and brick wall
- $L$  = length of the brick wall
- $W$  = width of the other side

(a) Find a formula for  $C$  in terms of only  $L$ .

$$A = 2W + 2L \quad B = 2000L^{-1} + 2L \quad C = 25L + 10000L^{-1}$$

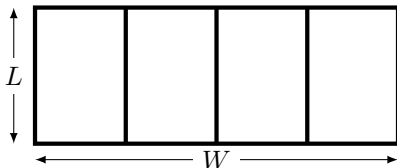
$$D = 20L + 10000WL^{-1} \quad E = 5L + 3000 \quad \boxed{C}$$

(b) What length of brick wall gives lowest cost?

$$A = 20 \quad B = 40 \quad C = 50 \quad D = 100 \quad E = 25 \quad \boxed{A}$$

## Word Problem #2

A rectangular field is surrounded by fence. It is divided into 4 equal



parts by 3 more dividing fences all parallel to one side of the field.

(a) What is the total length of all the fence needed?

$$A = 2L + 2W \quad B = LW \quad C = 5LW$$

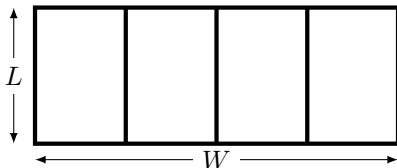
$$D = L + W \quad E = 5L + 2W \quad \boxed{E}$$

(b) The field must have an area of  $1000 \text{ m}^2$ . Express  $W$  in terms of  $L$ .

$$A \ 1000 - L \quad B \ 1000L \quad C \ 1000/L \quad D \ 1000 + L \quad \boxed{C}$$

## Word Problem #2 (cont'd)

A rectangular field is surrounded by fence. It is divided into 4 equal



parts by 3 more dividing fences all parallel to one side of the field.

(c) Express the total length of all the fence needed in terms of  $L$ .

$$A = 5L + 1000 \quad B = 5L + 2000/L \quad C = 5L + 2/L \quad \boxed{B}$$

(d) What should  $L$  be so that the total length of fence used is a minimum?

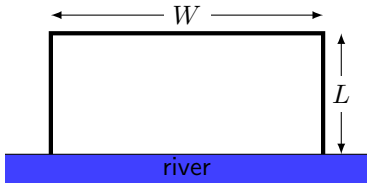
$$A = 10 \quad B = 20 \quad C = 40 \quad D = 50 \quad \boxed{B}$$

# Word Problem #3

A rectangular field is surrounded on three sides by a fence and the fourth side runs along a perfectly straight river. What is the largest area field which can be so enclosed with 120 meters of fence?

$A = 1200 \text{ m}^2$      $B = 1500 \text{ m}^2$      $C = 1800 \text{ m}^2$      $D = 1000 \text{ m}^2$

**C**



# Word Problem #4

Tickets are going to be sold for a concert.

- If the price of each ticket is \$40, then 2,000 tickets will be sold.
- For every \$1 the price is decreased, 100 more tickets will be sold.

(a) If the tickets are sold for \$ $x$  each, how many will be sold?

$$A = 2000 - x \quad B = 2000 - 100x \quad C = 2000 + 100x$$

$$D = 6000 - 100x \quad E = 6000 + 100x$$

D

(b) What is the total amount of money generated from selling tickets for \$ $x$  each?

$$A = 6000x - 100x^2 \quad B = 2000x$$

$$C = 2000 - 40x^2 \quad D = 6000 - 100x$$

A

(c) What price should the tickets be to generate the most money from sales?

$$A = \$20 \quad B = \$22 \quad C = \$24 \quad D = \$30 \quad E = \$40$$

D

# Word Problem #5

A farmer is growing wheat.

- On July 1, she has 1,000 bushels and this increases by 50 bushels per day.
- The price of a bushel on July 1 is \$10 and is dropping at a rate of 20 cents per day.
- She will harvest and sell on the same day.

How many days should she wait, assuming these trends continue?

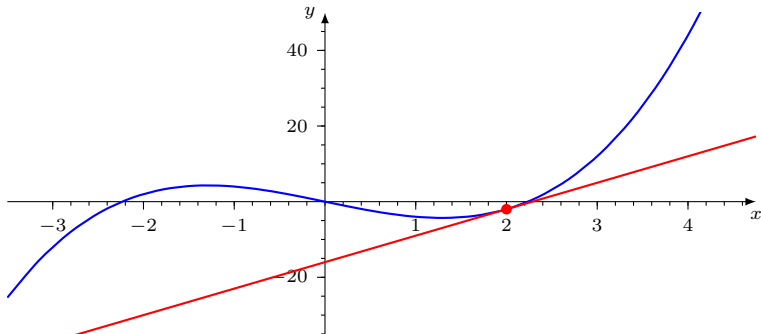
A = 5    B = 10    C = 15    D = 20    E = other    C



# Review Problems (page 1)

**1.** Find the equation of the tangent line to  $y = x^3 - 5x$  at  $x = 2$ .

A  $y = 2x - 6$     B  $y = 16x - 7$     C  $y = 7x + 16$     D  $y = 7x - 16$



Answer: D