Warm-up: Nov. 3th, 2017

Are these function written in factored form?

What is the a, r & s values?

$1 - 2 = -1$

$-2 + 1 = -1$

$f(x) = a(x - r)(x - s)$

$(-x + 1)(x + 4)$

$f(x) = (x - 1)(x - 4)$ $f(x) = (1 - x)(x + 4)$

yes

$a = 1$

$r = 1$

$s = 4$

$f(x) = (-x + 1)(x + 4)$

$f(x) = -(x - 1)(x + 4)$

$a = -1$

$r = 1$

$s = -4$ } x-int (zeros)

Quiz review question: pg 316 #4

INVESTIGATE the Math   page 300

Nov. 1, 2013   Oct. 17, 2012
Nov. 3, 2014   Nov. 3, 2015   Oct. 30, 2017

Nov. 3, 2017

Ataneq takes tourists on dogsled rides. He needs to build a kennel to separate some of his dogs from the other dogs in his team. He has budgeted for 40 m of fence. He plans to place the kennel against part of his home, to save on materials.

width(x)

length (y)

kennel

200 m²
150 m²
house

$40\,m = P$

$A = l \times w$

$A = (x)(y)$

❓ What dimensions should Ataneq use to maximize the area of the kennel?

$P = 2x + y \rightarrow 40 = 2x + y$

$y = 40 - 2x$

A. Using x to represent the width of the kennel, create an expression for the length of the kennel.

B. Write a function, in terms of x, that defines the area of the kennel. Identify the factors in your function.

$A = (x)(y)$
$A = (x)(40 - 2x)$

C. Create a table of values for the function, and then graph it.

D. Does the function contain a maximum or a minimum value? Explain.

E. Determine the x-intercepts of the parabola.

F. Determine the equation of the axis of symmetry of the parabola and the coordinates of the vertex.

$(x)(40 - 2x)$
$-2x^2 + 40x$

G. What are the dimensions that maximize the area of the kennel?

Answers

A. Length $= 40 - 2x$

B. Area: $A(x) = (40 - 2x)(x)$ $A(x) = -2x^2 + 40x$

C.

X	Y1
0	0
2	72
4	128
6	168
8	192
10	200
12	192

X=0

X	Y1
10	200
12	192
14	168
16	128
18	72
20	0
22	-88

X=22

$A(x)$
(Area)

(10, 200)

x
(width)

$X = 10$

D. A maximum; the table of values and the graph show a maximum.

E. The x-intercepts are 0 and 20.

F. $x = 10$; (10, 200)

G. length 20 m by width 10 m

10
20   Max Area
10

7.4 Page 2

Example: Nov. 3, 2017

The district was given permission to fence off an area at the school to store some items. As brilliant math students, we can explain to them the maximum area they can have using 50 m of fencing :)
What would the dimensions of the rectangular section be if they wanted to maximize the area?

Just draw the diagram!

$300\,m^2$

$A = l \times w$

$A = (50 - 2x)(x)$

w   w

$P = \dfrac{50\,m}{\text{fencing}}$ of

$P = 2w + l$

$A(x) = (50 - 2x)(x)$
$A(x) = -2x^2 + 50x$

$P = 2x + l$
$50 = 2x + l$
$l = 50 - 2x$

(12.5, 312.5)

$A(x)$ Y1= -2X²+50X

Left Bound?
X=12.553191 Y=312.49434

X

Max Area:
$312.5\,m^2$
when $w = 12.5\,m$
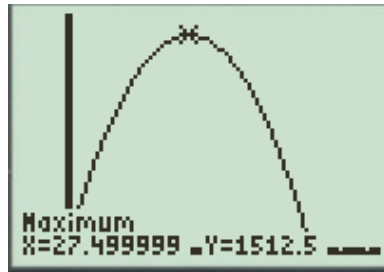
12.5 m   12.5 m

25 m

Feb 9-10:01 AM

Math 112B Quiz – Max/Min Problems

$110 = 2w + \ell$

A lifeguard wants to section off a rectangular swimming area using 110 m of rope.
The beach will serve as one side of the swimming area.
Show all work in the use of the graphics calculator to answer the following questions.

a) What is the maximum area that can be enclosed? _____ $1512.5 m^2$

b) What would be the dimensions of the swimming area? _____ $W = 27.5m \quad \ell = 55m$

beach

$W \quad A = \ell \cdot w \quad w$

ℓ

///Beach\\\

$w \qquad \qquad w = 27.5$

$\ell \ 55$

Maximum
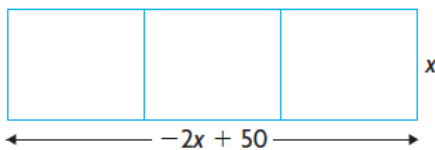X=27.499999 ▪Y=1512.5 ▪▪▪

Oct 17-9:19 AM

Page 311: #8 & 16

8. Byron is planning to build three attached rectangular enclosures for some of the animals on his farm. He bought 100 m of fencing. He wants to maximize the total area of the enclosures. He determined a function, $A(x)$, that models the total area in square metres, where x is the width of each rectangle:
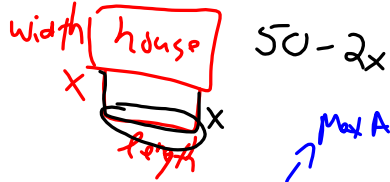
$$A(x) = -2x^2 + 50x$$

x

$\longleftarrow -2x + 50 \longrightarrow$

a) Determine the maximum total area.

b) State the domain and range of the variables in the function.

Oct 18-8:19 AM

3

Page 312: #16

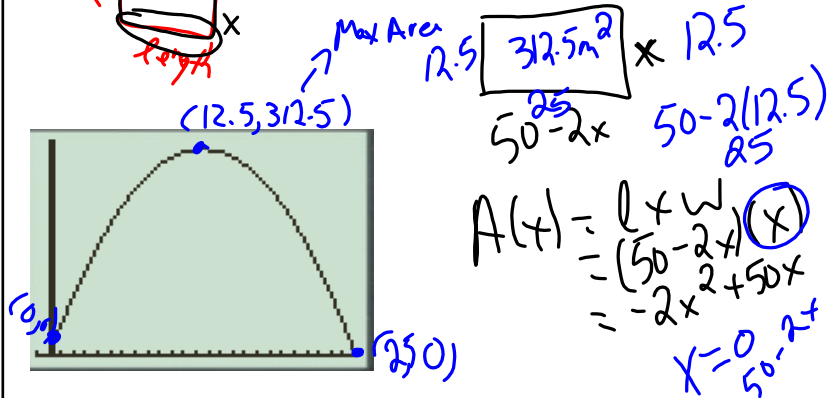(16) $800 fence

$16/ft

$800 \div 16 = 50$ ft fence

width [house] $50 - 2x$

x

length x

$\dfrac{50}{2} = \dfrac{2x}{2}$

$25 = x$

Max Area 12.5 [$312.5 m^2$] $\times$ 12.5

$\dfrac{50 - 2x}{25}$ $50 - 2(12.5)$

25

(12.5, 312.5)

(0, 0)   (25, 0)

$A(x) = l \times w$

$= (50 - 2x)(x)$

$= -2x^2 + 50x$

$x = 0$

$50 - 2x$

Oct 16-8:32 AM

4

Attachments

7s4e1 final.mp4

7s4e2 final.mp4

7s4e3 final.mp4

7s4e4 final.mp4

fm7s4-p11.tns

FM11-7s4.gsp