

Algebra II

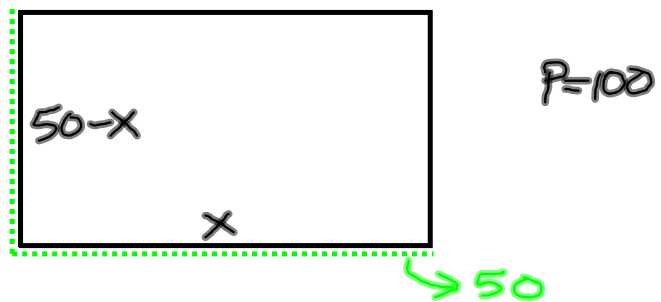
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2) other number: $x+8$ $P(x) = x^2 + 8x$ min = -16	12)	a) 100 Ft b) 5 sec
5) 625 cm^2	13)	$26,666 \frac{2}{3} \text{ m}^2$
6) 1250 m^2	15)	a) 40 Ft b) Yes
10) \$ 15		

- 2) The difference of two numbers is 8. If the smaller number is x , then the other number is _____. Their product is $p(x) =$ _____. Find the minimum value of p .

5) The rectangle has perimeter of 100 cm. Find the greatest possible area for the rectangle. 625cm^2

Let $x = \text{length}$
 $50 - x = \text{width}$



$$A(x) = \text{length} \times \text{width}$$

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

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

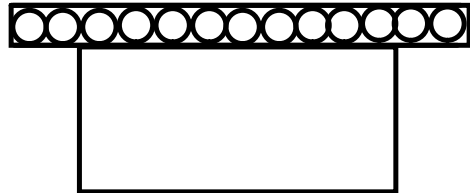
$$A(x) = -\left(x^2 - 50x + 625\right) + 625$$

$-50, -25, 625 \uparrow$

$$A(x) = -(x - 25)^2 + 625$$

vertex $(25, 625)$

- 6) A rectangular pen is made with 100 m of fencing on three sides. The fourth side is a stone wall. Find the greatest possible area of such an enclosure.



10) A ferry service transporting passengers to an island charges a fare of \$10 and carries 300 persons per day. The manager estimates that the company will lose 15 passengers for each increase of \$1 in the fare. Find the fare that yields the greatest income. $\boxed{\$15}$

$$I(x) = (\text{no. of passengers})(\text{amt. charged})$$

Let $x =$ increase in Fare

$$I(x) = (300 - 15x)(10 + x)$$

$$I(x) = 3000 + 300x - 150x - 15x^2$$

$$= -15x^2 + 150x + 3000$$

$$= -15(x^2 - 10x + 25) + 3000 + 375$$

$$-10, -5, 25$$

$$I(x) = -15(x - 5)^2 + 3375 \quad \text{vertex } (5, 3375)$$

12) A ball is thrown vertically upward with an initial speed of 80 ft/sec. Its height after t seconds is given by $h = 80t - 16t^2$.

a) How high does the ball go?

100 ft

$$h = -16t^2 + 80t$$

$$h = -16(t^2 - 5t + 6.25) + 100$$

$$-5, -2.5, 6.25$$

$$= -16(t - 2.5)^2 + 100$$

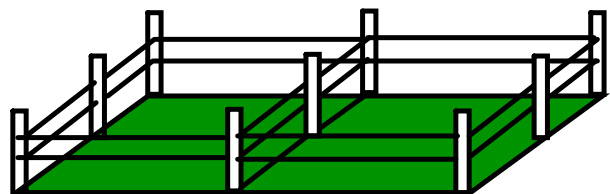
vertex (2.5, 100)

b) When does the ball hit the ground?

5 sec

(2.5 x 2)

- 13) A rectangular field is to be enclosed by a fence and divided into two parts by another fence. Find the maximum area that can be enclosed and separated in this way with 800 m of fencing.



- 15) A football kicker tries to make a field goal with the ball on the 25 yard line (105 ft from the goal post.) If you imagine a coordinate system with the ball being kicked at $x = 0$ and the goal post at $x = 105$, then the equation of the ball's path is $y = \frac{4}{3}x - \frac{x^2}{90}$ where y is the ball's height in feet.

a) What is the maximum height of the ball?

40'

$$y = -\frac{x^2}{90} + \frac{4}{3}x$$

$$y = -\frac{1}{90}(x^2 - 120x + 3600) + 40$$

-120, -60, 3600

$$y = -\frac{1}{90}(x - 60)^2 + 40$$

$$\frac{4}{3} \div \left(-\frac{1}{90}\right) = \frac{4}{3} \left(-\frac{90}{1}\right) = -120$$

(60, 40)

b) Will the ball clear the goal-post crossbar that is 10 ft above the ground?

$$y = \frac{4}{3}(105) - \frac{(105)^2}{90}$$

$$= 17.5' \quad \text{yes by } 7.5'$$

