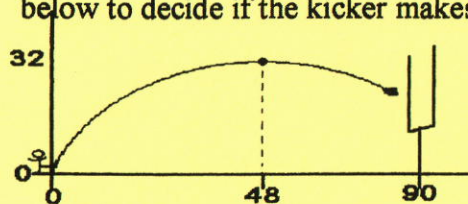


14. A football player attempts to kick a field goal from the 20 yd line (60 ft from the goalpost). The crossbar is 10 feet high, and the ball must travel over it for the field goal to count. The ball follows a parabolic flight path, reaching it's highest point (vertex) of 32 feet at a point 48 feet from where it was kicked. Use the equation and diagram below to decide if the kicker makes the field goal.



$$y = \frac{-1}{73}(x - 48)^2 + 32$$
 Where x is the distance and y is the height

15. How far does the ball travel before hitting the ground?

HINTS!!

1. Multiply base and height. (You'll have to distribute.)
2. Set your answer to #1 equal to the area and solve for x .
- 3&4 Maximizing is all about finding the vertex.
5. If the widths are both x , then she has $50-2x$ left for the length. Treat it like #1.
6. See 3 & 4
7. Use the dimensions x and $(100-2x)/2$
8. Add up the values to get a complex number, then find it's absolute value
9. Plug in the correct value for " t "
10. Your height is zero ($h = 0$)
11. Plug n' chug
12. see 3 & 4
13. The 2 "roots"
14. Plug the appropriate value for x in.
15. Set the height equal to 0 and solve for distance.

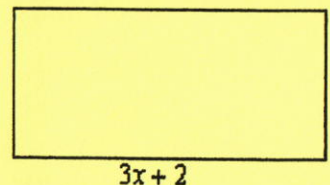
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NAME:

ALGEBRA II HONORS

Quadratic Applications

- 1. Find the area of the rectangle by multiplying $base \times height$**



2. If the area of the rectangle is 8 ft^2 what are the possible values for x ?

3. Jack's Computers manufactures computers for sale over the internet. According to economic laws of supply and demand, if they make too few computers, then they won't sell as many as they could, but if they make too many, they won't sell them all. Y = profit. X = # of computers manufactured. How many computers should they make to maximize their profits?

$$y = -10x^2 + 1300x - 40,000$$

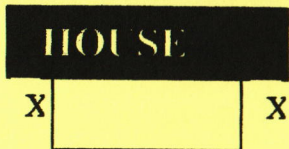
4. Scientists determined that the rate y (in calories per minute) at which you use energy while walking can be modeled by

$$y = 0.00849(x - 90.2)^2 + 51.3$$

where x is your speed in meters per minute. What walking speed minimizes energy use?

Page 1

5. Brooke is building a fence around her flower garden. She is going to use the side of her house as 1 side and has 50 feet of fencing for the other 3 sides. What should the length of the fence be to have the biggest flower garden possible?



6. Rebecca breeds and sells Peruvian fighting frogs. She currently has 22 females and wants to purchase some males to maximize the number of offspring. With too few males, they won't breed quickly, with too many, they'll spend time fighting rather than breeding. Y = number of offspring, X = # of males to purchase. How many males should she purchase to maximize the number of offspring?

$$y = -x^2 + 58x - 760$$

7. You want to build rectangular a pen for your dog, Buck. You have 100 feet of fencing. What dimensions would give your dog the most room to run and chase squirrels?

8. *Impedance* is a measure of the resistance to an electrical flow. The impedance of a resistor is a real number while it is an imaginary number for inductors and capacitors. To find the impedance of a circuit, find magnitude (absolute value) of the sum of the components. What is the impedance of a circuit passing through a resistor with impedance 5, an inductor with impedance $6i$ and a capacitor with impedance $12i$?

PROJECTILE MOTION

9. A falling object height from the ground is modeled by the equation $h = -16t^2 + h_0$ Where h is the current height from the ground in feet, h_0 is the height it started out from in feet, and t is time in seconds. If you jump out of a plane at 12,000 ft (with a parachute), how far above ground will you be in 20 seconds?

10. If your 'chute doesn't open, how much time do you have before you hit the ground? (do not try this at home)

11. Throwing a ball straight up in the air, its height can be found using the equation

$$h = \frac{3}{2}vt - 0.5at^2$$

where h is height of ground (feet), v is the speed at which it was thrown(mph), t is the time (seconds) and a is the gravitational acceleration of 30 feet per second². If you throw the ball at 60 mph, how high off the ground is it in

a) 2 seconds?

b) 3 seconds?

c) 5 seconds?

12. What is the maximum height achieved by the ball?

13. At what 2 times is the height 0?