Quadratic Word Problems Day One

Examples:
Learn calculator buttons w/potato problem

Ex. 1. (non calculator) A model rocket is launched from the roof of a building. Its flight path is modeled by $h(t) = -5t^2 + 30t + 10$ where h is the height of the rocket above the ground in meters and t is the time after the launch in seconds. What is the rocket's maximum height?
Ex.2. (calculator problem) A water balloon is catapulted into the air so that its height h, in meters, after t seconds is. $h(t) = -4.9t^2 + 27t + 2.4$. How high is the balloon after 1 second? For how long is the balloon more than 30 m high? What is the maximum height of the balloon? When will the balloon burst as it hits the ground?

Problems to work:

1. (calculator problem) The number of board feet in a 16 foot long tree is approximated by the model $F(d) = 0.77d^2 - 1.32d - 9.31$ where F is the number of feet and d is the diameter of the log. How many board feet are in a log with diameter 12 inches? What is the diameter that will produce the minimum number of board feet?

2. (calculator problem) The number of horsepower needed to overcome a wind drag on a certain automobile is given by $N(s) = 0.005s^2 + 0.007s - 0.031$, where s is the speed of the car in miles per hour. How much horsepower is needed to overcome the wind drag on this car if it is traveling 50 miles per hour? At what speed will the car need to use 200 horsepower to overcome the wind drag?

3. (calculator problem) Spencer hits a golf ball off the tee. The height of the ball is given by $y = -16x^2 + 100x + .007$, where y is the height in yards above the ground and x is the horizontal distance from the tee in yards. How far does Spencer hit the ball? What is the maximum height of the ball?

4. (calculator problem) While playing catch with a teammate, Kason throws a ball as hard as possible into the air. The height h in feet of the ball is given by $h(t) = -16t^2 + 64t + 8$, where t is time in seconds. How long will it take until the ball reaches Jackson's glove if he catches it at a height of 3 feet? What is the maximum height of the ball?

5. (calculator problem) During WW1, mortars were fired trenches 3 feet down. The mortars had a velocity of 150ft/s. Determine how long it will take for the mortar shell to strike its target.

6. The number of baseball games that must be scheduled in a league with n teams is given by $G(n) = \frac{n^2-n}{2}$ where each team plays every other team exactly once. A league schedules 15 games. How many teams are in the league?

7. The value of Mason's stock portfolio is given by the function $v(t) = 50 + 73t - 3t^2$, where v is the value of the portfolio in hundreds of dollars and t is the time in months. How much money did Mason start with? When will the value of Mason's portfolio be at a maximum?

8. A foul ball leaves the end of a baseball bat and travels according to the formula $h(t) = 64t - 16t^2$, where h is the height of the ball in feet and t is the time in seconds. How long will it take for the ball to reach a height of 64 feet in the air?

Quadratic Word Problems Day Two

Ex 3. Eight more than the square of a number is the same as 6 times the number. Find the number.
Ex. 4 Find two consecutive integers whose product is 56. (how would you set up consecutive odd/even integers?)
Ex. 5 A rectangular field will be fenced on all four sides. There will also be a line of fence across the field, parallel to the shorter side. If 900 ft of fencing are available, what dimensions of the field will produce the maximum area? What is the maximum area?
Ex. 6 Three hundred feet of fencing is available to enclose a rectangular yard adjacent to the Sabine River. There is no fence needed on the river side. What dimensions will produce an area of 10,000ft^2? What is the maximum area that can be enclosed?

Problems to work:
9. If a number is added to twice its square, the result is 6. Find the number.

10. Find two consecutive positive odd integers whose product is 35.

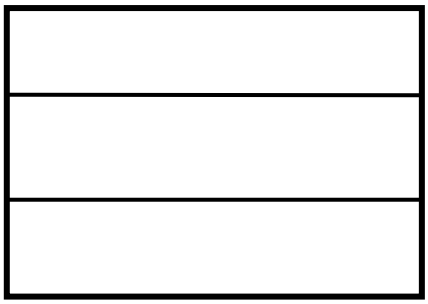
11. Find two consecutive even integers such that the square of the second, decreased by twice the first is 52.

12. Five hundred feet of fencing is available to enclose a rectangular lot along the side of Hwy 80. TxDOT will supply the fencing for the side along the highway, so only three sides are needed. What dimensions will produce an area of 30,000ft^2? What is the maximum area that can be enclosed?

13. Two adjacent rectangular pens are to be made from 200 yds of fencing. Determine the dimensions that will produce the maximum area.

14. Mrs. Meyers wants to make an enclosed rectangular are for a mulch pile. She wants to make the enclosure in such a way as to use a corner of her back yard. She also wants it to be twice as long as it is wide. Since the yard is already fenced, she simply needs to construct two sides of the mulch pile enclosure. She has only 15 feet of material available. Find the dimensions of the enclosure that will produce the maximum area.

15. Three rectangular corrals are to be made from 800 meters of fencing as seen below. Determine the dimensions that will produce the maximum area. What is the area of one of the corrals?



Quadratic Word Problems Day Three

Ex. 7 The length of a photograph is 1 cm less than twice the width. The area is 45 cm^2. Find the dimensions of the photograph.

Ex. 8 The dimensions of a rectangular garden were 3 m by 10 m. When both dimensions were increased by equal amounts, the area of the garden doubled. Find the dimensions of the new garden.

Ex. 9 A rectangular lawn measuring 8 m by 4 m is surrounded by a flower bed of uniform width. The combined area of the lawn and the flower bed is 165m^2. What is the width of the flower bed?

Ex. 10 A mural is to be painted on a wall that is 15 m long and 12 m high. A border of uniform width is to surround the mural. If the mural is to cover 75% of the area of the wall, how wide must the border be, to the nearest tenth of a meter?

Problems to work:

16. The length of a Ping-Pong table is 3ft more than twice the width. The area of a Ping-Pong table is 90 square feet. What are the dimensions of a Ping-Pong table?

17. The width of a rectangle is five decreased by twice the length. What is the maximum area of such a rectangle?

18. The base of a triangle is one more than four times the height. Determine the dimensions that will give a total area of 9cm^2.

19. The perimeter of a rectangle is 100 ft. What is the maximum area of such a rectangle?

Quadratic Word Problems Day Four

Ex. 11 Tickets to a school dance cost $4 and the projected attendance is 300 people. for every $0.10 increase in ticket price, the dance committee projects that attendance will decrease by 5. Determine the dance committee's greatest possible revenue. What ticket price will produce the greatest revenue?

Problems to work:

20. Last year, talent show tickets were sold for $11 each and 400 people attended. It has been determined that an increase of $1 in ticket price would cause a decrease in attendance of 20 people. What ticket price would maximize revenue?

21. An electronics store sells about 70 of a new model of digital camera per month at a price of $320 each. For each $20 decrease in price, about 5 more cameras per month are sold. How can the store maximize their monthly revenue from the sales of the camera?

Be sure that you have answered all questions in a complete sentence.
Double check that you have drawn pictures when the problem uses a picture.
Triple check that you have included all units of measure in your answers.