

### Quadratic Word Problems - Wednesday 12/3

- 1) A ball is thrown vertically upward from ground level with an initial speed of 48 ft./s.
  - (a) Write the equation that models this situation.
  - (b) Sketch a graph. Do all the required labeling. Dash the unreasonable and make the reasonable solid.
  - (c) Find the maximum height of the ball. (d) Find the amount of time the ball is in the air.
- 2) A projectile is launched upward from the ground level with an initial speed of 98 m/s.
  - (a) Write an equation that models this situation.
  - (b) Sketch a graph. Do all the required labeling. Dash the unreasonable and make the reasonable solid.
  - (c) How high will the projectile go above the ground? (d) How long is the projectile in the air?
- 3) page 270 #38
  - (a) Write an equation that models this situation.
  - (b) Sketch a graph. Do all the required labeling. Dash the unreasonable and make the reasonable solid.
  - (c) Answer the question in the book.
- 4) page 289 #39 and #40
  - (a) Sketch a graph. Do all the required labeling. Dash the unreasonable and make the reasonable solid.
  - (b) Answer the question in the book.

### Quadratic Word Problems - Thursday 12/4

- 1) Given a rectangular garden that has a perimeter of 68 ft.
  - (a) Write a function expressing area in terms of the width. (Hint: Identify the width of the garden as “x” and the length of the garden as “y”. Write two equations, one for perimeter and one for area, in terms of “x” and “y”. Then to avoid having fractions, solve the perimeter for “x” or “y” and substitute this expression into the area equation.)
  - (b) Show a sketch of the function. Show the required labeling. Dash the unreasonable part and make the reasonable part solid.
  - (c) Find the maximum area of the garden.
  - (d) Write a reasonable domain and range for the function.
  - (e) Find the dimensions of the garden if you want the area to be 208 sq. feet.
- 2) A farmer plans to use 21 meters of fencing to enclose a rectangular pen. Only three sides of the pen need fencing because part of the existing wall will form the fourth side.
  - (a) Write a function expressing area in terms of “x” where “x” represents the side perpendicular to the existing wall.
  - (b) Sketch a graph of this function. Label all the important information. Dash the unreasonable part and make the reasonable part solid.
  - (c) Find the maximum value of the function.
  - (d) Write a reasonable domain and range for the function.
  - (e) Find the dimensions of the pen so that area would be 55 sq. meters.
- 3) page 264 #62
  - (a) Write a function expressing the area in terms of “x”.
  - (b) Graph the function in part (a). (Show all the required parts including the window used.)
  - (c) Answer the question in the book.
- 4) page 265:#13
  - (a) Write the function expressing revenue in terms of DVD players
  - (b) Graph the function in part (a). (Show all the required parts including the window.)
  - (c)What number of members leads to a maximum revenue?
- 5) page 242: #56
  - (a) Write the function expressing revenue in terms of cameras.
  - (b) Graph the function in part (a). (Show all the required parts including the window.)
  - (c)What number of members leads to a maximum revenue?

## Quadratic Word Problems - Friday 12/5

### Velocity Problems

1. Suppose a car is traveling at a rate of 66 ft. /sec (45 mi. /hr) when the brakes are applied. The function for the car's position ( $p$ ) after " $t$ " seconds is  $p(t) = -8.25t^2 + 66t$
- Draw a graph of this function. (Do all the required parts including writing the window used.)
  - How long will it take the car to travel 120 feet?
  - How long will it take the car to stop? How far will the car have traveled?
2. Joe wanted to throw an apple to Kim, who was on a balcony 23 ft. above him. Joe tossed it upward with an initial speed of 52 ft. /sec.
- Write a function expressing height above "ground" in terms of the amount of time the apple is in the air.
  - Graph the function. (Show all the required parts including the window.)
  - Kim missed the apple on the way up but then caught it on the way down. How long was the apple in the air?
  - How long is the apple in the air above the balcony?

### Area problems

4. A room 8 meters by 6 meters is to have carpet installed in one corner, leaving a strip of floor " $x$ " meters wide around the other two sides.
- Write a function expressing the area of the carpet in terms of " $x$ ".
  - Graph the function in part (a). (Show all the required parts including the window used.)
  - How wide is the strip if the area of the carpet is 25 square meters?
  - Write a reasonable domain and range for the function.
  - If the area of the carpet is at least 70% of the area of the room, what are the possible values of " $x$ "?
5. The YMCA has a 40-foot by 60-foot area in which to build a swimming pool. The pool will have a sidewalk of uniform width around 3 sides. (The director of the YMCA does not want a sidewalk along one of the long sides of the pool.) Let " $x$ " be the width of the sidewalk.
- Express the area of the pool as a function in terms of " $x$ ".
  - Draw a sketch of this function. Show the correct labeling. Dash the unreasonable part and make the reasonable part solid.
  - Find the minimum value of the function. Is this a reasonable value? Explain.
  - Find the y-intercept of the function. Is this a reasonable value? Explain.
  - The YMCA would like to construct the pool so that the area of the pool is at least half of the total area set aside for this project. Shade the part of the graph drawn in part (b) that would satisfy this condition. Then state a reasonable interval for " $x$ " that would satisfy this condition.
6. Your company is building a deck of uniform width around a 20 ft. by 40-ft. swimming pool. Let " $x$ " = the width of the deck.
- Write a function expressing area of the deck in terms of " $x$ ". (Hint" total area minus area of the pool = area of the deck)
  - Graph this function. (Show all the required parts including the window.)
  - If the deck is 6 feet wide, what is the area of the deck?
  - The cost of decking is \$4.20 per square foot. Rewrite the function in part (a) so the function expresses the cost of building the deck in terms of " $x$ ".
  - Graph the function in part (d) (Show all the parts including the window).
  - If you can spend at most \$4000 on the deck, how wide can you build the deck?

### Revenue problem

7. A charter flight club charges its club members \$400 per year. But, for each new member in excess of 60, the charge is reduced by \$5.
- Write the function expressing revenue in terms of passengers.
  - Graph the function in part (a). (Show all the required parts including the window.)
  - What number of members leads to a maximum revenue?
8. The cost of a trip on an airplane is \$540 per passenger. The Airline Company agrees to reduce everyone's ticket by \$2 for each ticket sold in excess of 150. (Example: If there are 151 passengers, then the cost per ticket is \$538.)
- Write a function expressing revenue in terms of the number of passengers.
  - Graph the function in part (a). (Show all the required parts including the window used.)
  - Write a reasonable domain and range for this function. (The airplane has a 208-passenger capacity.)
  - What number of passengers will give the company the maximum revenue? Is this domain reasonable for this function?
  - The airline must have revenue of \$80,000. Find the number of passengers needed for revenue of \$80,000. How much should the airline charge per ticket to reach the revenue of \$80,000?