

A steel ball is propelled upward from a point that is 224 feet above the ground with an initial velocity of 80 feet per second. The function $h(t) = -16t^2 + 80t + 224$ expresses the height of the ball, h , (in feet) above the ground as a function of the time, t , in seconds ($t \geq 0$). Answer the following questions.

1. What is the maximum height reached by the ball? How long did it take the ball to reach that height?

2. How high above the ground is the ball after 3.2 seconds?

3. When will the ball be 320 feet above the ground?

4. When will the ball again be 224 feet above the ground?

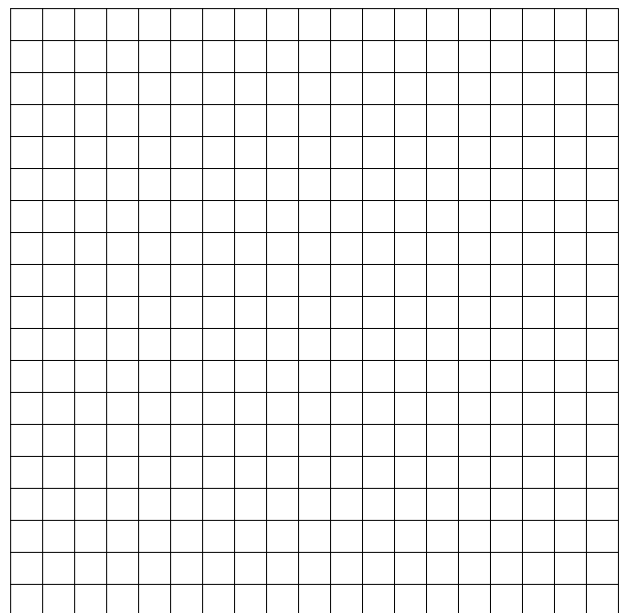
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A steel ball is propelled upward from a point that is 224 feet above the ground with an initial velocity of 80 feet per second. The function $h(t) = -16t^2 + 80t + 224$ expresses the height of the ball, h , (in feet) above the ground as a function of the time, t , in seconds ($t \geq 0$). Answer the following questions. (continued)

5. When will the ball be 150 feet above the ground?

6. When will the ball hit the ground?

7. Sketch a graph of this function from $t = 0$ until the ball hits the ground.



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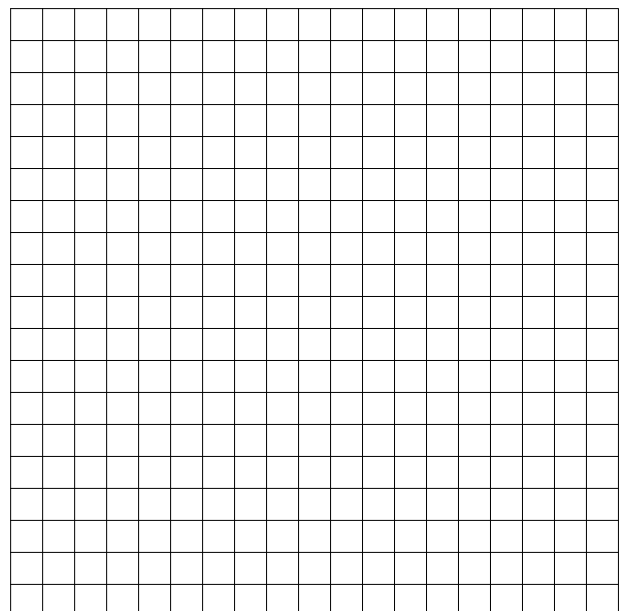
A company manufactures laboratory scales for pharmacies. They found that their monthly profit, P , depends on the selling price of the scales, s , according to the function $P(s) = -1.5s^2 + 105s - 1500$. (Assume that both P and s are measured in dollars.) Answer the following questions.

8. What value(s) of s correspond to 'break even' points (when the profit is 0)?

9. What value of s corresponds to a maximum profit? What is the maximum profit?

10. What will the monthly profit be if the scales are sold for \$40?

11. Sketch a graph of this function for values of s from 0 to \$60.



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Use an appropriate second degree function to solve each of the following problems. Show your work neatly organized on this sheet in the space provided.

12. A rectangle has two sides on the coordinate axes and one vertex in the first quadrant on the line $2x + 5y = 30$. What are the dimensions of the rectangle if its area is a maximum? What is the maximum area?

13. Sue wants to fence in a rectangular plot of land and to divide it into three equal areas using two lengths of fencing parallel to two opposite sides. If she has a total of 800 feet of fencing to work with, then find the dimensions that will maximize the total area enclosed. What is the maximum area?

14. A television set manufacturer can sell 300 sets per month for \$250 per set. Marketing research indicates that the company can sell 20 more sets per month for each \$10 decrease in price. What price per set will give the greatest monthly income? What is the maximum monthly income?

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Use an appropriate second degree function to solve each of the following problems. Show your work neatly organized on this sheet in the space provided.

15. A long piece of sheet metal 18 inches wide is to be made into a rain gutter with a rectangular cross section by bending up a vertical strip along each side. How many inches should be bent up along each side so that the gutter formed has a maximum cross-sectional area?

16. A summer theater charges \$4 per ticket and has a full house of 280 people nightly. The manager estimates that the ticket sales would decrease by 40 people for every \$1 increase in the ticket price. What price per ticket would maximize the total income? What is the maximum income?