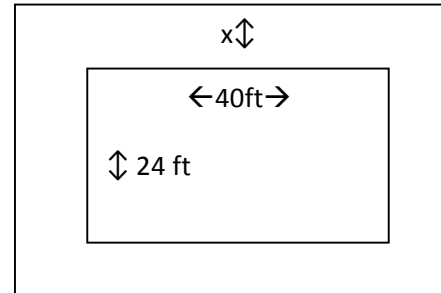


## Finding Zeros, Minimum values, and Maximum Values

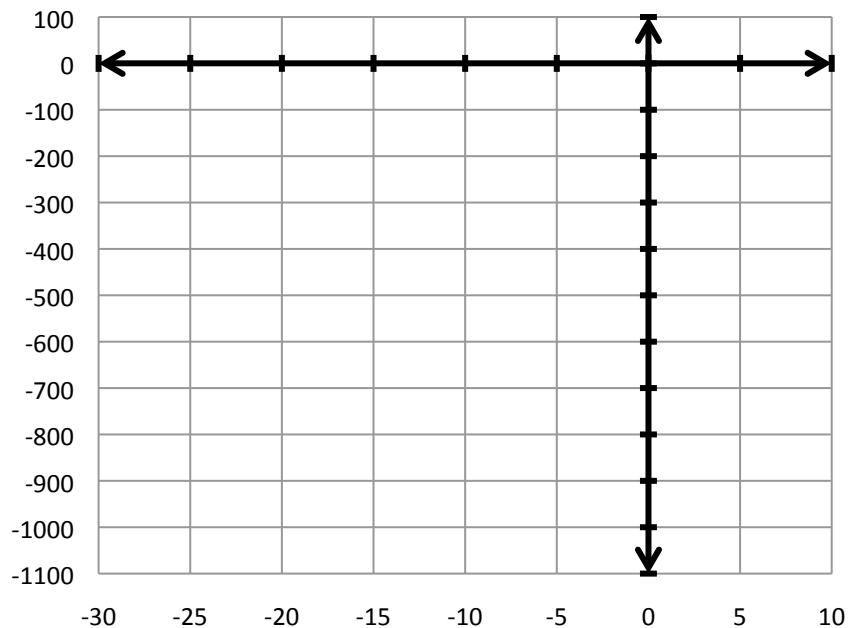
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1. A landscaper wants to put a cement walk of uniform width around a rectangular garden that measures 24 by 40 ft. She has enough cement to cover 660 square feet. How wide should the walk be to use up all the cement?
- a. Write an equation that calculates the amount of cement used when the width of the walk is  $x$  ft.



- b. What equation would you type into your calculator in order to solve for  $x$ ?

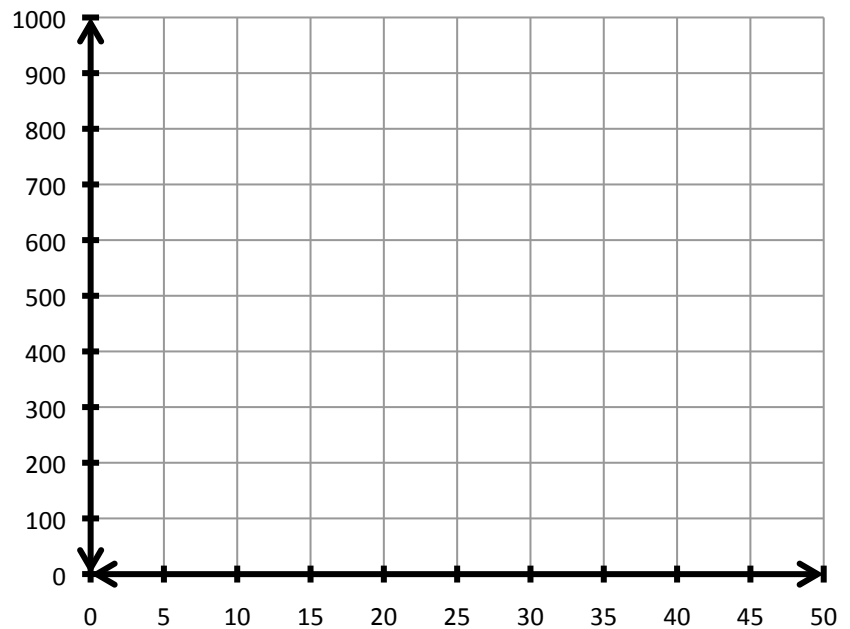
- c. Sketch a graph of the equation in part c.



- d. How wide should the walk be in order to use up all the cement?

2. A rocket is fired straight up from ground level with an initial velocity of 800 feet per second. The function  $D(x) = 800x - 16x^2$  models the height of the rocket at time  $x$  (in seconds).

- a. Sketch a graph of the function  $D(x)$ .

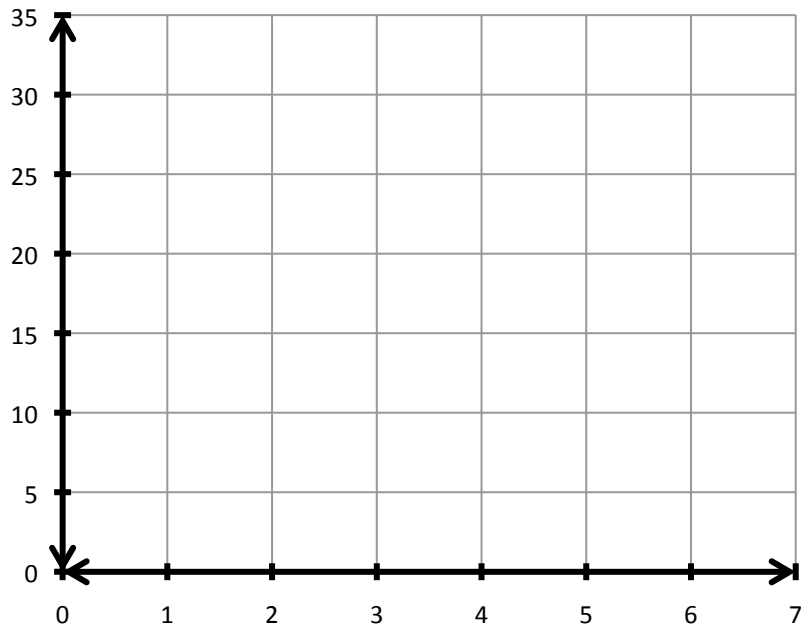


- b. How long does it take the rocket to rise 5000 ft?
- c. When will the rocket hit the ground?
- d. What is the maximum height of the rocket?
- e. At what time does the rocket reach its maximum height?
- f. List the  $x$  intercepts and interpret each?

3. A ball is thrown straight up in the air with an initial velocity of 24.5 meters per second. The distance of the ball is above the ground after  $t$  seconds is given by  $s(x) = 24.5x - 4.9x^2$ .

4.

- a. Sketch a graph of  $s(x)$ .



- b. How high does the ball rise above the ground?
- c. At what time does the ball reach its highest point?
- d. How long does it take for the ball to hit the ground?
- e. State the y-intercept and interpret.