

1. The square of a number decreased by 3 times the number is 28. Find all possible values of the number.
2. The sum of two numbers is 15 and difference of their squares is 45. Find both numbers.
3. Find two positive numbers whose ratio is 5:6 and whose product is 480
4. The product of two consecutive even integers is 48. Find all sets of integers that satisfy this description.
5. Find three consecutive positive integers such that the product of the first two is 22 less than 11 times the third.

6. The perimeter of a rectangle is 32 cm and the area is 63 cm^2 . Find the dimensions of this rectangle.

7. A rectangular picture has a width that is two-thirds its length. The picture has an area of 294 square inches. What are the dimensions of the picture?

8. A square is altered so that one dimension is increased by 4 and the other dimension is decreased by 2. The area of the resulting rectangle is 55. Find the area of the original square.

9. In a right triangle, the length of the longer leg is 7 more inches than the shorter leg. The length of the hypotenuse is 8 more inches than the length of the shorter leg. Find the perimeter of this right triangle.

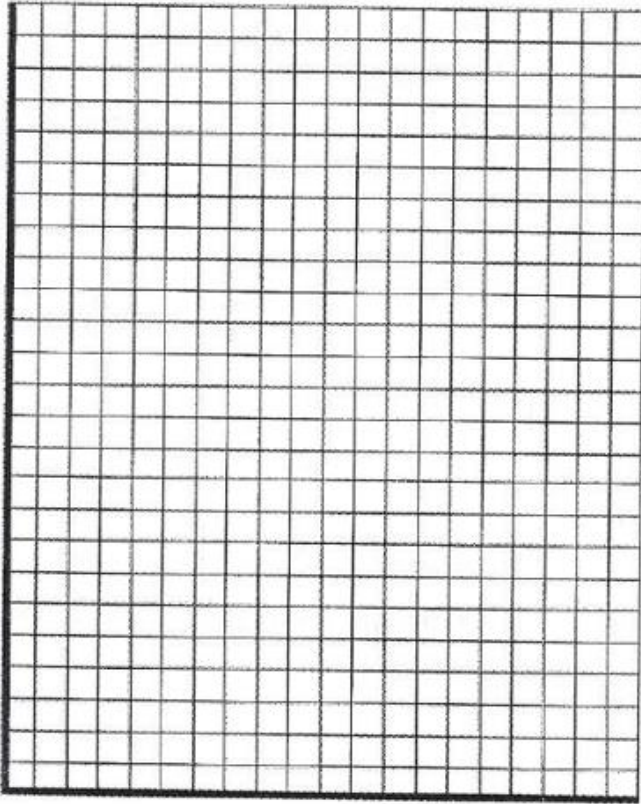
10. An object is moving such that it initially travels at a speed of 9 meters per second. It then speeds up at a rate of 2 meters per second each second. Under such conditions, the distance d , in meters, that the object travels is given by the equation $d = t^2 + 9t$, where t is in seconds. How long will it take the object to travel 22 meters?

- 11.** The profit P , in dollars, gained by selling x computers is modeled by the equation $P = -5x^2 + 1000x + 5000$. How many computers must be sold to obtain a profit of \$55,000?
- 12.** An object is launched straight up into the air at an initial velocity of 64 feet per second. Its height H , in feet, at t seconds is given by the equation $H = -16t(t - 4) + 6$. Find all times t that the object is at a height of 54 feet off the ground.
- 13.** A wood floor is partially covered by a rectangular rug that is 4 ft by 10 ft. There is a uniform width of exposed flooring. If the total area of both the rug and exposed flooring is 112 square feet, find the dimensions of the floor.
- 14.** Andy wants to have a walkway installed around his rectangular pool. His pool is 4 feet longer than it is wide. The width of the walkway is going to be 3 feet. If the area of the pool is going to be the same as the area of the walkway, what are the dimensions of his pool? Round to the nearest tenth.

15. A rocket is launched from a cliff. The relationship between the height of the rocket $h(t)$, in feet, and the time since it is launched t , in seconds, can be represented by the function

$$h(t) = -16t^2 + 80t + 384.$$

a) Using your calculator, sketch the graph of the rocket heights for all times where it is at or above the ground.



b) What is the maximum height of the rocket?

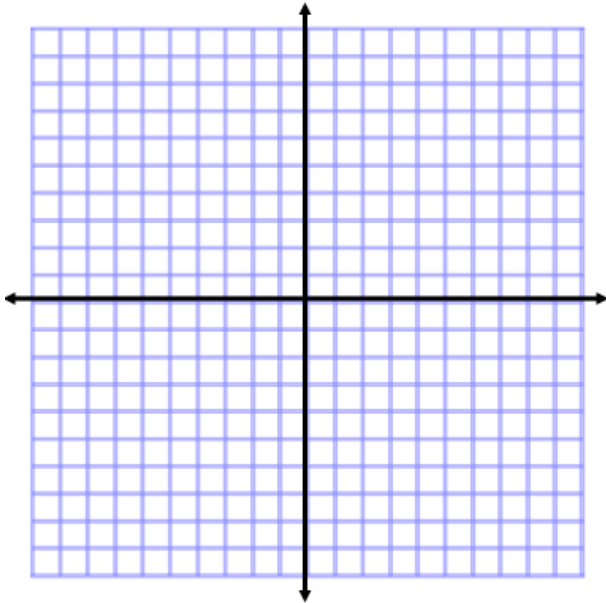
c) At what time will the rocket reach its maximum height?

d) At what time will the rocket hit the ground?

e) For what time interval is the rocket increasing?

16. A swimmer dives off a diving board in a path modeled by the quadratic function $y = (x - 4)^2 - 8$ in the interval $0 \leq x \leq 7$. The level of the surface of the water that she is diving into is represented by $y = 0$.

a) Graph the quadratic for the given interval



b) How many vertical units below the surface of the water is the diver at the lowest point of the dive?

c) What is the height of the diving board?

d) To the nearest hundredth of a second, when did the diver reach the water's surface?

17. A ball is thrown into the air with an initial upward velocity of 48 ft/s . Its height h in feet after t seconds is given by the function $h(t) = -16t^2 + 48t + 4$

a. From what height was the ball thrown?

b. What does the coefficient of t^2 tell you about the end behavior of the ball?

c. What is the height of the ball after 2 seconds have passed?

d. What is a reasonable domain and range for this situation?