

I. Review

Solve the following quadratics.

1. $x^2 + 8x + 12 = 0$

2. $x^2 + 4x - 60 = 0$

3. $3x^2 - 7x = -4$

II. Word Problems

With quadratics, we have two main types of word problems.

1. Finding a min/max:

2. Finding zeros/roots:

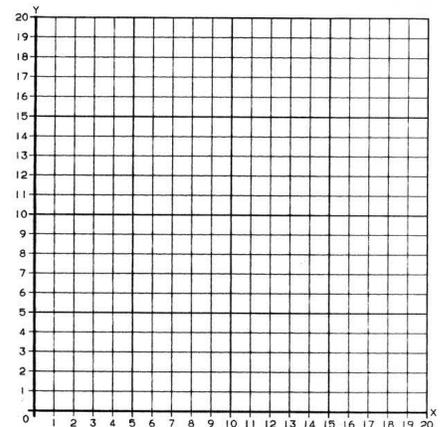
III. Practice

1. As a cat walks along the railing of a balcony, it knocks a flowerpot off the railing. The function $h(t) = -16t^2 + c$ gives the height h of the flowerpot after t seconds when it falls from a height of c feet. If the cat is 64 feet high, how long will it take the flowerpot to reach the ground? *Make a table & graph it first.

2. You throw a ball straight up into the air and catch it at the same height you released it. The height of the ball is modeled by $y = -16t^2 + 32t + 4$. Graph the equation.

a. What is the maximum height of the ball?

b. How long does it take to reach the max height?



3. In the shot put, an athlete throws a heavy metal ball through the air. The arc of the ball can be modeled by the equation $y = -0.04x^2 + 0.84x + 2$, where x is the horizontal distance, meters, from the athlete and y is the height, in meters, of the ball. How far from the athlete will the ball land?

4. A frog leaps into the air. The equation to model this is $f(x) = -3x^2 + 4x + 7$.
- What is the frog's maximum height?
 - When does he reach that height?
 - When does he land back on the ground?
5. A football player punts a ball. The path of the ball can be modeled by the equation $y = -0.004x^2 + x + 2.5$, where x is the horizontal distance, in feet, of the ball. How far from the football player will the ball land?
6. Mary Poppins is using her umbrella to fly. The equation to model this situation is $y = -2x^2 + 12x - 14$.
- What is Mary's maximum height?
 - When does she reach that height?
 - When does she return to the ground?
7. Jason jumped off a cliff into the ocean in Acapulco while vacationing with some friends. His height as a function of time could be modeled by the function $h(t) = -16t^2 + 16t + 480$, where t is the time in seconds and h is the height in feet.
- How long did it take for Jason to reach his maximum height?
 - What was the highest point that Jason reached?
 - Jason hit the water after how many seconds?
8. If a toy rocket is launched upward from a ground level with an initial velocity of 128 ft/s, then its height h after t seconds is given by $h(t) = 16t^2 + 128t$.
- How long will it take for the rocket to return to the ground?
 - After how many seconds will the rocket be 112 feet above the ground?
 - How long will it take the rocket to hit its maximum height?
 - What is the maximum height?
9. One of the games at a carnival involves trying to ring a bell with a ball by hitting a lever that propels the ball into the air. The height of the ball is modeled by the equation $h(t) = -16t^2 + 39t$. If the bell is 25 feet above ground, will it be hit by the ball?