SOME APPLICATIONS OF QUADRATIC EQUATIONS

1. Cathy hit a golf ball 180 yards down the fairway. If the ball reached a maximum height of 25 yards, find the equation for height of the golf ball versus the distance it has traveled.

2. A rocket at ground level is fired into the air. After one second the rocket is at 35 feet above the ground and after two seconds it is at 40 feet above the ground.

(a) What three data points are given above?

(b) Draw and label a sketch of the graph of this parabola.

(c) Find the equation of the parabola that fits the data.

(d) When will the rocket hit the ground?

(e) What is the maximum height of the rocket?

3. Another rocket is shot into the air. After 2 seconds, the rocket is estimated to be at an altitude of 110 feet and after 4 seconds it is at an altitude of 180 feet.

(a) Find the equation of the parabola that fits the data. Remember it starts on the ground.

(b) Find when the rocket will hit the ground.

(c) Find the maximum height of the rocket.

4. A baseball is thrown from center field to home plate. If the catcher is 300 feet from the center fielder and the ball attains a maximum height of 30 feet, find an equation to model the path of the baseball assuming it follows the path of a parabola. You can assume the ball starts and ends at ground level.

(a) How high is the ball as it passes the pitcher's mound (60 feet, 6 inches from home plate)?

5. Allaina kicks a ball just clearing a 15 foot fence. The ball lands 40 feet from the point where she had kicked it. If she was ten feet from the fence when she kicked the ball, find the equation for the height of the ball versus the distance traveled. What was the maximum height of the ball?

6. A spaceship is approaching a star and is caught in its gravitational pull. When the ship's engines are fired the ship will slow down, momentarily stop, and then, hopefully pick up speed, move away from the star, and not be pulled in by the gravitational field. The engines were engaged when the ship was 750 thousand miles away from the star. After one minute the ship was 635 thousand miles away. After two minutes the ship was 530 thousand miles away from the sun.

(a) Let t be the time since the engines were engaged and y be the distance from the sun. What are the three data points given?

(b) Find the equation of the parabola that fits the data.

(c) If the ship comes within 50 thousand miles of the star, the shields will fail and the ship will burn up. Use your equation to determine whether the space ship survives.