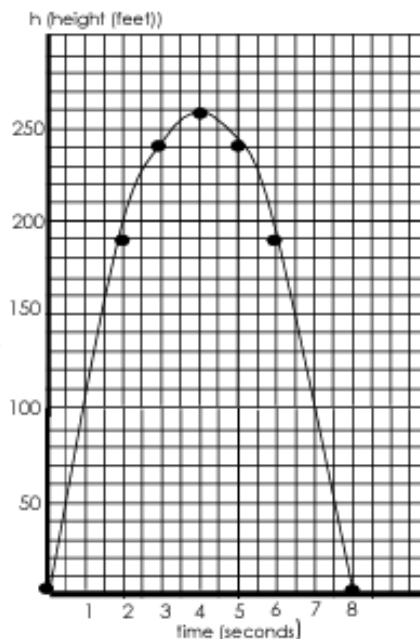


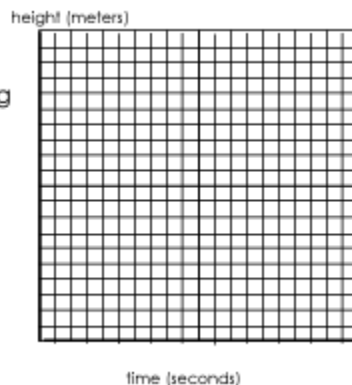
Applications of Quadratic Functions

EX. 1 Using the graph at the right, it shows the **height h** in feet of a small rocket **t seconds** after it is launched. The path of the rocket is given by the equation:
 $h = -16t^2 + 128t$.



- How long is the rocket in the air? _____
- What is the greatest height the rocket reaches? _____
- About how high is the rocket after 1 second? _____
- After 2 seconds,
 about how high is the rocket? _____
 is the rocket going up or going down? _____
- After 6 seconds,
 about how high is the rocket? _____
 is the rocket going up or going down? _____
- Do you think the rocket is traveling faster from 0 to 1 second or from 3 to 4 seconds?
 Explain your answer.
- Using the equation, find the **exact** value of the height of the rocket at 2 seconds.

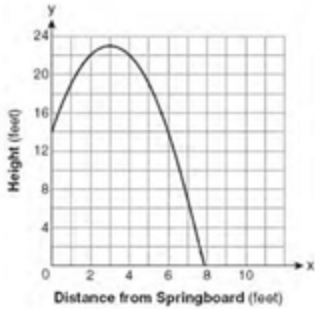
EX2: A ball is thrown in the air. The path of the ball is represented by the equation $h = -t^2 + 8t$. Graph the equation over the interval $0 \leq t \leq 8$ on the accompanying grid.



- What is the maximum height of the ball? _____
- What is the amount of time that the ball is above 7 meters? _____

*HINT: For part b, make a table from $t = 0$ to $t = 8$

EX3: A swim team member performs a dive from a 14-foot high springboard. The parabola below shows the path of her dive.



a) What is the axis of symmetry? _____

b) Find $f(6)$ _____

***HINT:** For part b, find the height when the distance is 6

1. After t seconds, a ball tossed in the air from the ground level reaches a height of h feet given by the function $h(t) = 144t - 16t^2$.

a. What is the height of the ball after 3 seconds?

b. What is the maximum height the ball will reach?

c. After how many seconds will the ball hit the ground before rebound?

HINT: For part c, factor using the greatest common factor.

2. A rocket carrying fireworks is launched from a hill 80 feet above a lake. The rocket will fall into the lake after exploding at its maximum height. The rocket's height above the surface of the lake is given by the function $h(t) = -16t^2 + 64t + 80$.

a. What is the height of the rocket after 1.5 seconds?

b. What is the maximum height reached by the rocket?

c. After how many seconds after it is launched will the rocket hit the lake?

HINT: For part c, factor. Don't forget to use the GCF to start your factoring.