

Quadratics – Maximum and Minimum

Name _____

1. Jason jumped off of a cliff into the ocean in Acapulco while vacationing with some friends. His height as a function of the 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.
 - a. How long did it take for Jason to reach his maximum height?
 - b. What was the highest point that Jason reached?
 - c. When did Jason hit the water?

2. If a toy rocket is launched vertically upward from ground level with an initial velocity of 128 feet per second, then its height h after t seconds is given by the equation $h(t) = -16t^2 + 128t + 2$ (if air resistance is neglected)
 - a. After how many seconds will the rocket be 112 feet above the ground?
 - b. How long will it take the rocket to hit its maximum height?
 - c. What is the maximum height?

3. A rocket is launched from atop a 101-foot cliff with an initial velocity of 116 ft/s.
 - a. When will the rocket be at the highest point?
 - b. What is the rocket's highest point?
 - c. When will the rocket hit the ground?

4. A diver is standing on a platform 24 ft. above the pool. He jumps from the platform with an initial upward velocity of 8 ft/s.
 - a. When will the diver hit the water?
 - b. When is the diver at the highest point?
 - c. What is the diver's highest point?
 - d. What was the height of the diver at 0.5 seconds?

5. When the Verrazano Narrows Bridge opened in 1964, it was the world's largest suspension bridge. The bridge's main cable is suspended from a tower 693 feet above the roadway. The following function rule gives the height of the suspension cable at a distance from the tower d .
- $$h(d) = .00009d^2 - 0.37d + 693$$
- When is the cable closest to the road surface?
 - How far away from the tower is the lowest point on the cable?
6. A ball is thrown upward from a height of 15 ft. with an initial upward velocity of 5 ft/s.
- When will the ball hit the ground?
 - What is the highest point of the ball?
 - When will the ball reach its highest point?
 - What is the height of the ball after 0.7 seconds?
7. 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 $h(t) = -16t^2 + 39t + 2$. If the bell is 25 feet above the ground, will the ball hit the bell?
8. Find the quadratic model that best models each table of values.

a.

x	-2	-1	0	1	2
y	46	34	27	24	24

b.

x	-4	-3	0	5	12
y	52.7	53.1	24.3	-123.7	-540.9

c.

x	-4	-1	4	8	11
y	86	32	-58	-130	-183

d.

x	0	10	20	30	40
y	-180	-65	40	135	220