

Exploring Acceleration with an Android Activity Assessment

ANSWER KEY

- 1) Describe the relationship between acceleration and velocity.
Acceleration is the derivative of an object's velocity. When looking at the acceleration graph, you can determine **when** the object's maximum velocity occurred because the acceleration is zero.
- 2) Given the equation for the velocity of an object representing projectile motion: $v(t) = -32t + 40$ find an equation that can be used to model the object's acceleration.
Take the derivative of the velocity equation provided, which gives the acceleration. Therefore, the acceleration due to gravity is -32 ft/sec^2 .

Activity Extensions

Discuss the relationships of projectile motion for an object's position, velocity, and acceleration and answer the questions below.

The relationship between an object's position, velocity, and acceleration are very closely related through calculus. If you take the derivative of the object's position function you obtain the object's velocity function. If you take the derivative of the object's velocity function you get the object's acceleration function. You can integrate to go from acceleration to velocity and integrate again to get the position function.

- 1) Given the equation for the velocity of an object simulating projectile motion: $v(t) = -32t + 20$, find an equation that can be used to model the object's position.
$$h(t) = -16t^2 + 20t$$
- 2) Given the position equation for an object representing projectile motion, $h(t) = -16t^2 + 65t + 40$ find equations that can be used to model the object's velocity and acceleration.
Velocity: $v(t) = -32t + 65$
Acceleration: $a(t) = -32$