Name_____ Class_____ Date _____

Example

2 Applying the Discriminant A football is kicked from a starting height of 3 ft with an initial upward velocity of 40 ft/s. Will the football ever reach a height of 30 ft? Use the vertical motion formula $h = -16t^2 + vt + c$, where $h = 30$, v = velocity, c = starting height, and t = time to land.

$h = -16t^2 + vt + c$	Use the vertical motion formula.
$30 = -16t^2 + 40t + 3$	Substitute 30 for h, 40 for v, and 3 for c.
$-30 \quad -30$ $0 = -16t^2 + 40t - 27$	Write in standard form.
$a=-16 \quad b=40 \quad c=-27$ $b^2 - 4ac = (40)^2 - 4(-16)(-27)$	Evaluate the discriminant.
$= 1600 - 1,728$	Use the order of operations.
$= -128$	Simplify.

The discriminant is negative. The football will not reach a height of 30 ft.

Check Understanding

2. A construction worker on the ground tosses an apple to a fellow worker who is 20 ft above the ground. The starting height of the apple is 5 ft with an initial upward velocity of 32 ft/s. Will the apple reach the worker? Use the vertical motion formula.