

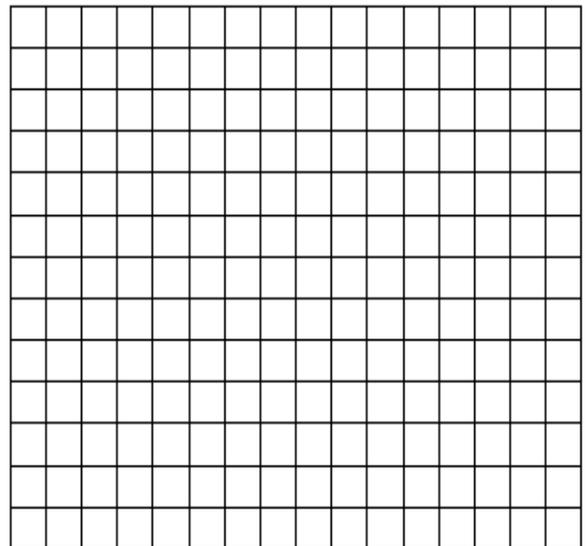
Name: _____

Height of fireworks



During the SummerFest festivities in Milwaukee, Wisconsin, firework displays are a nightly occurrence on the shore of Lake Michigan. If a rocket (firework) is launched with an initial velocity of 39.2 meters per second at a height of 1.6 meters above the ground, the equation $h = -4.9t^2 + 39.2t + 1.6$ represents the rocket's height h in meters after t seconds. The rocket will explode at approximately the highest point. Fire officials require the fireworks to explode at a height greater than 76 feet in order for debris to land in Lake Michigan and not on the festival site. The event planners assured the fire officials that the fireworks would reach a height greater than 76 feet. Are the event planners correct with their assumption? Prove your statement by using a table, graph, and solving algebraically.

Time (sec)	0	1	2	3	4	5	6	7	8
Height (m)									



Height of fireworks

Answer key



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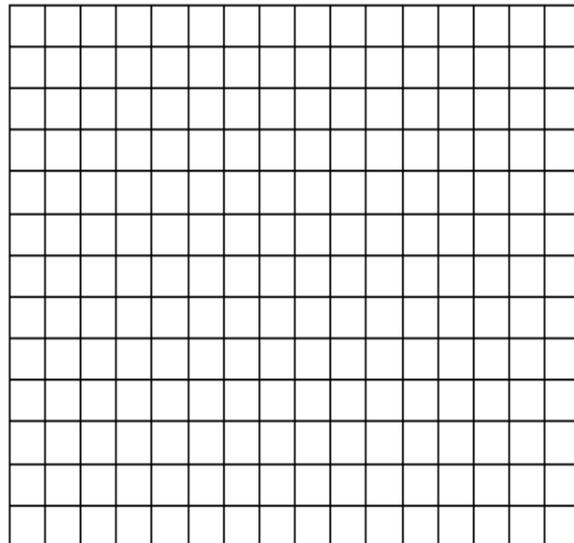
Time (sec)	0	1	2	3	4	5	6	7	8
Height (m)	1.6	35.9	60.4	75.1	80	75.1	60.4	35.9	1.6

Algebraically:

$$x = \frac{-b}{2a}$$
$$x = \frac{-39.2}{2 \cdot (-4.9)}$$
$$x = \frac{-39.2}{-9.8}$$
$$x = 4$$

At 4 seconds, the maximum height is 80 feet

Graph: (not available on answer key)



*The Event Planners were correct with their assumption because at 4 seconds the fireworks will reach a maximum height of 80 meters