

Parametric Equations 1

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Name: _____

Period: _____

- 1) An object is falling to Earth. The object is being subjected to a 4 ft/sec wind that is blowing to the East. The object started falling from a height of 256 feet.

Here is the system of parametric equations that governs the position of the falling object:

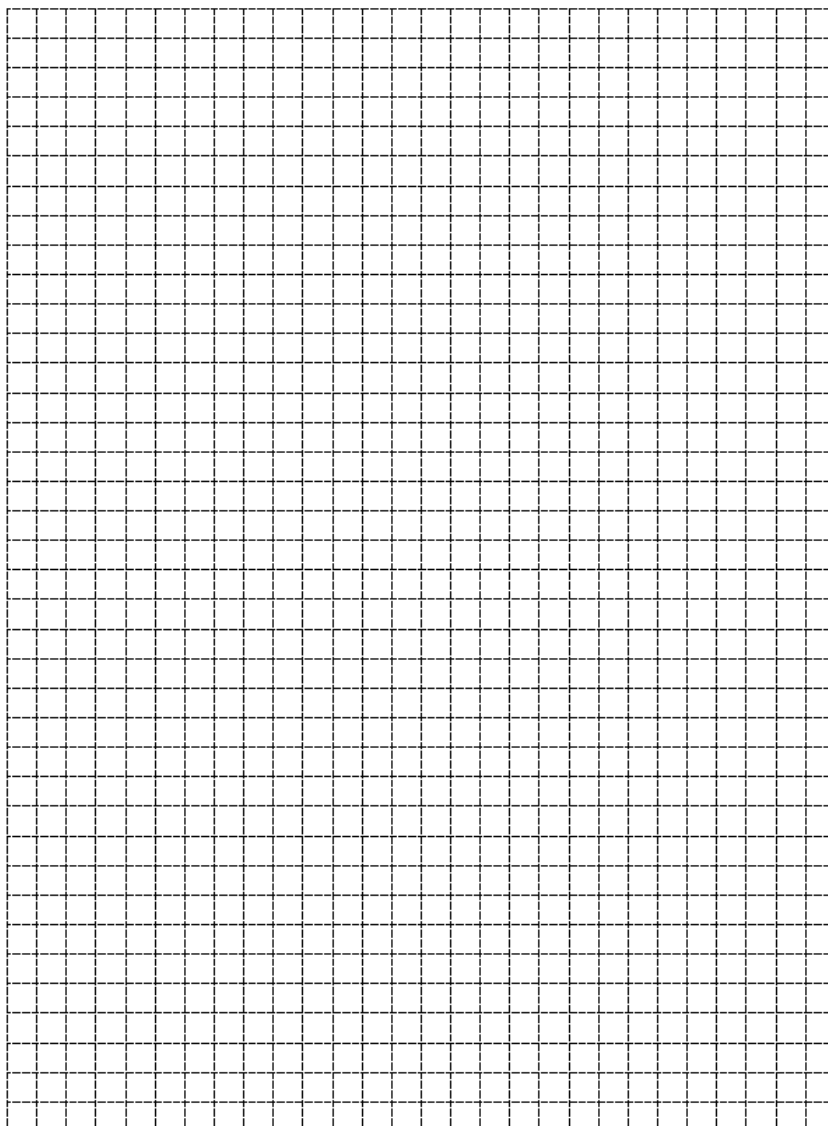
$$\begin{cases} x(t) = 4t \\ y(t) = -16t^2 + 256 \end{cases}$$

Use the table to the right to track the position of the object over time. Use this MATHguide webpage to check your responses.

<http://www.mathguide.com/cgi-bin/quizmasters3/PE.cgi>

t time (seconds)	x(t) horizontal position (feet)	y(t) vertical position (feet)
0	<input type="text"/>	<input type="text"/>
0.5	<input type="text"/>	<input type="text"/>
1.0	<input type="text"/>	<input type="text"/>
1.5	<input type="text"/>	<input type="text"/>
2.0	<input type="text"/>	<input type="text"/>
2.5	<input type="text"/>	<input type="text"/>
3.0	<input type="text"/>	<input type="text"/>
3.5	<input type="text"/>	<input type="text"/>
4.0	<input type="text"/>	<input type="text"/>

- 2) Sketch a graph of this object over time. Select appropriate horizontal and vertical scales.



- 3) If the object instead encountered a 2 ft/sec easterly wind but was dropped from the same 256 foot height, determine the system of parametric equations that governs the position of the falling object.

$$\begin{cases} x(t) = \\ y(t) = \end{cases}$$

Fill the table to the right to track its position over time.

t time (seconds)	x(t) horizontal position (feet)	y(t) vertical position (feet)
0	<input type="text"/>	<input type="text"/>
0.5	<input type="text"/>	<input type="text"/>
1.0	<input type="text"/>	<input type="text"/>
1.5	<input type="text"/>	<input type="text"/>
2.0	<input type="text"/>	<input type="text"/>
2.5	<input type="text"/>	<input type="text"/>
3.0	<input type="text"/>	<input type="text"/>
3.5	<input type="text"/>	<input type="text"/>
4.0	<input type="text"/>	<input type="text"/>

- 4) a) Sketch a graph of this object over time. Select appropriate horizontal and vertical scales.

b) On the same graph, sketch the position of the object over time if it encountered no wind.

c) Under both circumstances, at what time does the object hit the ground?

d) What are your thoughts about the horizontal force affecting the time at which the object hits the ground?

