

Physics 20

Graphing Worksheet

During an experiment, a class of physics students measure the velocity of a rocket as it launches. They have several students watching to call out when the rocket reaches certain heights, while one student measures the velocity. Since the rocket started from rest, the following formula can be used to calculate the acceleration of the rocket...

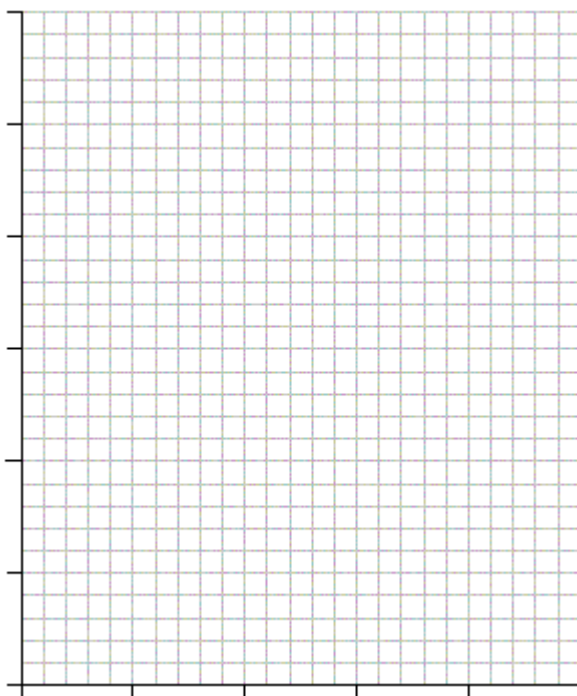
$$v^2 = 2ad$$

...where “v” is the velocity (m/s) of the rocket at each height, “a” is the acceleration (m/s²) of the rocket, and “d” is the distance (m) the rocket has traveled up from where it started on the launch pad.

The following information is gathered by the students.

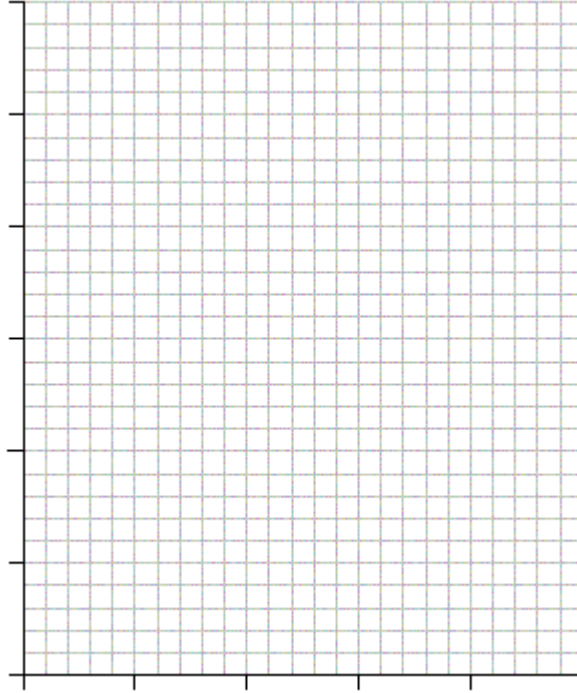
Displacement (m)	Velocity (m/s)	Velocity Squared (m ² /s ²)
25	37.4	
50	53.0	
75	64.7	
100	74.8	
125	84.0	
150	91.6	
175	99.0	
200	105.0	

1. **Determine** the values for the final column of the table of information given above and complete the table.
2. In the space provided below, **sketch** a graph of velocity as a function of displacement.



3. **Describe** the type of graph you obtained by showing velocity as a function of displacement.

4. In the space provided below, **sketch** a graph of velocity *squared* as a function of displacement.



5. **Describe** the type of graph you obtained by showing velocity *squared* as a function of displacement, and then **determine** the slope of the graph. Make sure to include units.
6. **Explain** the significance of the slope you have calculated, and how it relates to the formula $v^2 = 2ad$. Use your slope to **determine** the acceleration of the rocket.