Name: _____
Date: _____ Period _____

Acceleration, Velocity, Displacement, & Time Relationships
Unit 3: Linear Motion Worksheet IV

1. A battery-operated vehicle travels with a constant velocity of 30 m/s over a 10 s time interval. Complete the table below, and then use this data to answer the questions that follow: ½ pt per blank. (10pts)

Time Elapsed (s)	**Total Displacement** (m)	**Velocity** (m/s)	**Acceleration** (m/s^2)
0	0	30	
1		30	
2		30	
3		30	
4		30	
5		30	
6		30	
7		30	
8		30	
9		30	
10		30	

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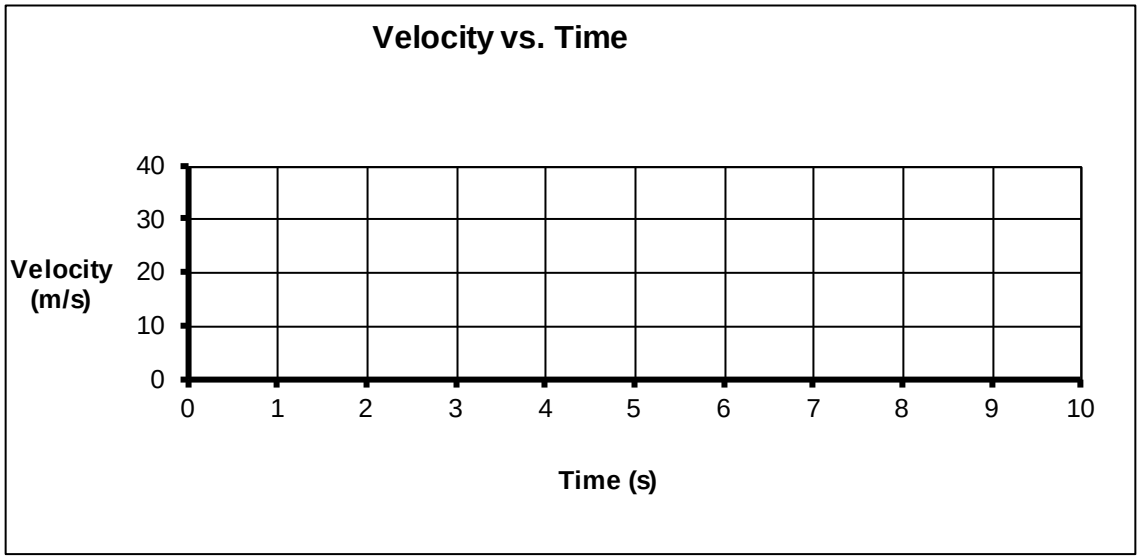
(a) Plot a graph of velocity vs. time using the previous chart. (3 pts)



i. What is the shape of the graph? (2pts)

ii. By examining your acceleration data, how could you have predicted the shape of this graph? (2pts)

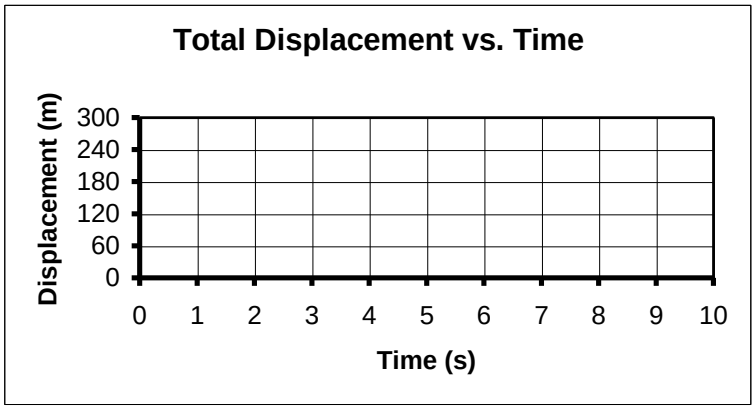
iii. What is the slope of the graph? (2pts)

iv. How does the slope of this graph relate to the acceleration of the vehicle? (2pts)

v. What is the area under the graph? (2pts)

vi. How does the area under the graph relate to the displacement of the vehicle over this time interval? (2pts)

Look back to page 1 and plot a graph of total displacement vs. time below. (3 pts)



i. What is the shape of the graph? (2pts)

ii. By examining your graph of velocity vs. time, how could you have predicted the shape of this graph? (2pts)

iii. What is the slope of the graph? (2pts)

iv. How does the slope of the graph compare with the velocity of the vehicle over the time interval?(2pts)

(b) Using only the velocity and time values, how could one determine the total displacement of the cart after any length of time? (2pts)

(c) Assuming this motion was to continue indefinitely, how far would the cart have traveled after 100 s? (2pts)

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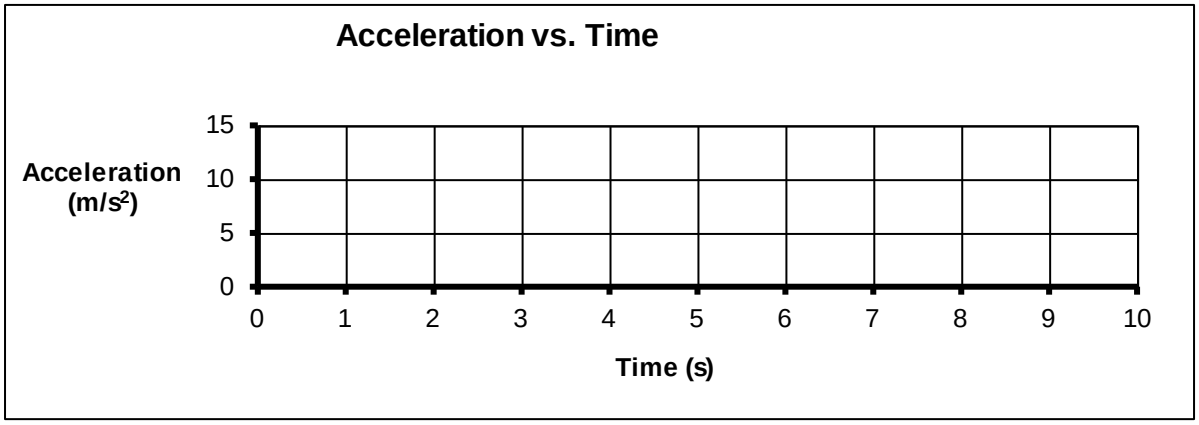
2. A motorized car accelerates at a constant rate of 10 m/s^2 over a time interval of 10 s. Complete the table below, and then use this data to answer the questions that follow: (10pts)

Time Elapsed (s)	**Total Displacement** (m)	**Velocity** (m/s)	**Acceleration** (m/s^2)
0	0	0	10
1			10
2			10
3			10
4			10
5			10
6			10
7			10
8			10
9			10
10			10

Name: _____
Date: _____ Period _____

(a) Plot a graph of acceleration vs. time, look back to the previous chart in #2. (3pts)



i. What is the shape of the graph? (2pts)

ii. What is the slope of the graph? (2pts)

iii. What does the slope of the graph tell you about the motion of the car? (2pts)

iv. What is the area under the graph? (2pts)

v. What is the significance of the area under the graph? (2pts)

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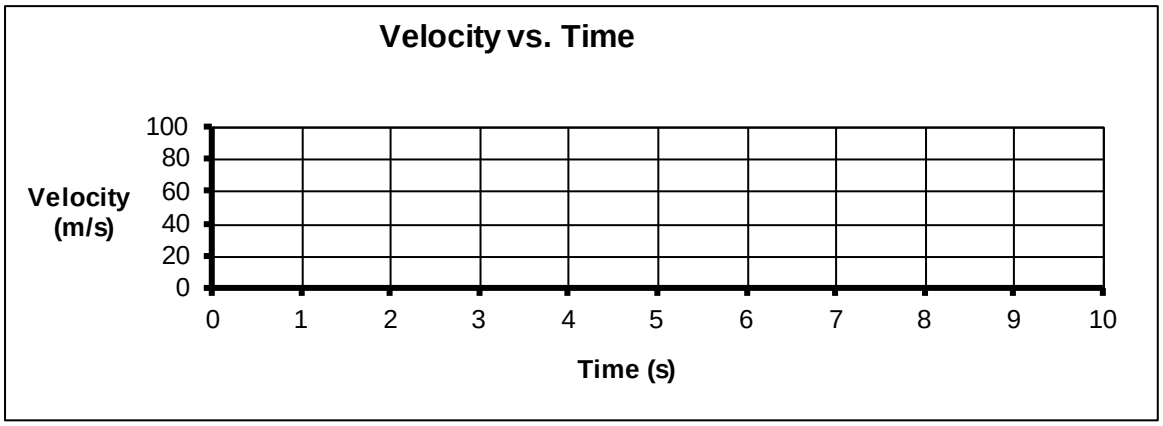
(b) Plot a graph of velocity vs. time. Look back to the previous chart in #2.(3pts)



i. What is the shape of the graph? (2pts)

ii. By examining your graph of acceleration vs. time, how could you have predicted the shape of this graph? (2pts)

iii. What is the slope of the graph? (2pts)

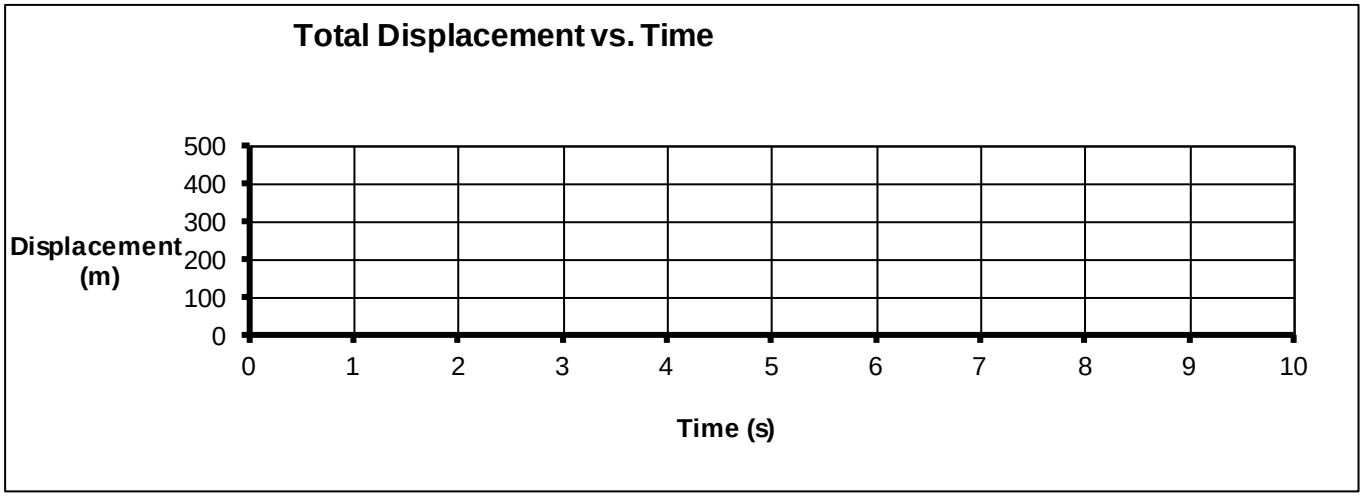
iv. What is the significance of the slope of the graph? (2pts)

v. What is the area under the graph? (2pts)

vi. What is the significance of the area under the graph? (2pts)

Name: _____
Date: _____ Period _____

(c) Plot a graph of total displacement vs. time. Look back to chart in #2. (3 pts)



i. What is the shape of the graph? (2pts)

ii. By examining your graph of velocity vs. time, how could you have predicted the shape of this graph? (2pts)

iii. Find the slope of the graph over the time interval from 0 to 10 s. What is the significance of the slope of the graph in terms of the car's velocity over that interval? (2pts)

(d) Using only the given acceleration, initial and final velocity values, and amount of elapsed time, how could one determine the total displacement of the cart after any length of time? (2pts)

(e) Assuming this motion was to continue indefinitely, how far would the cart have traveled after 100 s? (2pts)