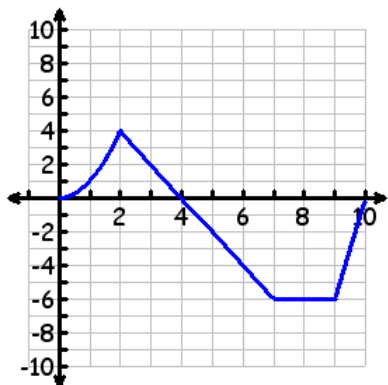
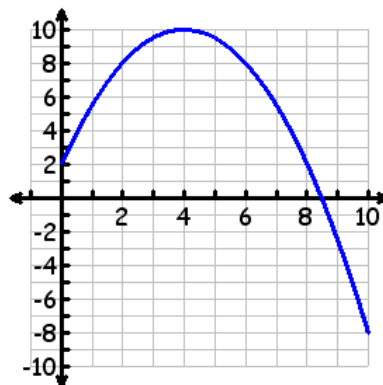




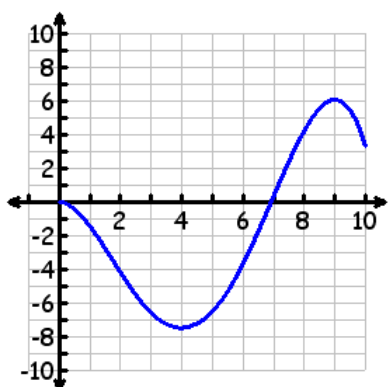
$s(t)$  #1



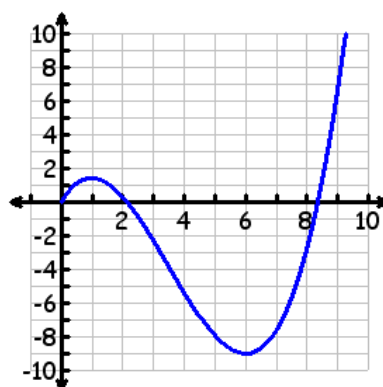
$s(t)$  #2



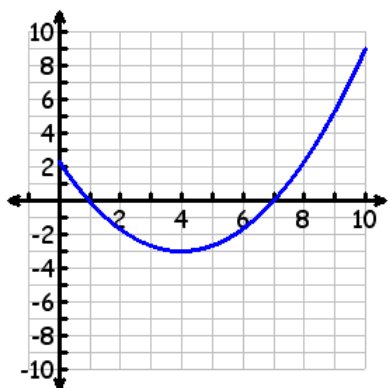
$s(t)$  #3



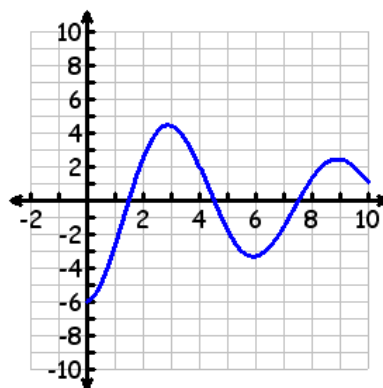
$s(t)$  #4



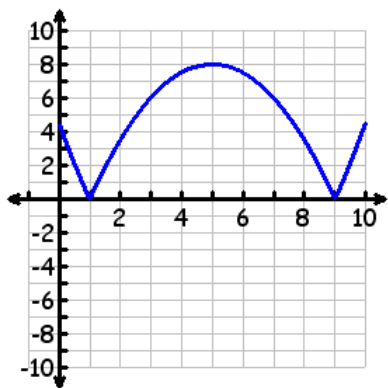
$s(t)$  #5



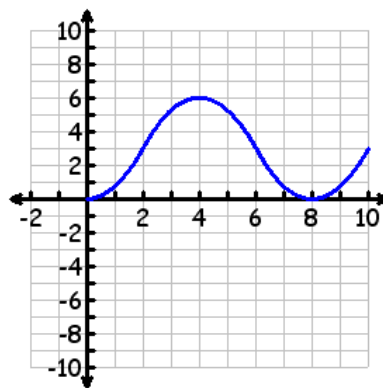
$s(t)$  #6

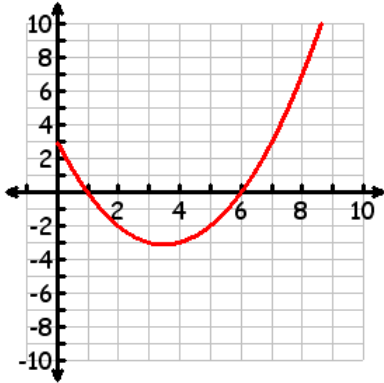
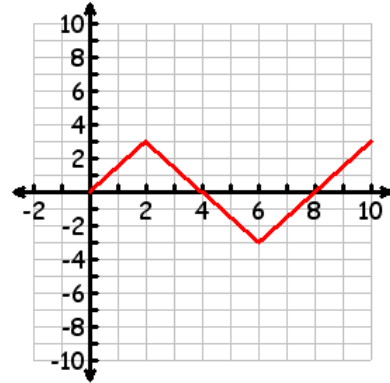
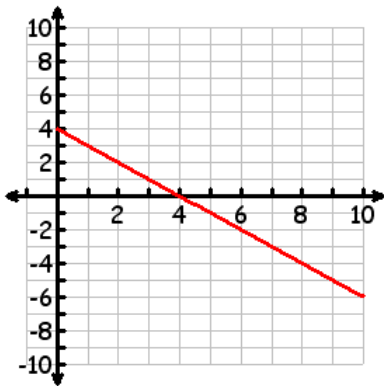
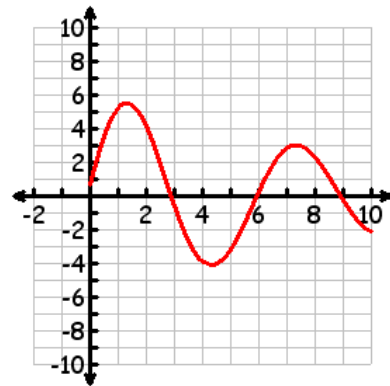
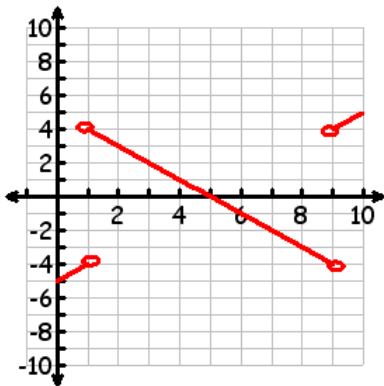
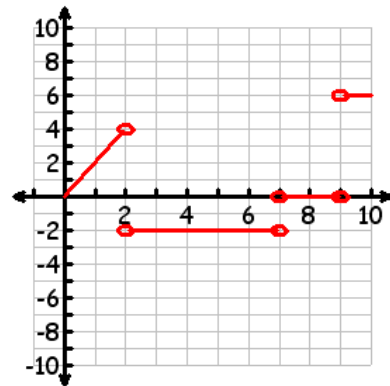
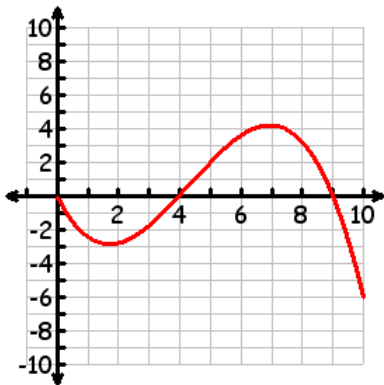
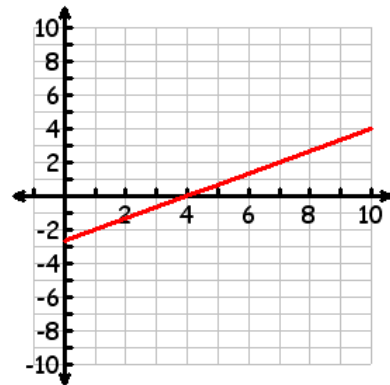


$s(t)$  #7

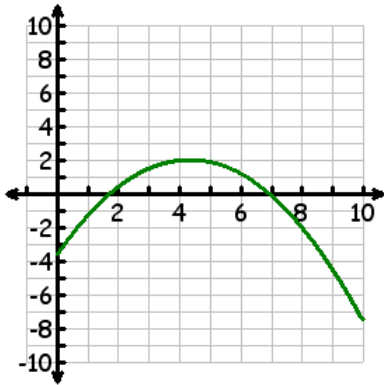


$s(t)$  #8

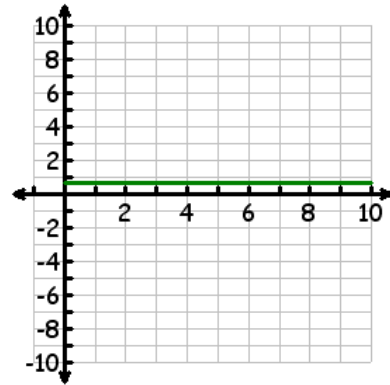


$v(t)$  #1 $v(t)$  #2 $v(t)$  #3 $v(t)$  #4 $v(t)$  #5 $v(t)$  #6 $v(t)$  #7 $v(t)$  #8

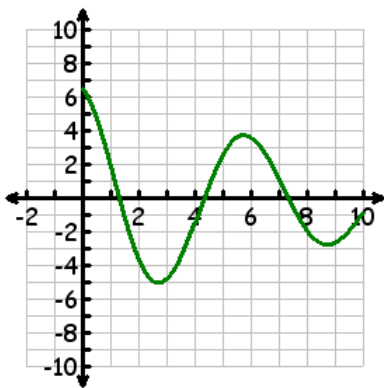
$a(t)$  #1



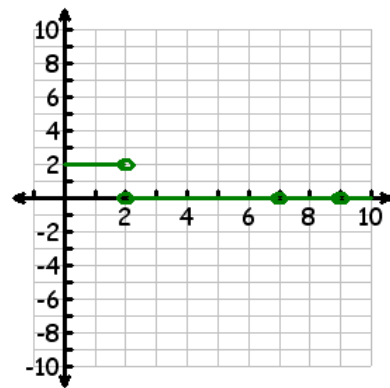
$a(t)$  #2



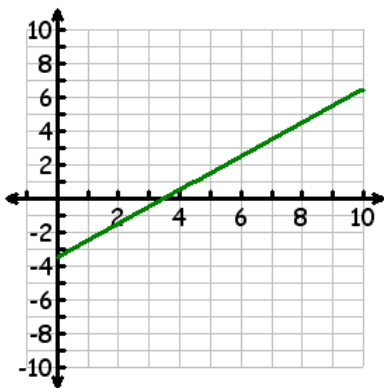
$a(t)$  #3



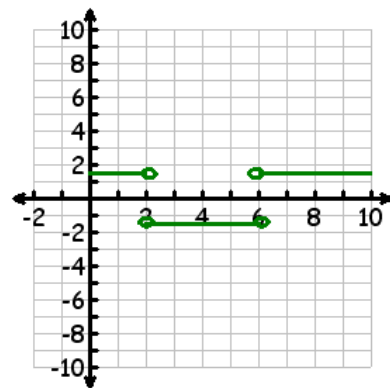
$a(t)$  #4



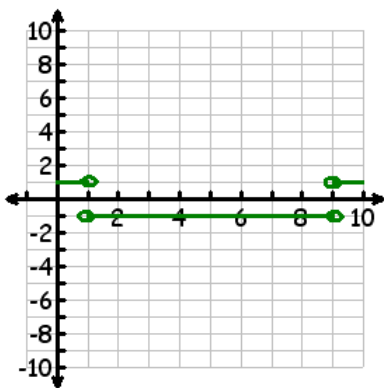
$a(t)$  #5



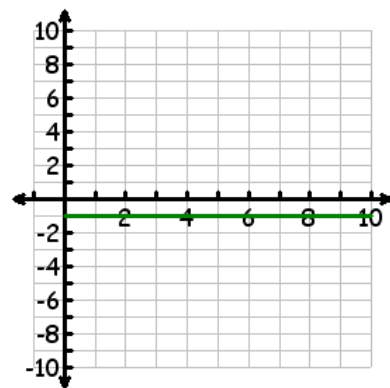
$a(t)$  #6



$a(t)$  #7



$a(t)$  #8



|  |  |
|--|--|
| <p>Description #1</p> <p>This particle starts its trip 6 units to the left of the origin.</p>                | <p>Description #2</p> <p>This particle is at rest on the interval (7, 9).</p>                          |
| <p>Description #3</p> <p>This particle slows down on the intervals (2, 4) and (6, 8).</p>                    | <p>Description #4</p> <p>The acceleration of this particle is positive throughout the entire trip.</p> |
| <p>Description #5</p> <p>This particle changes direction at <math>t = 4</math> and <math>t = 9</math>.</p>   | <p>Description #6</p> <p>The velocity of this particle is decreasing on the interval (1, 9).</p>       |
| <p>Description #7</p> <p>This particle moves to the left from <math>t = 4</math> to <math>t = 10</math>.</p> | <p>Description #8</p> <p>The velocity of this particle is increasing on the interval (3.5, 10).</p>    |

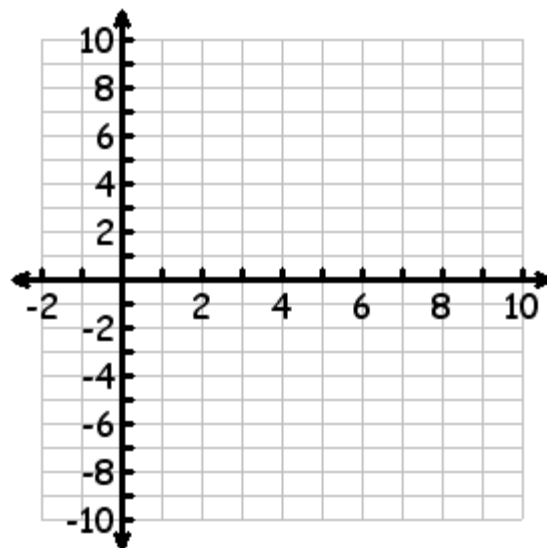
## Motion Lab Analysis Questions

- 1.) For the particle with position function  $s(t)$  #1, explain why the velocity is undefined at the times  $t = 2$ ,  $t = 7$ , and  $t = 9$ .
  
  
  
  
  
  
  
  
  
  
- 2.) For the particle with position function  $s(t)$  #2, determine the particle's average velocity and average acceleration over the interval  $[0, 10]$ .
  
  
  
  
  
  
  
  
  
  
- 3.) For the particle with position function  $s(t)$  #3, determine when the particle is moving to the right, moving to the left, and at rest. Justify your answer.
  
  
  
  
  
  
  
  
  
  
- 4.) For the particle with position function  $s(t)$  #4, determine when the particle is speeding up and slowing down. Justify your answer.
  
  
  
  
  
  
  
  
  
  
- 5.) For the particle with position function  $s(t)$  #5, the position function is given algebraically by  $s(t) = \frac{1}{3}(t-1)(t-7)$ . Find the total distance traveled over the interval  $[0, 10]$ .

6.) For the particle with position function  $s(t)$  #6, how many times does the particle change direction on the interval  $[0, 10]$ ? Explain your reasoning.

7.) For the particle with position function  $s(t)$  #7, write piecewise functions for the velocity and acceleration of the particle.

8.) For the particle with position function  $s(t)$  #8, sketch a graph of the particle's speed on the axes below.



Motion Matching Lab Teacher Answer Key

| Position Graph | Velocity Graph | Acceleration Graph | Description |
|----------------|----------------|--------------------|-------------|
| 1              | 6              | 4                  | 2           |
| 2              | 3              | 8                  | 7           |
| 3              | 7              | 1                  | 5           |
| 4              | 1              | 5                  | 8           |
| 5              | 8              | 2                  | 4           |
| 6              | 4              | 3                  | 1           |
| 7              | 5              | 7                  | 6           |
| 8              | 2              | 6                  | 3           |