

# Kinematics Review

Physics 2012

# Question 1

**Mom and Junior are driving north in a car. They pass Spike who is standing on the side of the road. Which of these statements are correct?**

1. Spike sees mom and junior driving South
2. Spike is not moving from the perspective of Mom
3. Junior is not moving from the perspective of the car
4. Spike is stationary in all perspectives
5. More than one of these is true
6. None of these are true

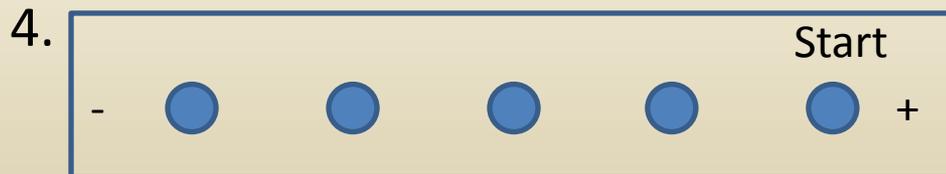
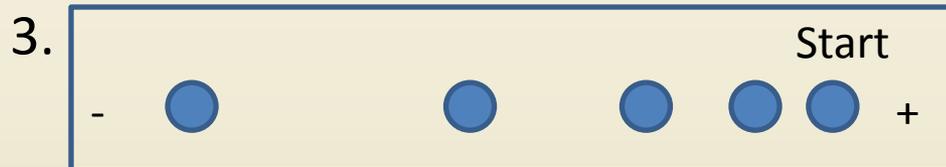
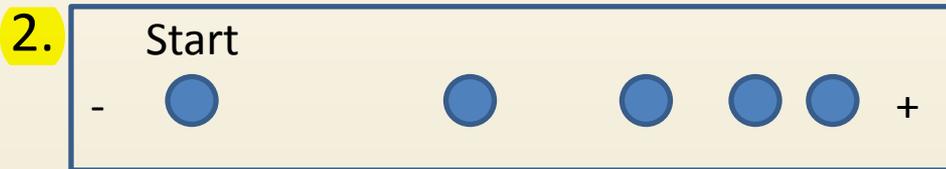
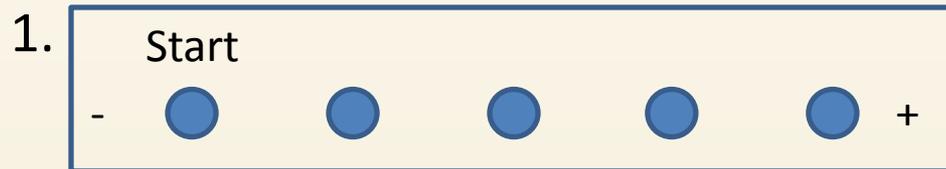
# Question 2

**Elvis is walking east and carrying a potato. Frank walks beside Elvis at the same pace and direction. How does Frank see the potato in his scope?**

1. Moving East
2. Moving West
3. Moving North
4. Moving South
5. Not moving
6. The answer cannot be determined

# Question 3

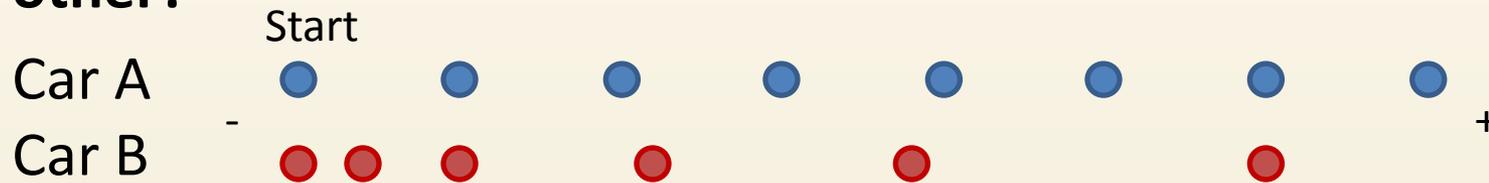
Which dot diagram shows an object that is slowing down?



5. None of the above.

# Question 4

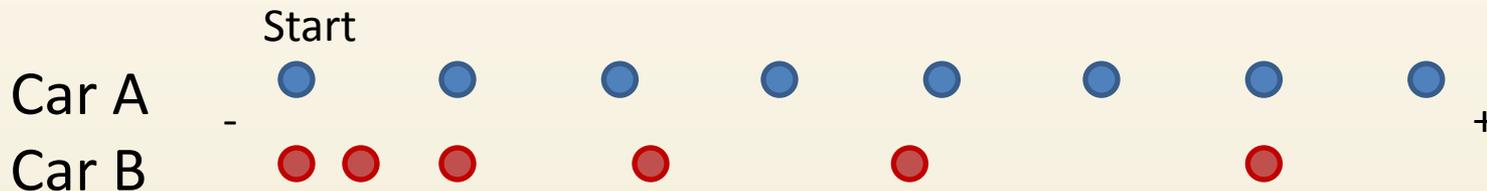
Are the cars represented in the dot diagram ever next to each other?



1. No
2. Yes, at the start
3. Yes, at the start, instant 2, and instant 7
4. Yes, at the start, instant 3, and instant 6
5. Not enough information to tell

# Question 5

What is true about the movement of Car A and Car B?



1. Car A has a greater acceleration than Car B
2. Car B has a greater acceleration than Car A
3. Car B is moving at a constant velocity
4. 1 and 3
5. 2 and 3
6. Not enough information to tell

# Question 6

**Which statements are true about an object moving at a constant speed?**

1. Any observer would see the object moving the same way
2. A graph of position vs time reading would produce a horizontal line
3. The object changes position by the same amount during any time interval
4. More than one of the above is correct
5. None of the above is correct

# Question 7

**Which of these is NOT a physical quantity? (something you can measure)**

1. Acceleration
2. Velocity
3. Mass
4. Speed
5. Ugliness
6. Time interval
7. More than one of the above are NOT physical quantities

# Question 8

**What is not a unit of measurement?**

1. m (meters)
2. cm (centimeters)
3. s (seconds)
4. m/s
5. m/s<sup>2</sup>
6.  $\Delta t$  (time interval)
7. More than one of the above is NOT a unit of measurement

# Question 9

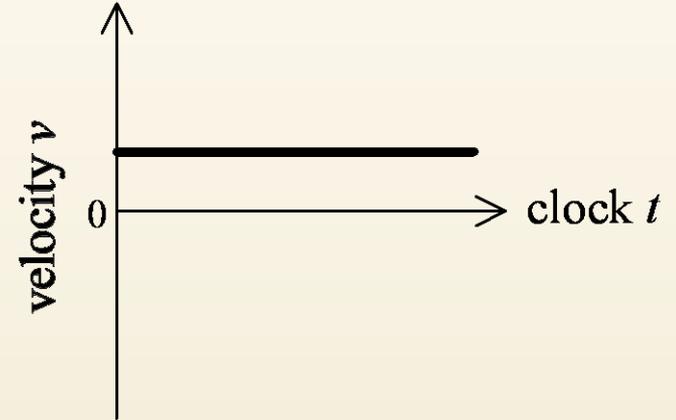
**At clock reading 2s, a rolling ball is at position 60cm. Which of the following is true?**

1. The speed of the ball is 30 cm/s.
2. The velocity of the ball is 30 cm/s.
3. The ball is rolling in the positive direction.
4. At clock reading 3s, the ball will be at position 90cm
5. More than one of the above is true
6. The answer cannot be determined

# Question 10

Which situation can match this graph?

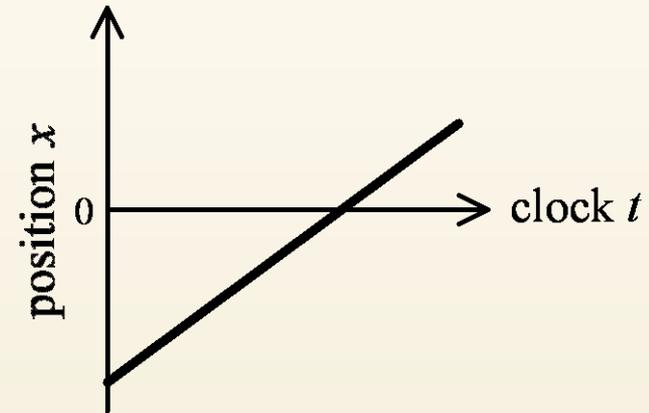
1. A pedestrian walks south at a steady pace
2. A car is parked by the side of the road
3. A ball rolls down a ramp, going faster and faster
4. A billiard ball hits a bumper and bounces back in the direction it came
5. More than one of the above
6. None of the above



# Question 11

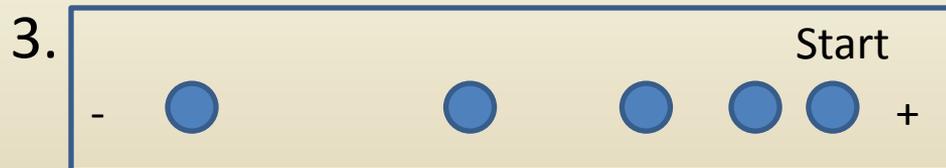
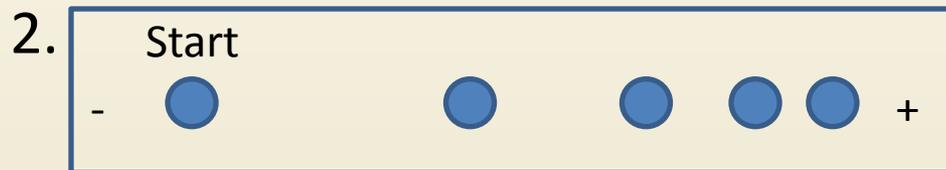
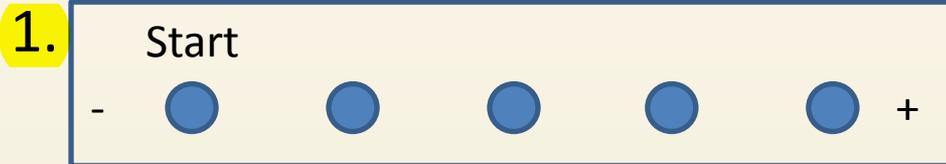
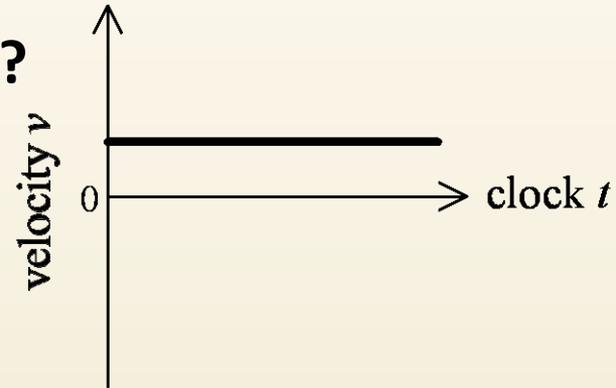
**Which situation could match this graph?**

1. An object is moving in one direction, slows to a stop, and then starts moving in the other direction
2. A pedestrian walks south at a steady pace
3. A model rocket accelerates off the launch pad
4. A skier glides straight down a hill at an increasing speed
5. A ball rolls up a ramp, slowing gradually until it stops



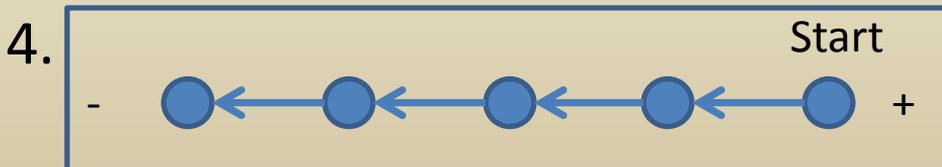
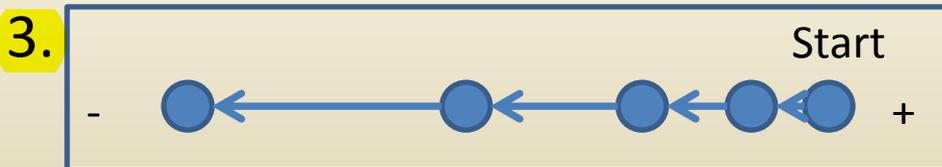
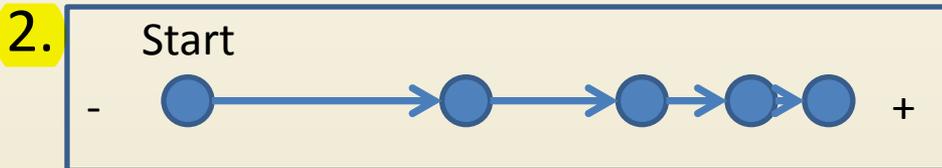
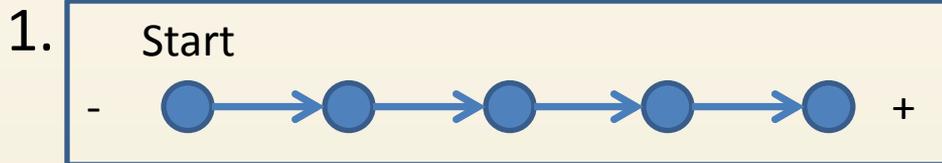
# Question 12

Which moving object could match this graph?



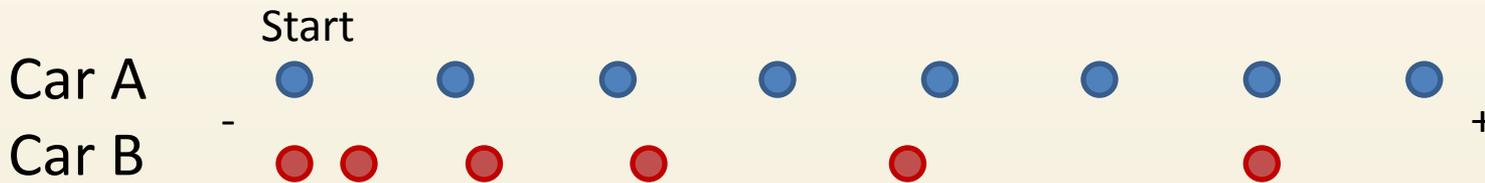
# Question 13

Which of these motion diagrams have a delta-v in the '-' dir?



# Question 14

Do the cars ever have the same speed at the same time?



1. No
2. Yes, sometime between instant 2 and 3
3. Yes, sometime between instant 3 and 4
4. Yes, sometime between instant 5 and 6
5. Not enough information to tell

# Question 15

Which equation shows an object moving in the positive direction but slowing down?

1. I only
2. II only
3. III only
4. IV only
5. V only
6. Both I and III
7. Both II and IV
8. Both II and V
9. None of them

I:  $x(t) = (20\frac{\text{m}}{\text{s}})t + (\frac{1}{2})(2\frac{\text{m}}{\text{s}^2})t^2$

II:  $x(t) = (-30\text{m}) + (5\frac{\text{m}}{\text{s}})t + (\frac{1}{2})(-4\frac{\text{m}}{\text{s}^2})t^2$

III:  $x(t) = (-10\frac{\text{m}}{\text{s}})t + (\frac{1}{2})(-3\frac{\text{m}}{\text{s}^2})t^2$

IV:  $v(t) = (-8\frac{\text{m}}{\text{s}})$

V:  $v(t) = (5\frac{\text{m}}{\text{s}}) + (\frac{1}{2})(-1\frac{\text{m}}{\text{s}^2})t$

# Question 16

**Which equation shows an object moving at a constant speed in the positive direction?**

1. I only
2. II only
3. III only
4. IV only
5. V only
6. Both I and III
7. Both II and IV
8. Both II and V
9. None of them

I:  $x(t) = (20\frac{\text{m}}{\text{s}})t + (\frac{1}{2})(2\frac{\text{m}}{\text{s}^2})t^2$

II:  $x(t) = (-30\text{m}) + (5\frac{\text{m}}{\text{s}})t + (\frac{1}{2})(-4\frac{\text{m}}{\text{s}^2})t^2$

III:  $x(t) = (-10\frac{\text{m}}{\text{s}})t + (\frac{1}{2})(-3\frac{\text{m}}{\text{s}^2})t^2$

IV:  $v(t) = (-8\frac{\text{m}}{\text{s}})$

V:  $v(t) = (5\frac{\text{m}}{\text{s}}) + (\frac{1}{2})(-1\frac{\text{m}}{\text{s}^2})t$

# Question 17

**Which statement is correct about the motion of this object, based on the information in this table?**

$t$ (s)	$x$ (cm)
10	-200
20	100
30	400

1. The object changes direction
2. The object is moving at an average velocity of 300 cm/s
3. The object's initial velocity is in the negative direction
4. The object's speed is increasing
5. More than one of these is correct
6. None of the above are correct

# Question 18

Which equation shows an object initially getting faster?

1. I only
2. II only
3. III only
4. IV only
5. V only
6. Both I and III
7. Both II and IV
8. Both II and V
9. None of them

I:  $x(t) = (20\frac{\text{m}}{\text{s}})t + (\frac{1}{2})(2\frac{\text{m}}{\text{s}^2})t^2$

II:  $x(t) = (-30\text{m}) + (5\frac{\text{m}}{\text{s}})t + (\frac{1}{2})(-4\frac{\text{m}}{\text{s}^2})t^2$

III:  $x(t) = (-10\frac{\text{m}}{\text{s}})t + (\frac{1}{2})(-3\frac{\text{m}}{\text{s}^2})t^2$

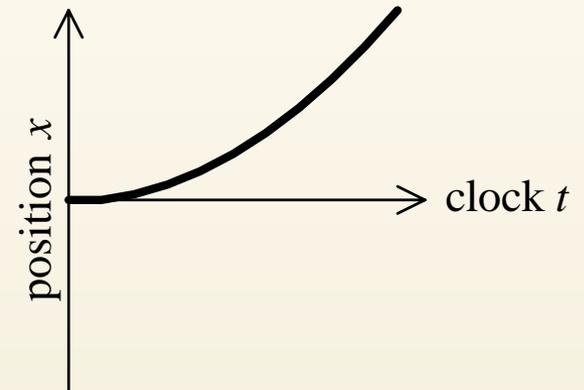
IV:  $v(t) = (-8\frac{\text{m}}{\text{s}})$

V:  $v(t) = (5\frac{\text{m}}{\text{s}}) + (\frac{1}{2})(-1\frac{\text{m}}{\text{s}^2})t$

# Question 19

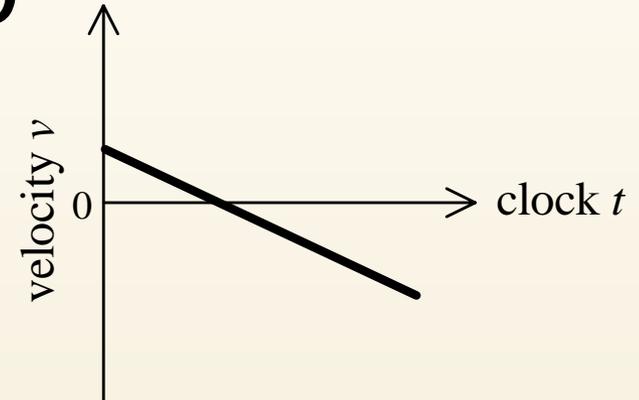
Which mathematical representation of motion could match this graph?

1.  $x = (2 \text{ m/s}) t$
2.  $v = 2 \text{ m/s}$
3.  $v = (2 \text{ m/s}^2) t$
4.  $x = 2 \text{ m}$
5. None of these



# Question 20

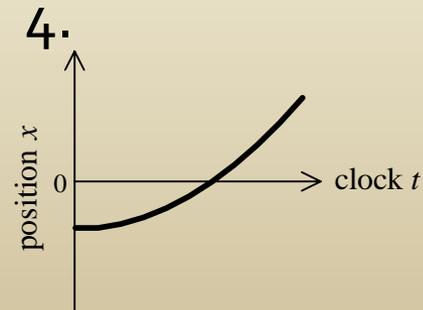
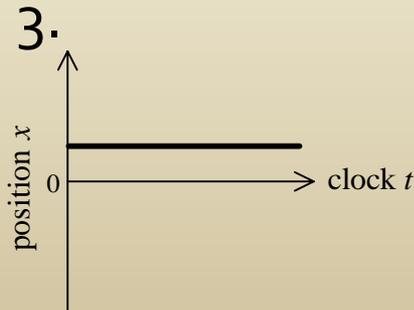
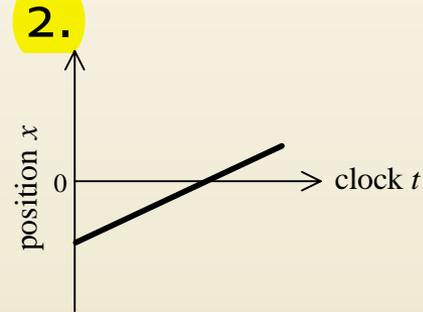
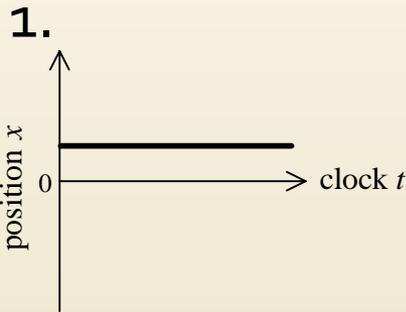
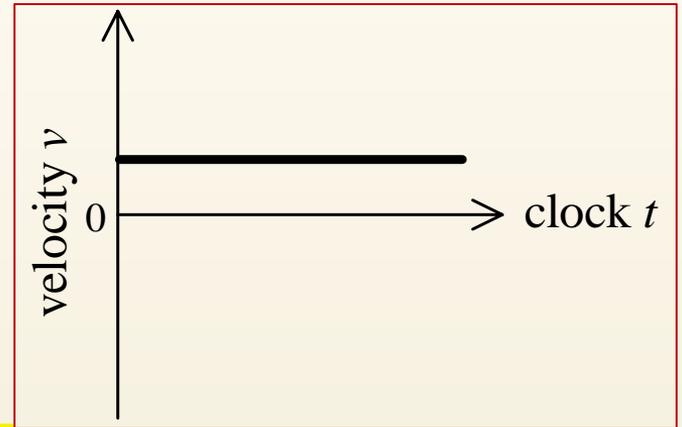
**Which statement is correct about the moving object described in this graph?**



1. The object is in motion the whole time
2. The object is going slower and slower the whole time
3. The object is moving with a constant velocity
4. The object is moving with a constant acceleration
5. None of these is correct

# Question 21

Which graph could describe the same moving object as this graph does?



# Question 22

Which graph could describe the same moving object as this graph does?

