CONCEPT: CONCEPTUAL PROBLEMS WITH POSITION-TIME GRAPHS

● You'll need to interpret position-time graphs to solve conceptual questions about position, velocity & acceleration.

EXAMPLE: The figure shows a position-graph for a moving object. At which lettered point(s):

1) is the object at the origin?

2) is the object the farthest away from the origin?

3) is the object moving forwards?

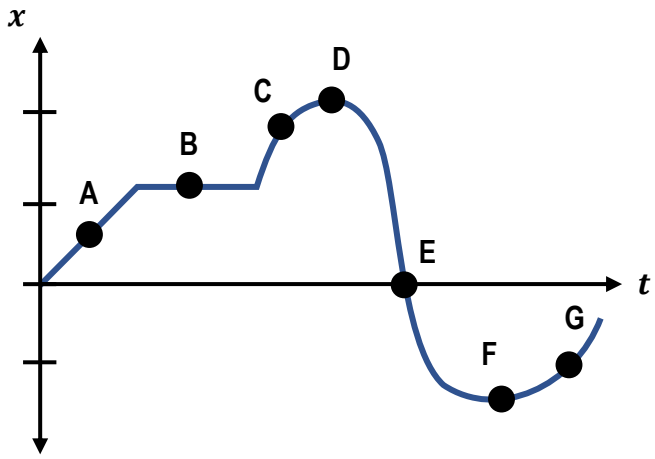
4) is the object moving backwards?

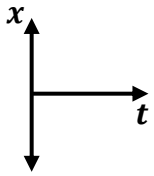
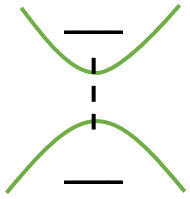
5) is the object at rest?

6) is the object's acceleration positive?

7) is the object's acceleration negative?

STEPS
1) Identify Variable: **[Position | Velocity (Speed) | Accel.]**
2) Identify Graph Feature: **[Value | Slope | Curvature]**
3) Identify Qualifier: **[+ | - | 0 | Up | Down | Sign Change | max. | min.]**
4) Interpret from Graph



	Position (x)	Velocity (v) (or Speed)	Acceleration (a)
	Value	Slope	Curvature
X-T			

EXAMPLE: Using the position-time graph for a moving car, determine the lettered point(s) where the car:

1) is moving *fastest*?

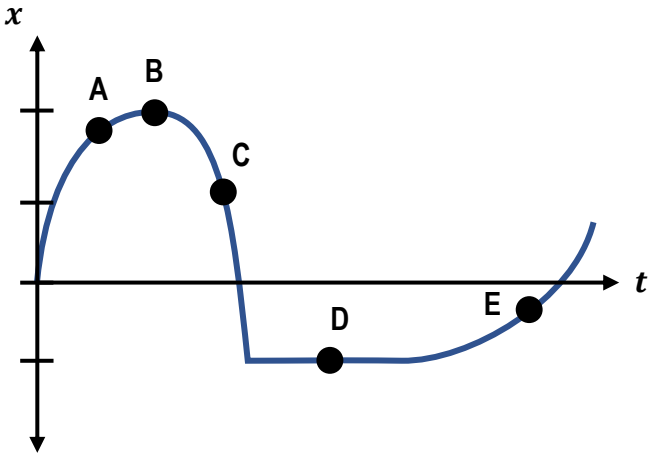
2) is moving *slowest*?

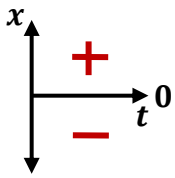
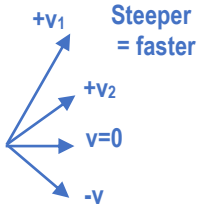
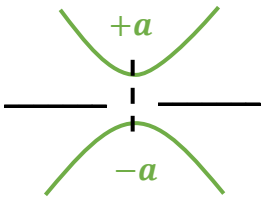
3) turns around?

4) is speeding up?

5) is slowing down?

STEPS
1) Identify Variable: **[Position | Velocity (Speed) | Accel.]**
2) Identify Graph Feature: **[Value | Slope | Curvature]**
3) Identify Qualifier: **[+ | - | 0 | Up | Down | Sign Change | max. | min.]**
4) Interpret from Graph



	Position (x)	Velocity (v) (or Speed)	Acceleration (a)
	Value	**Slope**	**Curvature**
X-T			

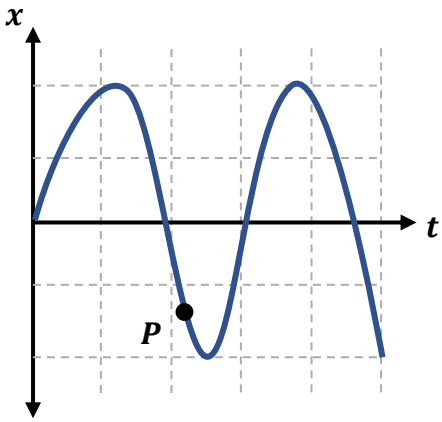
PRACTICE: The position of an object vibrating on a moving spring is represented by the diagram below. Which of the following answer choices is true of the velocity and acceleration at Point **P**?

(a) The velocity is **positive** and the acceleration is **positive**

(b) The velocity is **positive** and the acceleration is **negative**

(c) The velocity is **negative** and the acceleration is **positive**

(d) The velocity is **negative** and the acceleration is **negative**



EXAMPLE**:** The figure shows the position-time graphs for two moving bicycles, labeled **A** and **B.**

(a) At what time(s) do the bicycles have the same position?

(b) At what time(s) do the bicycles have roughly the same velocity?