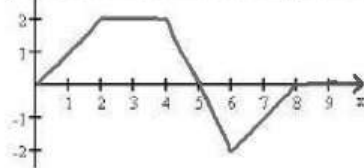


In each situation below, the graph given is the graph of the velocity function

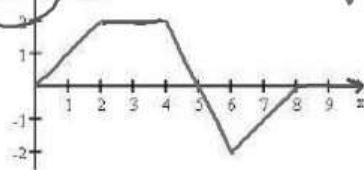
a) Determine when the particle is moving forward and moving backward



$v(t) > 0$
above x-axis
(0,5)

$v(t) < 0$
below x-axis
(5,8)

b) Determine when the acceleration of the particle is positive, negative, and zero.



$v'(t) = 0$
slope zero
 $v(t)$ constant
(2,4) \cup (8,00)

$v'(t) > 0$
slope pos
 $v(t)$ going up
(0,2) \cup (6,8)

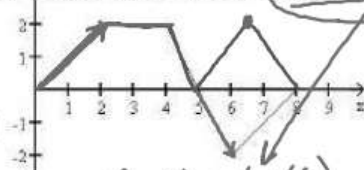
$v'(t) < 0$
slope neg
 $v(t)$ going down
(4,6)

c) Determine when the particle is at its greatest speed.

(2,4) \cup t=6 \quad $2 < x < 4$ and $t=6$

Max of the speed graph
OR
Farthest from x-axis on $v(t)$ graph

d) Determine when the speed is increasing.



speedup
 $Speed = |v(t)|$

Speed graph going up

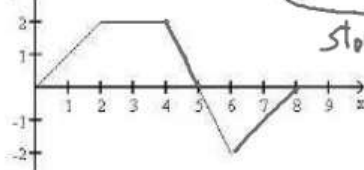
(0,2) \cup (5,6)

$v(t) > 0$ $a(t) > 0$

$v(t) < 0$ $a(t) < 0$

if $v(t)$ and $a(t)$ have the same sign

e) Determine when the speed is decreasing.

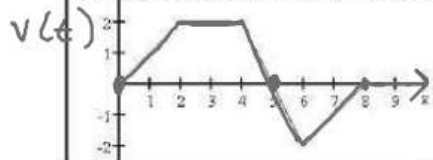


slow down

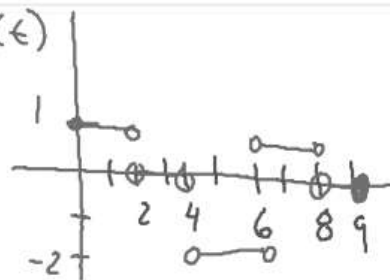
when $a(t)$ and $v(t)$ opp signs

(4,5) \cup (6,8)

f) Determine when the particle is standing still

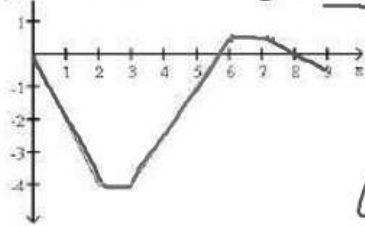


Find x -int $x=0$ $x=5$ $x=8$
 $v(t) = 0$



In each situation below, the graph given is the graph of the position function $s(t)$

a) When is P moving to the left, to the right, and standing still?

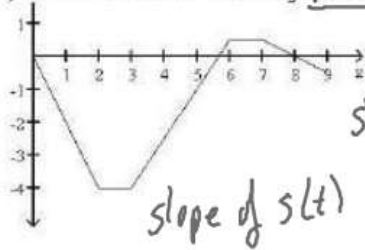


graph is moving down
 $s'(t) < 0$
 $(0, 2) \cup (7, 9)$

graph going up
 $s'(t) > 0$
 $(3, 6)$

$s'(t) = 0$
 slope is zero
 $(2, 3) \cup (6, 7)$

b) When is the velocity positive, negative, and zero?



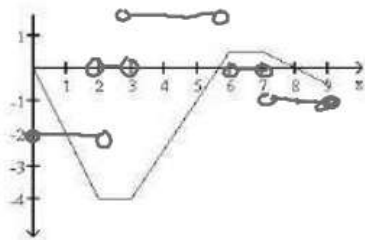
$s'(t) > 0$

$s'(t) < 0$

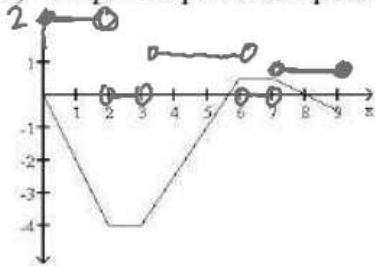
$s'(t) = 0$

slope of $s(t)$

c) Graph the particles velocity



d) Graph the particles speed



slope from $(0, 2)$
 $(2, 3)$
 $(3, 6)$
 $(6, 7)$
 $(7, 9)$

Particle Motion Summary Given the **Velocity $v(t)$** graph

Determine when the particle	Justify/Explain/Give a reason	Where to look on the velocity graph
Forward/Up/Right	$v(t) > 0$	Above the x-axis
Backward/Down/Left	$v(t) < 0$	Below the x-axis
Stopped/At rest	$v(t) = 0$	Touches x-axis
Changes Direction	$v(t) = 0$ and $v(t)$ changes sign	Crosses x-axis
Acceleration Positive	$v'(t) > 0$	Positive slope/Increasing
Acceleration Negative	$v'(t) < 0$	Negative slope/Decreasing
Acceleration Zero	$v'(t) = 0$	Zero slope/Constant
Acceleration Undefined	$v'(t)$ undefined	Corners/Cusps/Vertical Tangents
Speed increasing Speeding up	$v(t)$ and $a(t)$ have the same sign	Graph moving away from the x-axis
Speed decreasing <i>slow down</i>	$v(t)$ and $a(t)$ have opposite signs	Graph moving toward the x-axis
Greatest Speed	$ v(t) $ is the greatest	When graph is furthest away from the x-axis in either direction