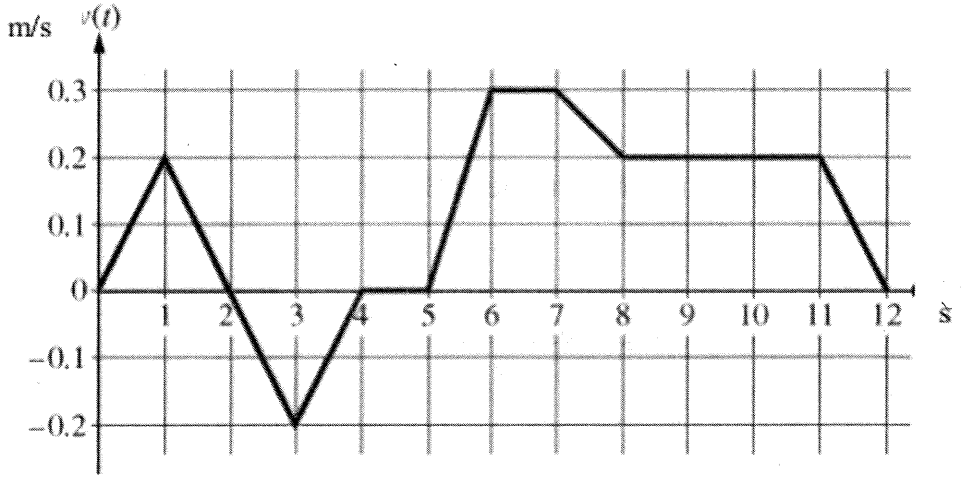


From the velocity time graph above, please indicate the time or times when:

The object is moving in the positive direction. (0, 2) (5, 12)

The object is speeding up. (0, 1) (2, 3) (5, 6)

The object is slowing down (1, 2) (3, 4) (7, 8) (11, 12)

The object is standing still for more than an instant. $v(t) = 0$ (4, 5)

The object changes direction. $t =$ 2, (4, 5)

The acceleration is negative. slope ↓ (1, 3) (7, 8) (11, 12)

The acceleration is positive. slope ↑ (0, 1) (3, 4) (5, 6)

The speed is the greatest. (6, 7)

Practice 1 The graph at the right is v(t): When is the particle speeding up? Explain.

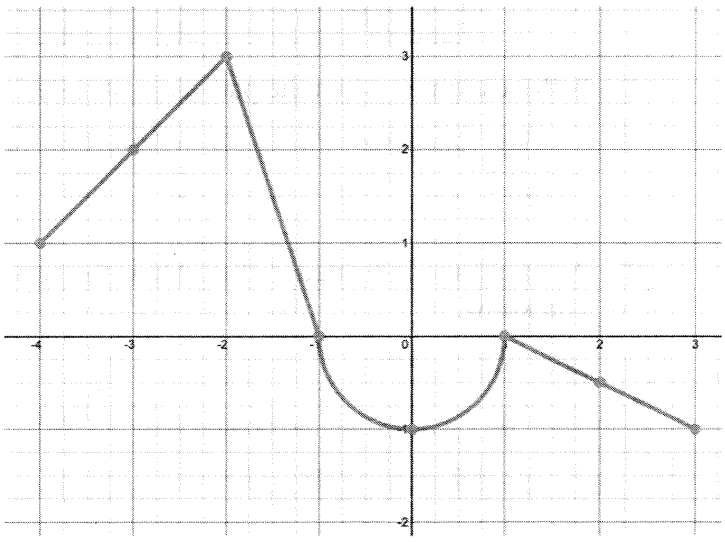
(-4, -2) (-1, 0) (1, 3)
↳ when a(t) & v(t) are the same sign

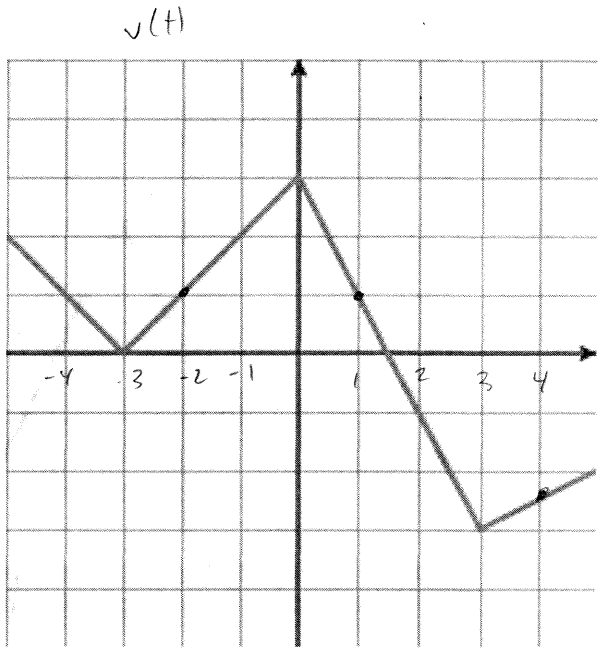
When is the particle moving to the right? Explain.

(-4, -1) when v(t) is +

At what time does the particle reach its maximum speed?

@ t = -2 b/c |v(t)| is the greatest





Practice 2: When is the particle speeding up? Explain. when v(t) & a(t) are the same

(-3, 0) (1.5, 3)

When is the particle moving to the left? Explain.

when v(t) is negative

(1.5, 5)

When is acceleration the greatest: t=-2, t=1, or t=4?

1 -1

<1

t = -2, slope is the greatest of v(-2)

OR

v'(-2)

Ex 1: The table below gives values for the velocity and acceleration of a particle moving along the x-axis for selected values of time t. Both velocity and acceleration are differentiable (and therefore continuous!) functions of time t. The velocity is decreasing for all values of t, $0 \le t \le 10$. Use the data in the table to answer the questions that follow.

Time, t	0	2	6	10
Velocity, v(t)	5	3	-1	-8
Acceleration a(t)	0	-1	-3	-5

1. Is there a time t when the particle is at rest? Explain your answer.

Yes, because v(t) is continuous & has values (3, -1) and 0 is between them so there is a 0 according to IVT.

2. At what time indicated in the table is the speed of the particle decreasing? Explain how you know.

diff. a(t) & v(t)

@ t=2 b/c a(t) and v(t) have different signs.

→ According to Intermediate Value Theorem: b/c v(t) is continuous on (2, 6), v(t) = 0.

Practice 1: The table below gives values for the velocity and acceleration of a particle moving along the x-axis for selected values of time t. Both velocity and acceleration are differentiable (and therefore continuous!) functions of time t. The velocity is decreasing for all values of t, $0 \le t \le 10$. Use the data in the table to answer the questions that follow.

Time, t	0	2	6	10
Velocity, v(t)	-2	-4	-1	6
Acceleration a(t)	0	-1	4	3

1. Is there a time t when the particle is at rest? Explain your answer.

Yes b/c v(t) is continuous & 0 is between (-1, 6) so according to IVT, there is a 0.

2. At what time indicated in the table is the speed of the particle increasing? Explain how you know.

@ t = 2, t = 10 b/c v(t) & a(t) are both positive or both negative

Practice 2: The table below gives values for the velocity and acceleration of a particle moving along the x-axis for selected values of time t. Both velocity and acceleration are differentiable (and therefore continuous!) functions of time t. The velocity is decreasing for all values of t, $0 \le t \le 10$. Use the data in the table to answer the questions that follow.

Time, t	1	5	6	11
Velocity, v(t)	-2	-9	-4	-12
Acceleration a(t)	1	-8	3	-5

1. Is there a time t when the particle is at rest? Explain your answer.

According to the data in the table, no b/c there are no intervals where there is a 0 between them

2. At what time indicated in the table is the speed of the particle decreasing? Explain how you know.

@ t = 1, t = 6 b/c v(t) and a(t) have different signs