

4.2 – Straight-Line Motion: Connecting Position, Velocity and Acceleration Two Truths & A Lie

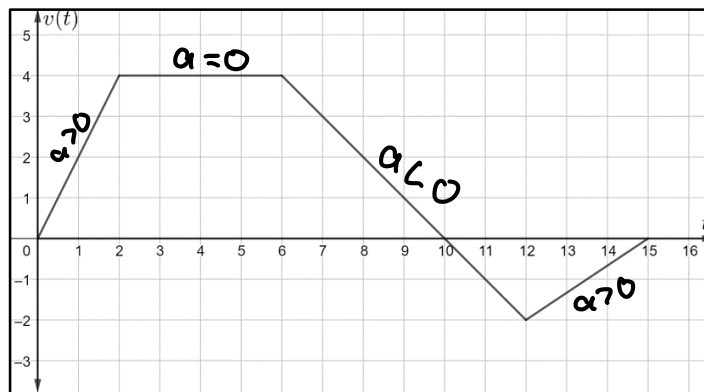
Is Straight Line Motion bugging you?

Five different bugs are moving along the x axis. The graphs of their velocities are given below on various time intervals. There are three statements below each velocity graph. Two of these statements are true while one statement is false.

For each velocity graph:

1. Identify which of the three statements is false.
2. Explain why the statement is false and/or correct the statement.

Bug #1 - Herman

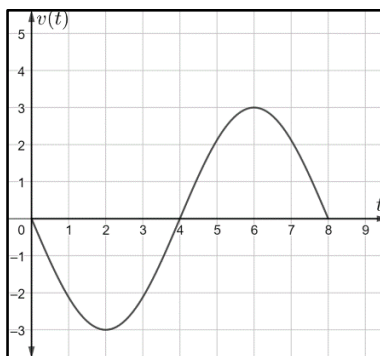


Statement 1: $a(4) = 0$ True

Statement 2: $a(11) < 0$ True

Statement 3: $a(13) < 0$ False $a(13) > 0$ b/c $v(t)$ is increasing there

Particle 2 - Brutus



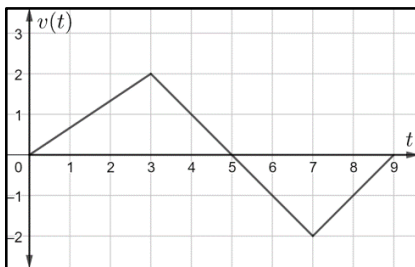
Statement 1: The particle changes directions at $t = 4$ True

Statement 2: The particle changes directions at $t = 6$ False

Statement 3: The particle is moving left at $t = 2$ True

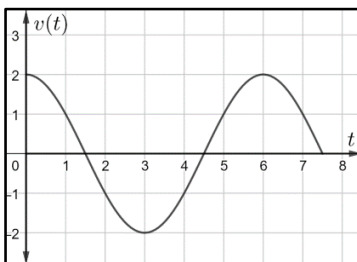
$v(t) \neq 0$ and doesn't change signs at $t=6$

Bug #3 - Landon



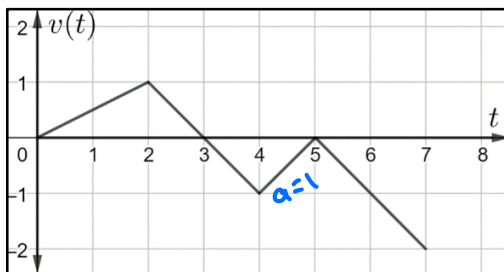
- Statement 1:** The particle is slowing down at $t = 4$ *True* $v(t) > 0, a(t) < 0$
- Statement 2:** The particle is slowing down at $t = 6$ *False* $v(t) < 0, a(t) < 0 \therefore$ particle speeds up
- Statement 3:** The particle is slowing down at $t = 8$ *True* $v(t) < 0, a(t) > 0$

Bug #4 - Hershel



- Statement 1:** The particle is moving to the left on the interval $(0, 3)$ *False* Particle moves right when $v(t) > 0$ which happens on 0 to about 1.5
- Statement 2:** The particle is moving to the right on the interval $(6, 7)$ *True*
- Statement 3:** The particle is moving to the left on the interval $(2, 3)$ *True*

Bug #5 - Maude



- Statement 1:** The particle is moving to the left when $a(t) = 1$ *True* ($v(t) < 0$)
- Statement 2:** The particle changes direction only once. *True* at $t = 3$
- Statement 3:** The acceleration of the particle is 0 when $t = 3$. *False*, $a(t) = -1$ at $t = 3$
(The velocity is 0 when $t = 3$)