

Acceleration Worksheet

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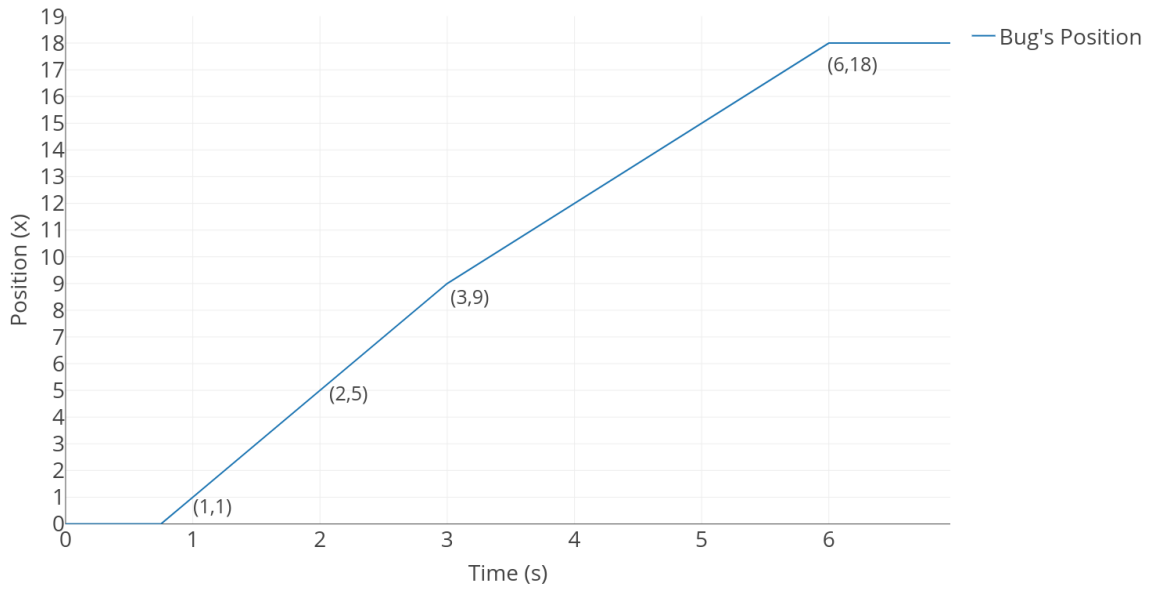
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Assume all units are SI units: meters and seconds.

Problem 1. A lady bug's position can be given by $x = 15t^3 - 5t - 3$. Determine (a) the position (b) the velocity and (c) the acceleration of the lady bug at $t = 2$ seconds. (d) What is the acceleration of the lady at the instant when he/she is not moving? (e) What is the ladybugs average velocity between $t = 0$ s and $t = 2$ s? (f) What is his average acceleration between $t = 0$ s and $t = 2$ s?

Problem 2. At a certain time our ladybug friend has a speed of 15 m/s in the positive x direction. 5 seconds later, he has a speed of 45 m/s in the opposite direction ($-x$). What is the average acceleration of our ladybug?

Problem 3. The ladybug takes a break, but then starts zooming around with a position $x = 45t - 5t^3$. When is his velocity zero? (b) When is his acceleration zero? Sketch graphs of his position, velocity and acceleration.



Problem 4. An ant's velocity is given as $v = 4t^2 + 3t$. Assuming that at 1 s, her position is 5 meters, what is the equation for the ant's position? What is the equation for the ant's acceleration?

Problem 5. Graph the velocity of the particle motion expressed by the graph above.

Problem 6. Graph the acceleration of the particle motion expressed by the graph above.