

Position, Velocity, & Acceleration (Std 2h)

Name _____

Given the equation for the position of a particle at time t , indicate

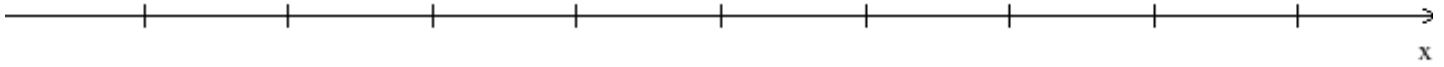
- a) when the particle is moving to the left
- b) when and where the particle changes directions
- c) its maximum and minimum velocities

1) $x(t) = t^2 - 9t - 14 \quad t \geq 0$

2) $x(t) = t^3 - 9t^2 + 15t + 4 \quad t \geq 0$

3) $x(t) = 3t^4 - 22t^3 + 30t^2 + 48t + 1 \quad t \geq 0$

- 4) Emma and Lindsay are sitting on the x -axis arguing over who is the better student. In a fit of anger, Emma begins chasing Lindsay back and forth on the x -axis. Ari sits with a bowl of popcorn watching and observing the chase over a period of 8 seconds. With a little help from Lizzy, Ari determines the equation for Lindsay's position on the x -axis to be $x(t) = t^4 - 15t^3 + 75t^2 - 125t - 2$ $0 \leq t \leq 8$



- a) Where on the x -axis were they originally sitting?
- b) During what times are they running to the right?
- c) Does Blaire ever stop and then start again without changing directions? If so, when and where?
- d) What are Blaire's maximum and minimum velocities?
- e) On the number line above, draw the path of Blaire's run over 8 seconds indicating all points where she stops.