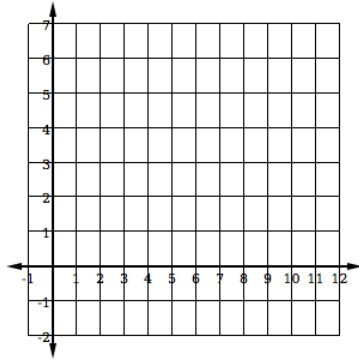


Examples:

1. Given a position vector $\langle 3t^2, t^3 - 3t^2 + 4 \rangle$ for a particle moving in the xy-plane find the following:

- a. Graph the path of the particle on the interval $0 \leq t \leq 2$.



- b. The velocity vector at time $t = 1$.
- c. The speed of the particle at time $t = 1$.
- d. The distance travelled between $t = 0$ and $t = 3$.
- e. The time(s) when the particle is at rest.
- f. The acceleration vector of the particle at time $t = 2$.
- g. The direction of the particle at time $t = 1$ and when $t = 2$.

2. A particle is moving in the xy -plane with acceleration vector $a(t) = \langle -2 \cos(t), -3 \sin(t) \rangle$. At time $t = 0$ its velocity vector is $v(0) = \langle 0, 3 \rangle$ and its position vector is $s(0) = \langle 2, \frac{\sqrt{2}}{2} \rangle$. Find:

a. The velocity vector when $t = \frac{\pi}{4}$.

b. The position vector when $t = \frac{\pi}{4}$.

c. The speed when $t = \frac{\pi}{4}$.

d. The time(s) when the particle is at rest.

e. The direction of the particle when $t = \frac{\pi}{4}$.

f. The distance travelled between $t = 0$ and $t = 2$.