

BC Calc Vector Practice 2**Name:**

Seat:

1. (NC) A particle moves in the xy -plane so that at any time t , the position of the particle is given by $\mathbf{r}(t) = \langle t^3 + 4t^2, t^4 - t^3 \rangle$.
 - (a) Find the velocity vector when $t = 1$.

- (b) Find the acceleration vector when $t = 2$.

2. (NC) A particle moves in the xy -plane so that at any time $t \geq 0$, the position of the particle is given by $\mathbf{r}(t) = \langle t^2 + 3t, t^3 - 3t^2 \rangle$.

(a) Find the velocity vector when $t = 1$.

(b) Find magnitude of the velocity vector when $t = 1$

(c) What is the meaning of the magnitude of the velocity vector when $t = 1$

3. (NC) A particle moves in the xy -plane at time t , $0 \leq t \leq 2\pi$, the position of the particle is given by $\mathbf{r}(t) = \langle \sqrt{3} - 4 \cos(t), 1 - 2 \sin(t) \rangle$. The path intersects the x -axis twice. Write an equation that represents the distance traveled by the particle between the two x -intercepts. Evaluate with your Calculator.

Answers

1. (a) $\langle 11, 1 \rangle$, (b) $\langle 20, 36 \rangle$
2. (a) $\langle 5, -3 \rangle$ (b) $\sqrt{34}$ (c) at time $t=1$, the particle is traveling at the speed of $\sqrt{34}$ in the south east direction (the angle $\arctan(-\frac{3}{5})$)
3. intersects when $t = \frac{\pi}{6}$ and $\frac{5}{6}$ so $\int_{\pi/6}^{5\pi/6} \sqrt{(4 \sin t)^2 + (-2 \cos t)^2} dt \approx 7.347$