

Classroom Voting Questions: Multivariable Calculus

17.1 Parameterized Curves

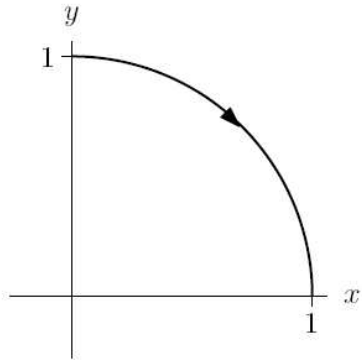
1. Which of the following is an equation of a line in three dimensions (x, y, z) ?
 - (a) $x = 4$
 - (b) $y = 2x + 3$
 - (c) $z = 3x + 2y + 7$
 - (d) All of the above
 - (e) None of the above

2. Which of the following best describes the path of a particle defined by the parametric equations $x(t) = \cos(t^2)$, $y(t) = \sin(t^2)$?
 - (a) a circle around which the particle moves faster and faster
 - (b) a parabola on which the particle travels at constant speed
 - (c) a parabola on which the particle travels faster and faster
 - (d) a circle on which the particle moves slower and slower

3. Which of the following is not a parameterization of the entire curve $y = x^3$?
 - (a) $x(t) = t; y(t) = t^3$
 - (b) $x(t) = t^2; y(t) = t^6$
 - (c) $x(t) = t^3; y(t) = t^9$
 - (d) $x(t) = 2t; y(t) = 8t^3$

4. What does the path of the particle described by $x(t) = \cos(t)$, $y(t) = \sin(t)$, $z(t) = -t$ look like?
 - (a) a circle in the xz plane
 - (b) a helix on which the particle is traveling up
 - (c) a helix on which the particle is traveling down
 - (d) a sine wave in the xz plane

5. Which of the following parameterizations does not describe the quarter circle in the figure below?



- (a) $(\cos t, \sin t), 0 \leq t \leq \pi/2$
(b) $(\sin t, \cos t), 0 \leq t \leq \pi/2$
(c) $(-\cos t, \sin t), \pi/2 \leq t \leq \pi$
(d) $(\cos t, -\sin t), 3\pi/2 \leq t \leq 2\pi$
6. Let $(\cos at, \sin at)$ be the position at time t seconds of a particle moving around a circle, where $a > 0$. If a is increased,
- (a) The radius of the circle increases.
(b) The speed of the particle increases.
(c) The center of the circle changes.
(d) The path ceases to be a circle.
7. Let $(a \cos t, a \sin t)$ be the position at time t seconds of a particle moving around a circle, where $a > 0$. If a is increased,
- (a) The radius of the circle increases.
(b) The speed of the particle increases.
(c) The center of the circle changes.
(d) The path ceases to be a circle.
8. Which of the following parametric curves does not trace out the unit circle?
- (a) $(\cos t, \sin t), 0 \leq t \leq 2\pi$
(b) $(\sin^2 t, \cos^2 t), 0 \leq t \leq 2\pi$
(c) $(\sin(t^2), \cos(t^2)), 0 \leq t \leq 2\pi$

(d) $(\sin(2t), \cos(2t)), 0 \leq t \leq 2\pi$

9. Which of the following parametric paths describe particles that are not traveling along a straight line in 3-space?

(a) $(1 - t, 2 + 2t, 3 - t)$

(b) $(1 - t^2, 2 + 2t^2, 3 - t^2)$

(c) $(1, 2, 1 - t)$

(d) $(1, t, 1 - t^2)$

(e) More than one of the above

10. The value of c for which the lines $l(t) = (c + 4t, 2 - t, 3 + t)$ and $m(t) = (4t, 1 - 8t, 4 + 4t)$ intersect is

(a) 4

(b) 0

(c) -4

(d) There is no such c .