First Name_____ Last Name _____

Lab 5

Find both the parametric and the vector equation of the line.

1) The line through (0, 1, 0) in the direction of the vector $v = \langle 3, 0, -1 \rangle$

A) $x = 3t, y = 1, z = -t; r = \langle 3, 0, -1 \rangle + t \langle 0, 1, 0 \rangle$

B) $x = 3, y = t, z = -1; r = \langle 3, 0, -1 \rangle + t \langle 0, 1, 0 \rangle$

C) $x = 3t, y = 1, z = -t; r = \langle 0, 1, 0 \rangle + t \langle 3, 0, -1 \rangle$

D) $x = 3, y = t, z = -1; r = \langle 0, 1, 0 \rangle + t \langle 3, 0, -1 \rangle$

Find parametric equations for the line described below.

2) The line through the point P(5, -1, -5) parallel to the vector $-6i + 5j - 5k$

A) $x = 6t - 5, y = 5t + 1, z = -5t + 5$

B) $x = 6t + 5, y = 5t - 1, z = -5t - 5$

C) $x = -6t + 5, y = 5t - 1, z = -5t - 5$

D) $x = -6t - 5, y = 5t + 1, z = -5t + 5$

Find a parametrization for the line segment beginning at P_1 and ending at P_2.

3) $P_1(-3, 7, 3)$ and $P_2(0, 7, 7)$

A) $x = -3t, y = 7t, z = -4t + 7, 0 \le t \le 1$

B) $x = 3t - 3, y = 7, z = 4t + 3, 0 \le t \le 1$

C) $x = 3t - 3, y = 7t, z = 4t + 3, 0 \le t \le 1$

D) $x = -3t, y = 7, z = -4t + 7, 0 \le t \le 1$

Find parametric equations for the line described below.

4) The line through the point P(-4, -7, 4) and perpendicular to the vectors $u = 6i + 4j + 4k$ and $v = -7i - 6j - 4k$

A) $x = 8t + 4, y = -4t + 7, z = -4t - 4$

B) $x = 8t - 4, y = -4t - 7, z = -4t + 4$

C) $x = 8t - 4, y = 4t - 7, z = -8t + 4$

D) $x = 8t - 4, y = -4t - 7, z = -8t + 4$

Determine whether the pairs of lines are parallel, intersect at a single point, or are skew. If the lines are parallel, determine whether they are the same line (and thus intersect at all points). If the lines intersect at a single point, determine the point of intersection.

5) $x = 1 + 3t$, $y = 3 - 3t$, $z = -t$ and $x = 3 + 4s$, $y = -1 - 2s$, $z = 3 - 5s$

  A) The lines intersect at a single point, $(-5, 1, 3)$.   B) The lines are parallel, distinct lines.

  C) The lines are skew.   D) The lines intersect at a single point, $(7, -3, -2)$.

6) $r = \langle 3, 1, 4 \rangle + t \langle -1, 6, -2 \rangle$; $R = \langle -6, 55, -14 \rangle + t \langle 5, -30, 10 \rangle$

  A) The lines are skew.   B) The lines are the same line.

  C) The lines intersect at a single point, $\left(\dfrac{3}{2}, 10, 1 \right)$.   D) The lines are parallel, distinct lines.

Write the equation for the plane.

7) The plane through the point $P(4, -3, 2)$ and normal to $n = \langle 2, 7, 6 \rangle$.

  A) $4x - 3y + 2z = -1$ B) $-4x + 3y - 2z = -1$ C) $2x + 7y + 6z = -1$ D) $-2x - 7y - 6z = -1$

8) The plane through the points $P(-1, 8, -58)$, $Q(2, -2, 27)$ and $R(1, -5, 43)$.

  A) $5x - 7y - z = 3$ B) $5x + 7y + z = 3$ C) $5x + 7y + z = -3$ D) $5x - 7y - z = -3$

Find the line of intersection.

9) $-2x + 2y = -2$, $-2y + 5z = 4$,   (Hint: use $z = 0$ to get one of the answer choices)

  A) $x = 10t - 1$, $y = 10t - 2$, $z = 4$ B) $x = 10t + 1$, $y = 10t + 2$, $z = -4t$

  C) $x = 10t - 4$, $y = 10t + 4$, $z = 4t$ D) $x = 10t - 1$, $y = 10t - 2$, $z = 4t$

10) $x + y + z = 7$, $x + y = 12$,   (Hint: use $x = 0$ to get one of the answer choices.)

  A) $x = -t$, $y = 12 + t$, $z = -5$ B) $x = t$, $y = 12 - t$, $z = -5$

  C) $x = -t$, $y = 12 + t$, $z = 5$ D) $x = -1$, $y = 1 + 12t$, $z = -5t$

1) C
2) C
3) B
4) D
5) D
6) B
7) C
8) D
9) D
10) A