



NOMBRE: \_\_\_\_\_

CÉDULA: \_\_\_\_\_

**Selección Múltiple**

1. Which of the following is a set of parametric equations for the line through the points  $(-3, 2, 0)$  and  $(4, 3, 3)$ ?

- (a)  $x = 4 + 7t$   
 $y = 3 + t$   
 $z = 3 + 3t$
- (b)  $x = 4 - 3t$   
 $y = 3 + 2t$   
 $z = 3$
- (c)  $x = -3 + t$   
 $y = 2 + 5t$   
 $z = 3t$
- (d)  $x = -3 + 4t$   
 $y = 2 + 3t$   
 $z = 3t$
- (e) None of these

2. Which of the following is a set of parametric equations for the line through the points  $(-2, 0, 3)$  and  $(4, 3, 3)$ ?

- (a)  $x = -2 + 2t$   
 $y = t$   
 $z = 3 + t$
- (b)  $x = -2 + 2t$   
 $y = 3t$   
 $z = 3$
- (c)  $x = -2 + 2t$   
 $y = t$   
 $z = 3$
- (d)  $x = -2 + 4t$   
 $y = 3t$   
 $z = 3 + 3t$
- (e) None of these

let  $\mathbf{u} = 3\mathbf{i} - \mathbf{j} - 2\mathbf{k}$ ,  $\mathbf{v} = -2\mathbf{i} - 3\mathbf{j} + 2\mathbf{k}$  and  $\mathbf{w} = \mathbf{i} + 2\mathbf{k}$ .

3. Calculate  $\mathbf{u} \cdot (\mathbf{v} \times \mathbf{w})$ .

- (a)  $-30$
- (b)  $-18\mathbf{i} - 6\mathbf{j} - 6\mathbf{k}$
- (c)  $-16$
- (d)  $-24$
- (e) None of these

4. Calculate  $\text{proj}_{\mathbf{v}}\mathbf{u}$ .

- (a)  $-\frac{7}{17}$
- (b)  $\langle \frac{14}{17}, \frac{21}{17}, -\frac{14}{17} \rangle$
- (c)  $\sqrt{17}$
- (d)  $\langle 14, 21, -14 \rangle$
- (e) None of these

5. Calculate  $\cos \theta$  where  $\theta$  is the angle between  $\mathbf{u}$  and  $\mathbf{v}$ .

- (a)  $\frac{-7}{2\sqrt{17}}$
- (b)  $\frac{-7}{\sqrt{238}}$
- (c)  $\frac{-13}{\sqrt{238}}$
- (d)  $\frac{-13}{2\sqrt{17}}$
- (e) None of these

6. Write an equation of the plane that contains the line given by  $\frac{x}{1} = \frac{y-1}{3} = \frac{z+1}{2}$  and is perpendicular to the line given by  $\frac{x-1}{-17} = \frac{y+5}{1} = \frac{z-3}{7}$ .

- (a)  $17x - y - 7z - 6 = 0$
- (b)  $x + 3y + 2z + 8 = 0$
- (c)  $x + 3y + 2z - 1 = 0$
- (d)  $17x - y - 7z + 1 = 0$
- (e) None of these

7. Which of the following is a sketch of the plane given by  $2x + y + 3z = 6$ ?

- (a)
- (b)
- (c)
- (d)

(e) None of these

(1)

8. Find an equation of the plane that passes through the points  $(2, 1, -4)$ ,  $(-3, 1, 3)$  and  $(-2, -1, 0)$ .
- (a)  $2x - 4y + 5z + 10 = 0$       (b)  $7x + 6y + 5z + 20 = 0$       (c)  $7x - 4y + 5z + 10 = 0$   
 (d)  $7x - 4y + 5z + 2 = 0$       (e) None of these
9. Find a vector with magnitude  $\sqrt{10}$  in the direction of  $\mathbf{v} = \langle -1, 1 \rangle$ .
- (a)  $\left\langle -\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}} \right\rangle$       (b)  $\langle -\sqrt{10}, \sqrt{10} \rangle$       (c)  $\langle -\sqrt{5}, \sqrt{5} \rangle$   
 (d)  $\langle -\sqrt{2}, \sqrt{2} \rangle$       (e) None of these
10. Determine which vector is parallel to the vector  $\mathbf{v} = \langle 2, -3, -1 \rangle$ .
- (a)  $\langle 4, 6, -2 \rangle$       (b)  $\langle -\frac{2}{3}, 1, \frac{1}{3} \rangle$       (c)  $\langle 1, -\frac{3}{2}, \frac{1}{2} \rangle$   
 (d)  $\langle 6, -9, 3 \rangle$       (e) None of these
11. Find the unit vector in the direction of the vector  $\mathbf{v} = 2\mathbf{i} + \mathbf{j} + 2\mathbf{k}$ .
- (a)  $\frac{2}{\sqrt{5}}\mathbf{i} + \frac{1}{\sqrt{5}}\mathbf{j} + \frac{2}{\sqrt{5}}\mathbf{k}$       (b)  $\frac{2}{9}\mathbf{i} + \frac{1}{9}\mathbf{j} + \frac{2}{9}\mathbf{k}$       (c)  $\mathbf{i} + \mathbf{j} + \mathbf{k}$   
 (d)  $\frac{2}{3}\mathbf{i} + \frac{1}{3}\mathbf{j} + \frac{2}{3}\mathbf{k}$       (e) None of these
12. Find  $\mathbf{u} \cdot \mathbf{v}$  if  $\|\mathbf{u}\| = 40$ ,  $\|\mathbf{v}\| = 15$ , and the angle between vectors  $\mathbf{u}$  and  $\mathbf{v}$  is  $\frac{2\pi}{3}$ .
- (a)  $-300\sqrt{3}$       (b)  $\frac{900}{\pi}$       (c) 300  
 (d) -300      (e) None of these
13. Calculate the angle that vector  $\mathbf{v} = 3\mathbf{i} - 5\mathbf{j} + \mathbf{k}$  makes with the positive  $y$ -axis.
- (a)  $59.5^\circ$       (b)  $32.3^\circ$       (c)  $147.7^\circ$   
 (d)  $80.3^\circ$       (e) None of these
14.  $\mathbf{v} \cdot \mathbf{v} =$  \_\_\_\_\_
- (a)  $\|\mathbf{v}\|$       (b)  $\frac{\mathbf{v}}{\|\mathbf{v}\|}$       (c)  $\|\mathbf{v}\|^2$   
 (d)  $\text{proj}_{\mathbf{u}}\mathbf{v}$       (e) None of these
15. Calculate  $\mathbf{u} \times \mathbf{v}$  for  $\mathbf{u} = 3\mathbf{i} + 4\mathbf{j} - \mathbf{k}$  and  $\mathbf{v} = 2\mathbf{i} - \mathbf{j} + 3\mathbf{k}$ .
- (a)  $-11\mathbf{i} + 11\mathbf{j} + 11\mathbf{k}$       (b)  $13\mathbf{i} - 7\mathbf{j} + 5\mathbf{k}$       (c)  $11\mathbf{i} + 11\mathbf{j} - 11\mathbf{k}$   
 (d)  $11\mathbf{i} - 11\mathbf{j} - 11\mathbf{k}$       (e) None of these
16. Find the area of the parallelogram having vectors  $\mathbf{v}_1 = -\mathbf{i} + 2\mathbf{j} + 2\mathbf{k}$  and  $\mathbf{v}_2 = 3\mathbf{i} - 2\mathbf{j} + \mathbf{k}$  as adjacent sides.
- (a) 3      (b) 10      (c)  $\sqrt{101}$   
 (d)  $\sqrt{69}$       (e) None of these
17. Find an equation of the plane determined by the points  $(1, 2, -3)$ ,  $(2, 3, 1)$ , and  $(0, -2, -1)$ .
- (a)  $18\mathbf{i} - 6\mathbf{j} - 3\mathbf{k} = 0$       (b)  $6x - 2y - z = 0$       (c)  $6x - 2y - z = 5$   
 (d)  $14x + 6y + 3z = 17$       (e) None of these

(2)

18. Which of the following is an orthogonal pair of vectors?  
 (a)  $2\mathbf{i} - \mathbf{j}, \mathbf{i} + \mathbf{k}$  (b)  $\mathbf{i} - \mathbf{j} + 2\mathbf{k}, -\mathbf{i} - \mathbf{j} - \mathbf{k}$  (c)  $3\mathbf{i} - 2\mathbf{k}, 2\mathbf{j} - \mathbf{k}$   
 (d)  $5\mathbf{i} + \mathbf{j} + \mathbf{k}, -\mathbf{i} + 2\mathbf{j} + 3\mathbf{k}$  (e) None of these
19. Which of the following is a set of parametric equations for the line through the points  $(-2, 0, 3)$  and  $(4, 3, 3)$ ?  
 (a)  $x = -2 + 2t$   
 $y = t$   
 $z = 3 + t$  (b)  $x = -2 + 2t$   
 $y = 3t$   
 $z = 3$  (c)  $x = -2 + 2t$   
 $y = t$   
 $z = 3$   
 (d)  $x = -2 + 4t$   
 $y = 3t$   
 $z = 3 + 3t$  (e) None of these
20. Which of the following vectors is orthogonal to both  $\mathbf{u}$  and  $\mathbf{w}$ ?  
 (a)  $\mathbf{j}$  (b)  $\mathbf{w} \times \mathbf{u}$  (c)  $\mathbf{v}$   
 (d)  $4\mathbf{j} + \mathbf{k}$  (e) None of these
21. Which of the following statements is true about the vectors  $\mathbf{u} = \frac{1}{2}\mathbf{i} + \frac{1}{3}\mathbf{j} - \frac{1}{4}\mathbf{k}$  and  $\mathbf{v} = -2\mathbf{i} - \frac{4}{3}\mathbf{j} + \mathbf{k}$ ?  
 (a)  $\mathbf{u}$  and  $\mathbf{v}$  are orthogonal. (b)  $\mathbf{u}$  and  $\mathbf{v}$  are parallel.  
 (c)  $\mathbf{u}$  is a unit vector of  $\mathbf{v}$ . (d) The angle between  $\mathbf{u}$  and  $\mathbf{v}$  is  $\frac{\pi}{4}$ .  
 (e) None of these
22. Which of the following is a set of parametric equations for the line through the points  $(-3, 2, 0)$  and  $(4, 3, 3)$ ? (3)  
 (a)  $x = 4 + 7t$   
 $y = 3 + t$   
 $z = 3 + 3t$  (b)  $x = 4 - 3t$   
 $y = 3 + 2t$   
 $z = 3$  (c)  $x = -3 + t$   
 $y = 2 + 5t$   
 $z = 3t$   
 (d)  $x = -3 + 4t$   
 $y = 2 + 3t$   
 $z = 3t$  (e) None of these
23. Determine which vector is parallel to the vector  $\mathbf{v} = \langle 2, -3, -1 \rangle$ .  
 (a)  $\langle 4, 6, -2 \rangle$  (b)  $\langle -\frac{2}{3}, 1, \frac{1}{3} \rangle$  (c)  $\langle 1, -\frac{3}{2}, \frac{1}{2} \rangle$   
 (d)  $\langle 6, -9, 3 \rangle$  (e) None of these
24. Find the unit vector in the direction of the vector  $\mathbf{v} = 2\mathbf{i} + \mathbf{j} + 2\mathbf{k}$ .  
 (a)  $\frac{2}{\sqrt{5}}\mathbf{i} + \frac{1}{\sqrt{5}}\mathbf{j} + \frac{3}{\sqrt{5}}\mathbf{k}$  (b)  $\frac{2}{9}\mathbf{i} + \frac{1}{9}\mathbf{j} + \frac{2}{9}\mathbf{k}$  (c)  $\mathbf{i} + \mathbf{j} + \mathbf{k}$   
 (d)  $\frac{2}{3}\mathbf{i} + \frac{1}{3}\mathbf{j} + \frac{2}{3}\mathbf{k}$  (e) None of these
25. Find the point of intersection of the line given by the parametric equations  $x = 3 + 2t, y = 7 + 8t,$  and  $z = -2 + t$  with the  $yz$ -plane.  
 (a)  $(0, -5, -\frac{7}{2})$  (b)  $(0, \frac{37}{3}, -\frac{4}{3})$  (c)  $(3, 7, -2)$   
 (d)  $(-7, -33, -7)$  (e) None of these