3-1

November 9, 2025

In Exercises 3-4,find the components of the vector $\overrightarrow{P_1P_2}$

3 a)

$P_1(3,5), \quad P_2(2,8)$

b)

$P_1(5,-2,1),\ P_2(2,4,2)$

7) Find an initial point P of a nonzero vector $\mathbf{u} = \overrightarrow{PQ}$ with terminal point $Q(3, 0, -5)$ and such that

a)

$\mathbf{u}$ has the same direction as $\mathbf{v} = (4, -2, -1)$

(b)

$\mathbf{u}$ is oppositely directed to $\mathbf{v} = (4, -2, -1)$

11 d) Let $\mathbf{u} = (-3, 2, 1, 0)$, $\mathbf{v} = (4, 7, -3, 2)$,and $\mathbf{w} = (5, -2, 8, 1)$.

$(6\mathrm{v} - \mathrm{w}) - (4\mathrm{u} + \mathrm{v})$

15) Which of the following vectors in R^6 , if any, are parallel to $\mathbf{u} = (-2, 1, 0, 3, 5, 1)$?

(a)

$(4, 2, 0, 6, 10, 2)$

(b)

$(4, -2, 0, -6, -10, -2)$

(c)

$$(0, 0, 0, 0, 0, 0)$$

17) Let $\mathbf{u} = (1, -1, 3, 5)$ and $\mathbf{v} = (2, 1, 0, -3)$. Find scalars a and ^{b} so that $a\mathbf{u} + b\mathbf{v} = (1, -4, 9, 18)$

In Exercises 19-20, find scalars c_1, c_2 , and c_3 for which the equation is satisfied.

19) $c_1(1, -1, 0) + c_2(3, 2, 1) + c_3(0, 1, 4) = (-1, 1, 19)$

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Show that there do not exist scalars c_1, c_2, and c_3 such that

$$c_1(-2, 9, 6) + c_2(-3, 2, 1) + c_3(1, 7, 5) = (0, 5, 4)$$

Answers

1. (a) $(3, -4)$ (b) $(2, -3, 4)$

3. (a) $(-1, 3)$ (b) $(-3, 6, 1)$

5. (a) $(2, 3)$ (b) $(-2, -2, -1)$

7. (a) $(-1, 2, -4)$ is one possible answer (b) $(7, -2, -6)$ is one possible answer

9. (a) $(1, -4)$ (b) $(-12, 8)$ (c) $(38, 28)$ (d) $(4, 29)$

11. (a) $(-1, 9, -11, 1)$ (b) $(-13, 13, -36, -2)$ (c) $(-90, -114, 60, -36)$ (d) $(27, 29, -27, 9)$

13. $\left(-\frac{25}{3}, 7, -\frac{32}{3}, -\frac{2}{3}\right)$

15. (a) Not parallel to u (b) Parallel to u (c) Parallel to u

17. $a = 3, b = -1$

19. $c_1 = 2, c_2 = -1, c_3 = 5$

23. (a) $\left(\frac{9}{2}, -\frac{1}{2}, -\frac{1}{2}\right)$ (b) $\left(\frac{23}{4}, -\frac{9}{4}, \frac{1}{4}\right)$

25. (a) $(-2, 5)$ (b) $(3, -8)$ 27. $(7, -3, -19)$