

MATH 369 Linear Algebra

Assignment # 3

Problem # 15

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Problem # 16

The vector is in the set. What value of the parameters produces that vector?

- a) $\begin{pmatrix} 5 \\ -5 \end{pmatrix}, \left\{ \begin{pmatrix} 1 \\ -1 \end{pmatrix} k \mid k \in \mathbb{R} \right\}$
- b) $\begin{pmatrix} -1 \\ 2 \\ 1 \end{pmatrix}, \left\{ \begin{pmatrix} -2 \\ 1 \\ 0 \end{pmatrix} i + \begin{pmatrix} 3 \\ 0 \\ 1 \end{pmatrix} j \mid i, j \in \mathbb{R} \right\}$
- c) $\begin{pmatrix} 0 \\ -4 \\ 2 \end{pmatrix}, \left\{ \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} m + \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix} n \mid m, n \in \mathbb{R} \right\}$

Problem # 17

Intersect these planes: $\left\{ \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} t + \begin{pmatrix} 0 \\ 1 \\ 3 \end{pmatrix} s \mid s, t \in \mathbb{R} \right\}$ and $\left\{ \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix} + \begin{pmatrix} 0 \\ 3 \\ 0 \end{pmatrix} k + \begin{pmatrix} 2 \\ 0 \\ 4 \end{pmatrix} m \mid k, m \in \mathbb{R} \right\}$

Problem # 18

Find the equation of the line which passes through the intersection of the pair of lines and satisfies the other given condition.

- a) $3x + y - 2 = 0, x + 5y - 4 = 0$; through $(5, 2)$
- b) $3x - 4y - 2 = 0, 3x + 4y + 1 = 0$; intercepts are equal.

Problem # 19

The points $A(1, -2, 3)$, $B(-4, 5, 6)$ and $C(5, 7, 0)$ are vertices of a triangle. Express the sides as vectors and find the length of each side.

Problem # 20

Compute the distance of the point P from the line ℓ

- a) $P(-1, 5), \ell = \left\{ \vec{x} \in \mathbb{R}^2 \text{ s.t. } \left[\vec{x} - \begin{pmatrix} 1 \\ 2 \end{pmatrix} \right] \cdot \begin{pmatrix} -5 \\ 12 \end{pmatrix} = 0 \right\}$
- b) $P(7, 9), \ell = \left\{ \begin{pmatrix} 9 \\ -5 \end{pmatrix} + \lambda \begin{pmatrix} -4 \\ 3 \end{pmatrix} \mid \lambda \in \mathbb{R} \right\}$.

Problem # 21

Compute the area of the triangle ABC .

$A(1, 2), B(8, -1), C(6, 5)$.