

1. If $x = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$ $y = \begin{pmatrix} 2 \\ -4 \end{pmatrix}$ $z = \begin{pmatrix} 3 \\ 0 \end{pmatrix}$

find:

(a) $x + y$

(b) $y + z$

(c) $x + z$

(d) $x - y$

(e) $y - z$

(f) $x - z$

2. If $p = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$ $q = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$ $r = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$

solve each equation for the column vector x

(a) $x = p - q$

(b) $x - q = p$

(c) $q = r - x$

(d) $r + p = 2x$

(e) $3r = 2q - x$

(f) $p = 3r - 2x$

3. Find the magnitude of each column vector. (answer to 2 d.p.)

(a) $\begin{pmatrix} 2 \\ 1 \end{pmatrix}$

(b) $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$

(c) $\begin{pmatrix} 5 \\ -1 \end{pmatrix}$

4. If vectors are drawn from the origin O, what angle does each make with the positive x-axis in an anti-clockwise sense?

(a) $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$

(b) $\begin{pmatrix} -1 \\ 1 \end{pmatrix}$

(c) $\begin{pmatrix} -1 \\ -1 \end{pmatrix}$

1.

(a) $\begin{pmatrix} 5 \\ 1 \end{pmatrix}$

(b) $\begin{pmatrix} 5 \\ -4 \end{pmatrix}$

(c) $\begin{pmatrix} 6 \\ 5 \end{pmatrix}$

(d) $\begin{pmatrix} 1 \\ 9 \end{pmatrix}$

(e) $\begin{pmatrix} -1 \\ -4 \end{pmatrix}$

(f) $\begin{pmatrix} 0 \\ 5 \end{pmatrix}$

2.

(a) $\begin{pmatrix} -1 \\ 6 \end{pmatrix}$

(b) $\begin{pmatrix} 3 \\ 0 \end{pmatrix}$

(c) $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$

(d) $\begin{pmatrix} 2 \\ 0.5 \end{pmatrix}$

(e) $\begin{pmatrix} -5 \\ 0 \end{pmatrix}$

(f) $\begin{pmatrix} 4 \\ -4.5 \end{pmatrix}$

3.

(a) 2.24

(b) 3.61

(c) 5.10

4.

(a) 45°

(b) 135°

(c) 225°