

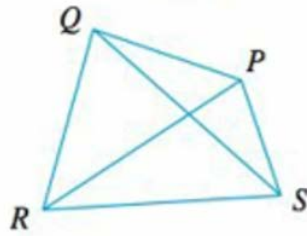
4. Write each combination of vectors as a single vector.

(a) $\vec{PQ} + \vec{QR}$

(b) $\vec{RP} + \vec{PS}$

(c) $\vec{QS} - \vec{PS}$

(d) $\vec{RS} + \vec{SP} + \vec{PQ}$



5. Copy the vectors in the figure and use them to draw the following vectors.

(a) $\mathbf{u} + \mathbf{v}$

(b) $\mathbf{u} - \mathbf{v}$

(c) $\mathbf{v} + \mathbf{w}$

(d) $\mathbf{w} + \mathbf{v} + \mathbf{u}$



#s 5 and 6: I'm looking for the general idea.

13–16 Find the sum of the given vectors and illustrate geometrically.

13. $\langle -1, 4 \rangle, \langle 6, -2 \rangle$ 15. $\langle 0, 1, 2 \rangle, \langle 0, 0, -3 \rangle$

17–20 Find $\mathbf{a} + \mathbf{b}$, $2\mathbf{a} + 3\mathbf{b}$, $|\mathbf{a}|$, and $|\mathbf{a} - \mathbf{b}|$.

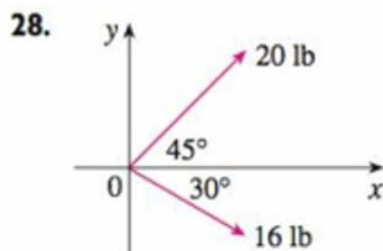
17. $\mathbf{a} = \langle 5, -12 \rangle, \mathbf{b} = \langle -3, -6 \rangle$

21–23 Find a unit vector that has the same direction as the given vector.

21. $-3\mathbf{i} + 7\mathbf{j}$

27. A quarterback throws a football with angle of elevation 40° and speed 60 ft/s. Find the horizontal and vertical components of the velocity vector.

28–29 Find the magnitude of the resultant force and the angle it makes with the positive x -axis.



41. If $\mathbf{r} = \langle x, y, z \rangle$ and $\mathbf{r}_0 = \langle x_0, y_0, z_0 \rangle$, describe the set of all points (x, y, z) such that $|\mathbf{r} - \mathbf{r}_0| = 1$.

42. If $\mathbf{r} = \langle x, y \rangle, \mathbf{r}_1 = \langle x_1, y_1 \rangle,$ and $\mathbf{r}_2 = \langle x_2, y_2 \rangle,$ describe the set of all points (x, y) such that $|\mathbf{r} - \mathbf{r}_1| + |\mathbf{r} - \mathbf{r}_2| = k,$ where $k > |\mathbf{r}_1 - \mathbf{r}_2|$.

45. Use vectors to prove that the line joining the midpoints of two sides of a triangle is parallel to the third side and half its length.