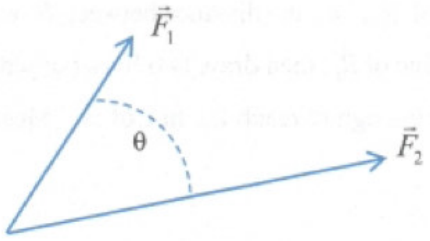
Questions

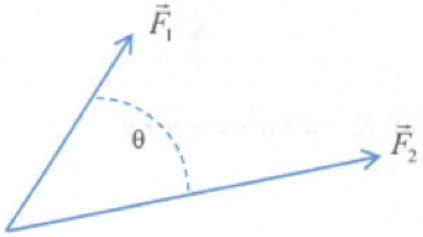
1. Two vectors $\vec{F}_1$ and $\vec{F}_2$ are shown in the figure.

   (a) Use the "Parallelogram Method" shown in Fig. 2a draw the resultant vector of $\vec{F}_1 - \vec{F}_2$.

   Hint: Vector subtraction ($\vec{F}_1 - \vec{F}_2$) is a special case of vector addition, since $\vec{F}_1 - \vec{F}_2 = \vec{F}_1 + (-\vec{F}_2)$.



   (b) Use the "Triangle (head to tail) Method" shown in Fig. 2b draw the resultant vector of $\vec{F}_1 - \vec{F}_2$.



2. What is the difference between scalar and vector quantities?

3. Is it always true that $\vec{1}+\vec{2}=\vec{3}$? If not, under what condition $\vec{1}+\vec{2}=\vec{3}$?

4. Draw on Fig. (a) the vector sum $\vec{R}_1=\vec{a}+\vec{b}+\vec{c}+\vec{d}+\vec{e}$ using polygon method.
   Draw on Fig. (b) the vector sum $\vec{R}_2=\vec{a}+\vec{b}+\vec{e}+\vec{c}+\vec{d}$ using polygon method.
   Verify $\vec{R}_1=\vec{R}_2$ by showing:
   (a) $R_1=R_2$:
   R_1 is the magnitude (length) of $\vec{R}_1$, i.e., the distance between P_1 and P_2.
   R_2 is the magnitude (length) of $\vec{R}_2$, i.e., the distance between P_3 and P_4.
   (b) $\vec{R}_1 \| \vec{R}_2$: Draw an extension line of $\vec{R}_1$, then draw two lines perpendicular to the extension line and make the two lines longer enough to reach the line of $\vec{R}_2$. Measure the lengths of the two lines to show that $\vec{R} \| \vec{R}_2$.

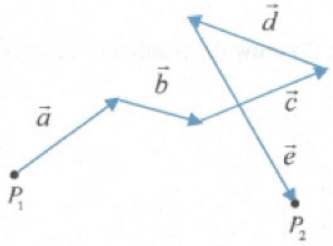


Figure (*a*) $\vec{R}_1=\vec{a}+\vec{b}+\vec{c}+\vec{d}+\vec{e}$

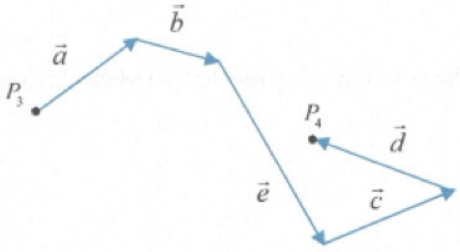


Figure (*b*) $\vec{R}_2=\vec{a}+\vec{b}+\vec{e}+\vec{c}+\vec{d}$