



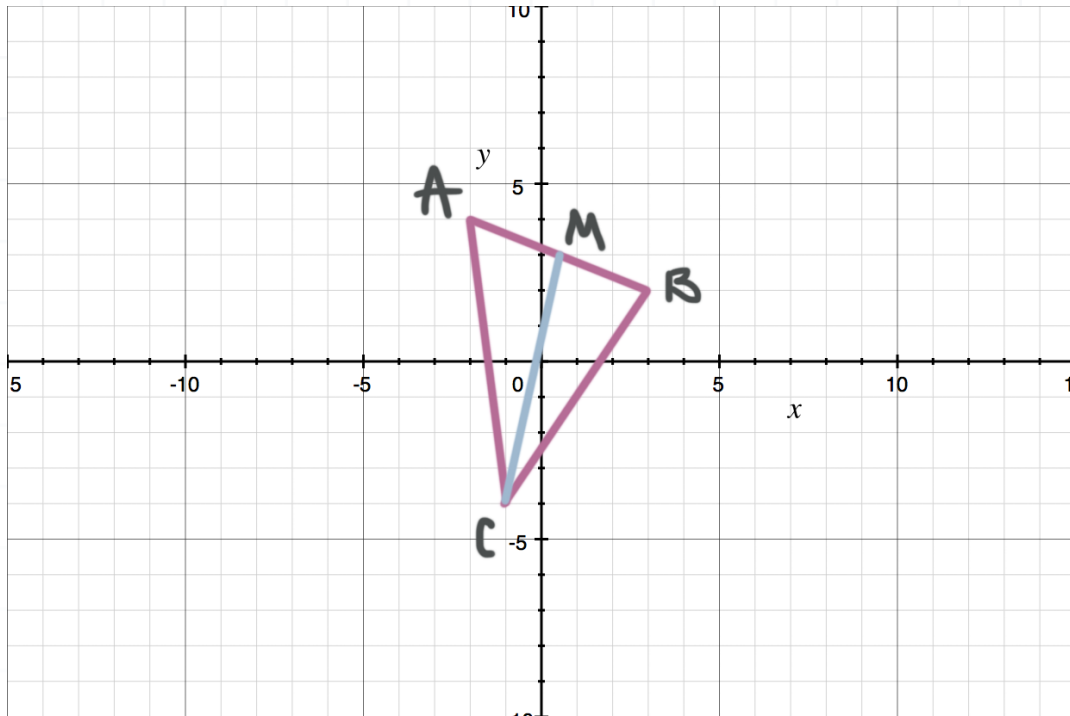
Calculus 3 Workbook

Introduction to vectors

krista king
MATH

VECTOR FROM TWO POINTS

- 1. Find the vector \overrightarrow{CM} , if M is the midpoint of \overline{AB} .



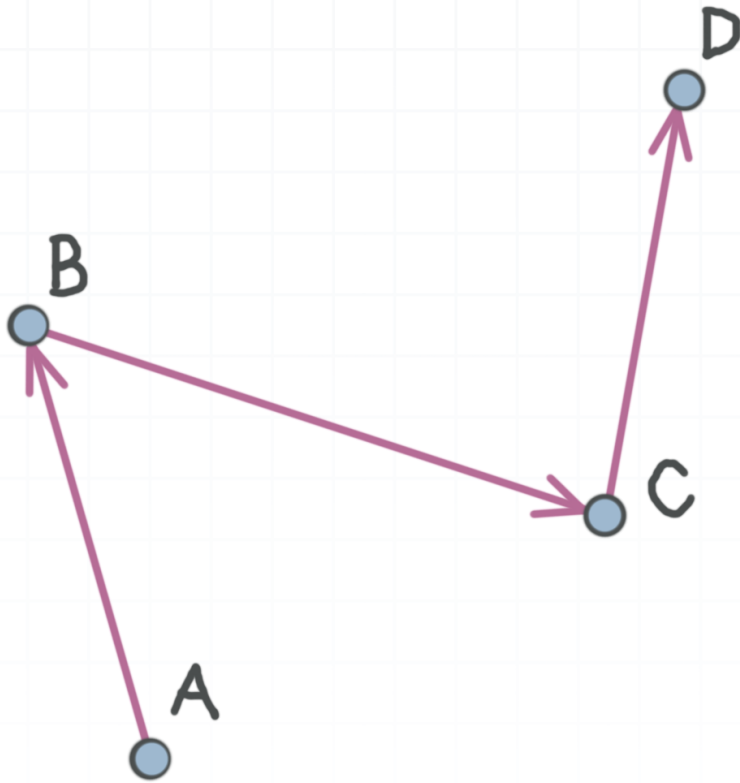
- 2. Find the coordinates of the point P , given $Q(-\sqrt{2}, 0, \sqrt{2})$ and $\overrightarrow{PQ} = \langle \sqrt{2}, 4, \sqrt{2} \rangle$.

- 3. Find the coordinates of the point C , given the coordinates of the point $A(-2, 3, 4)$, and the vectors $\overrightarrow{AB} = \langle 0, 5, 0 \rangle$ and $\overrightarrow{BC} = \langle 2, -3, 6 \rangle$.



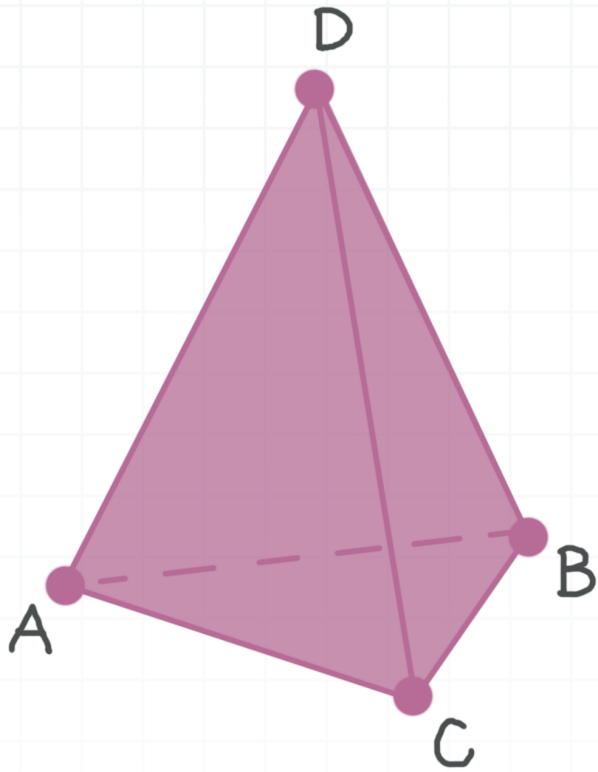
COMBINATIONS OF VECTORS

- 1. Find the combination $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CD}$.

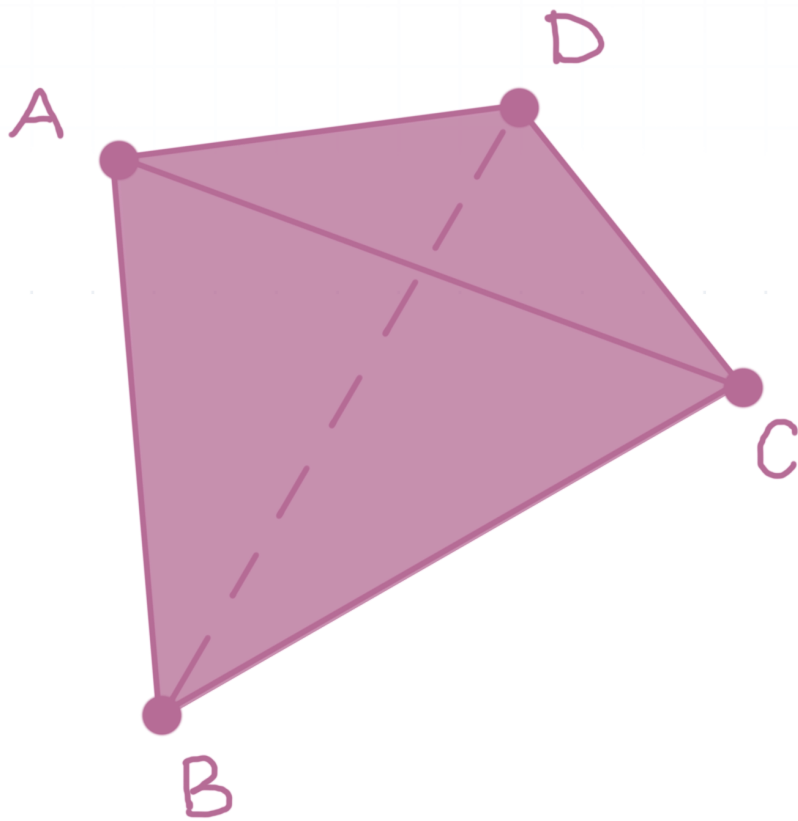


- 2. In the tetrahedron $ABCD$, find the resulting vector $\overrightarrow{DA} - \overrightarrow{DB} - \overrightarrow{BC}$.



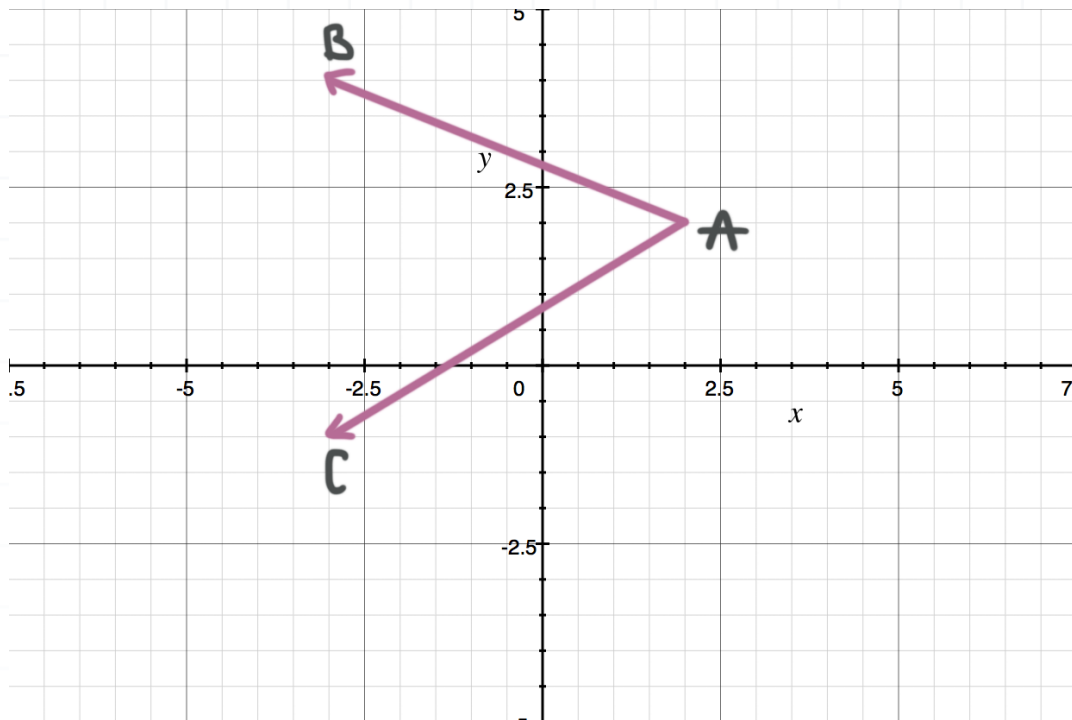


■ 3. In tetrahedron $ABCD$, find the vector $\overrightarrow{AB} + \overrightarrow{DC} + \overrightarrow{BD} - \overrightarrow{BC}$.



SUM OF TWO VECTORS

- 1. Find the sum $\overrightarrow{AB} + \overrightarrow{AC}$.



- 2. Find the vector $\vec{a} - \vec{b} + 2\vec{c}$, if $\vec{a} = \langle 0, 4, 5 \rangle$, $\vec{b} = \langle -3, 2, 1 \rangle$, and $\vec{c} = \langle 6, 0, 2 \rangle$.

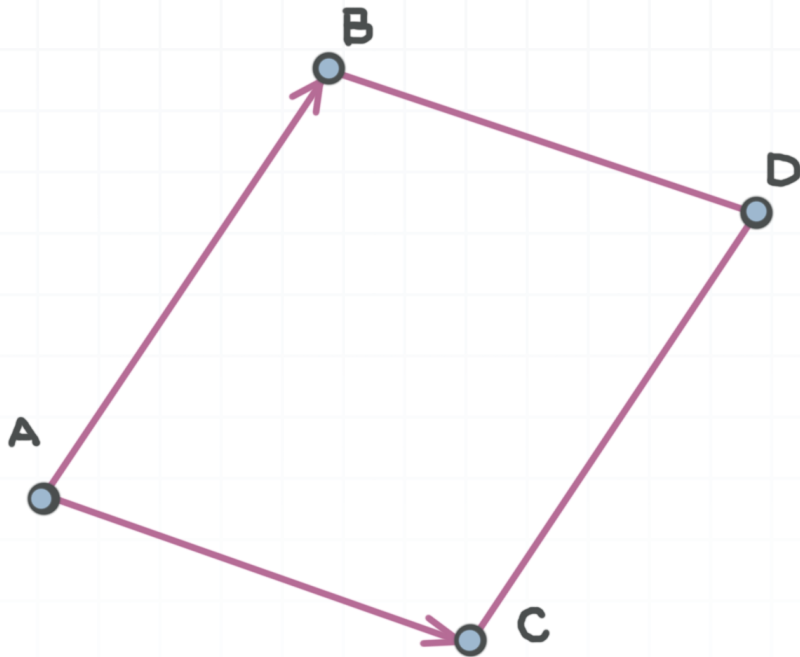
- 3. Find the sum of the vectors.

$$\sum_{k=1}^{100} \langle 5, k \rangle$$

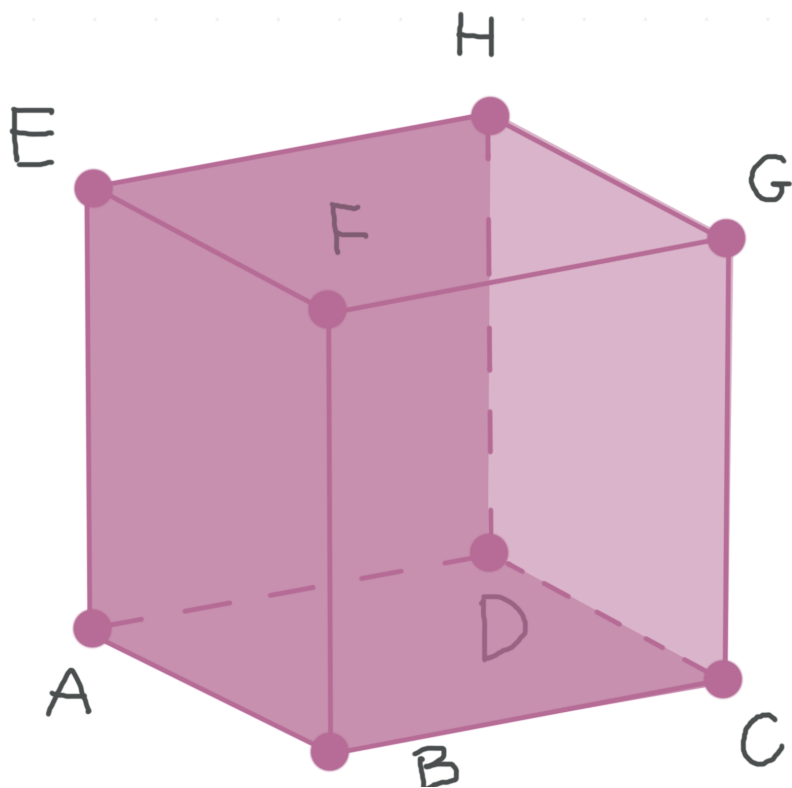


COPYING VECTORS AND USING THEM TO DRAW COMBINATIONS

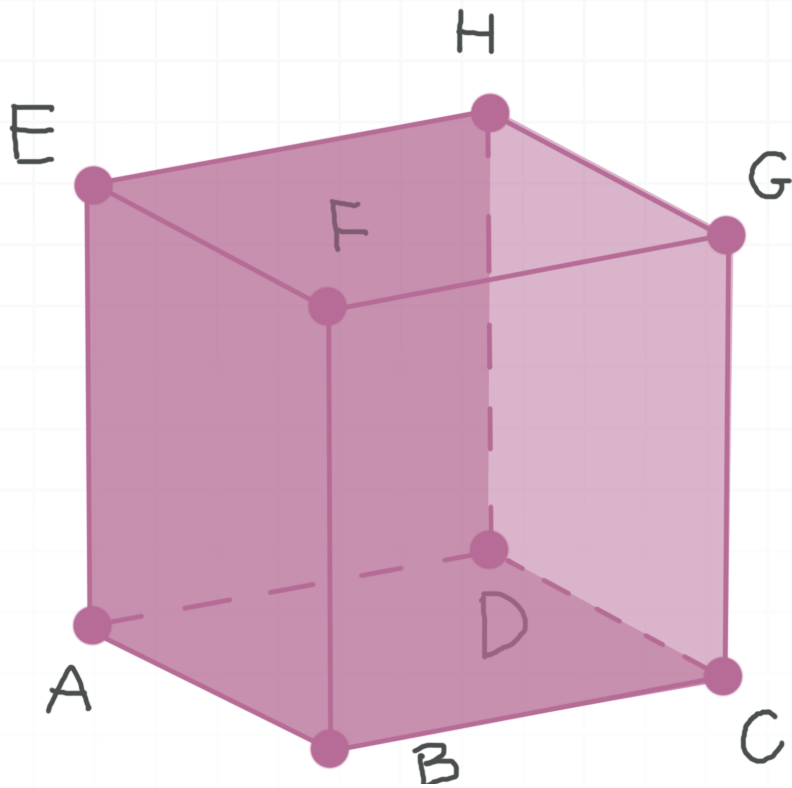
- 1. In parallelogram $ABDC$, find the combination $\overrightarrow{AB} + \overrightarrow{AC}$



- 2. In the cube $ABCDEFGH$, find the combination $\overrightarrow{AB} + \overrightarrow{AD} + \overrightarrow{AE}$.



- 3. In the cube $ABCDEFGH$, find the combination $\overrightarrow{AB} - \overrightarrow{AD} - \overrightarrow{AE}$.



UNIT VECTOR IN THE DIRECTION OF THE GIVEN VECTOR

■ 1. Find the unit vector in the direction of the combination $\vec{a} + \vec{b}$, where $\vec{a} = \langle -2, -7 \rangle$ and $\vec{b} = \langle 5, 3 \rangle$.

■ 2. The magnitude of the vector \vec{a} is three times larger than the unit vector in the same direction. Find the vector \vec{a} .

$$\vec{u}_a = \left\langle \frac{1}{3}, -\frac{2}{3}, -\frac{2}{3} \right\rangle$$

■ 3. Find the unit vector in the direction of \overrightarrow{AC} in the rectangle $ABCD$, if $A(4,1)$, $B(1,4)$, and $D(9,6)$.



ANGLE BETWEEN A VECTOR AND THE X-AXIS

- 1. Find the clockwise angle in radians between the vector $\vec{a} = \langle \sqrt{3}, -1 \rangle$ and the negative direction of the x -axis.

- 2. Find the angle between the vector $\overrightarrow{OA} = \langle 4, -4, 2 \rangle$ and the positive direction of the x -axis.

- 3. Find the angle between the vectors $\vec{a} = \langle 3, 4 \rangle$ and $\vec{b} = \langle -5, 12 \rangle$.



MAGNITUDE AND ANGLE OF THE RESULTANT FORCE

- 1. Find the magnitude and angle of the resultant force \vec{f} of the vectors $\vec{a} = \langle 2, -1 \rangle$, $\vec{b} = \langle 5, 1 \rangle$, and $\vec{c} = \langle -3, 3 \rangle$.

- 2. Find the magnitude of the resultant force \vec{f} of the vectors $\vec{a} = \langle 4, 0, 0 \rangle$, $\vec{b} = \langle 0, 4, 0 \rangle$, and $\vec{c} = \langle 0, 0, 2 \rangle$, then find the angles between \vec{f} and each of the major coordinate axes.

- 3. The resultant force \vec{f} of the vectors \vec{a} and \vec{b} has a magnitude of 12 and an angle of $2\pi/3$. Find vector \vec{b} , if $\vec{a} = \langle -8, 5\sqrt{3} \rangle$.



