

1. Calculate:  $\frac{1 - \frac{1}{2} - \frac{1}{4} - \frac{1}{8}}{\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}} =$

2. Move  $\triangle ABC$  as indicated the by arrow  $\vec{e}_1$  to produce  $\triangle A_1B_1C_1$ . Move  $\triangle A_1B_1C_1$  as indicated the by arrow  $\vec{e}_2$  to produce  $\triangle A_2B_2C_2$ .

$A( \quad , \quad ) \quad B( \quad , \quad ) \quad C( \quad , \quad )$

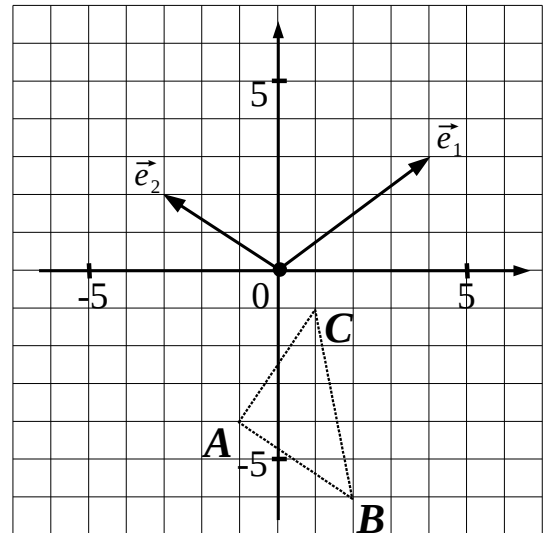
$A_1( \quad , \quad ) \quad B_1( \quad , \quad ) \quad C_1( \quad , \quad )$

$A_2( \quad , \quad ) \quad B_2( \quad , \quad ) \quad C_2( \quad , \quad )$

$\vec{e}_1 = (4, 3)$

$\vec{e}_2 = (-3, 2)$

$\vec{e} = \vec{e}_1 + \vec{e}_2 = ( \quad , \quad )$



### Properties of vectors:

I. Vectors whose “heads” and “tails” form a parallelogram are considered the same.

II. Coordinates of vectors add up independently:

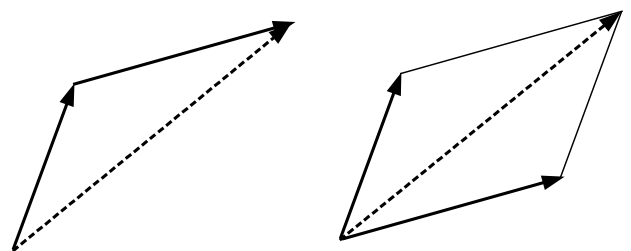
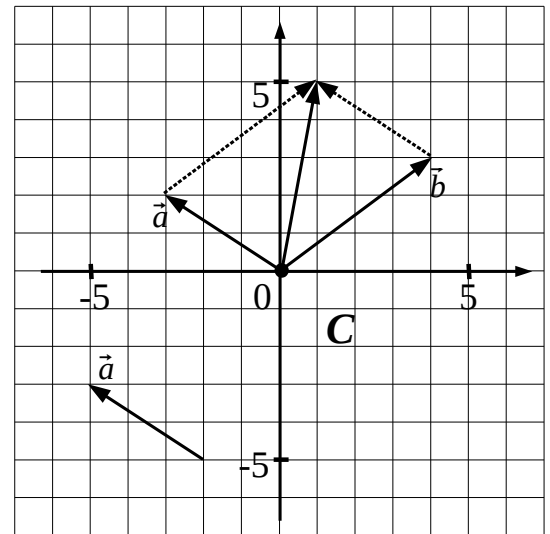
$$\begin{aligned} \vec{a} &= (x_1, y_1) \\ \vec{b} &= (x_2, y_2) \end{aligned} \quad \vec{a} + \vec{b} = (x_1 + x_2, y_1 + y_2)$$

III.  $\vec{a} + \vec{b} = \vec{b} + \vec{a}$

Graphic addition of vectors is done either ...

... according to “rule of triangle” (when the vectors are plotted head to tail) or

... according to the “rule of parallelogram” (when the tails are matched).



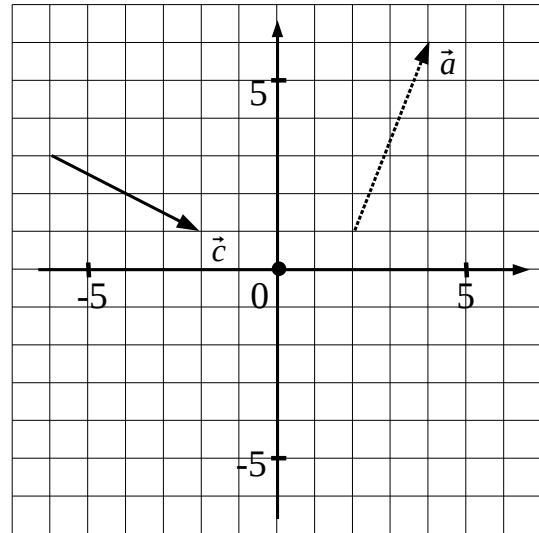
3. Plot vectors  $\vec{a}$  and  $\vec{c}$  from the origin and find their coordinates.

$$\vec{a} = \underline{\hspace{2cm}}$$

$$\vec{c} = \underline{\hspace{2cm}}$$

Plot vector  $\vec{x} = (4, -2)$  from the origin.

Plot vector  $\vec{y} = (-5, -2)$  from the origin.



4. Add the following vectors:  $\vec{a} = (3, 1)$  ,  $\vec{b} = (3, -1)$  ,  $\vec{g} = (0, 3)$  ,  $\vec{e} = (-1, 0)$  .

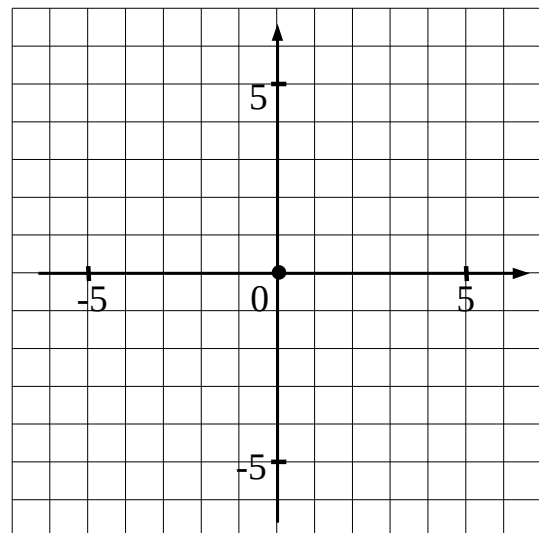
$$\vec{a} + \vec{b} = \underline{\hspace{2cm}}$$

$$\vec{a} + \vec{e} = \underline{\hspace{2cm}}$$

$$\vec{a} + \vec{b} = \underline{\hspace{2cm}}$$

$$\vec{e} + \vec{g} = \underline{\hspace{2cm}}$$

$$\vec{g} + \vec{a} = \underline{\hspace{2cm}}$$



5. Add vectors  $\vec{x}$  and  $\vec{y}$  using the rule of parallelogram with the help of a compass and a straight edge.

6. Solve the equation:

$$\frac{3x-1}{x+1} = 4$$

