

Esperimenti di Matematica con Materiali Semplici e Storia

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A diagram illustrating vector addition on a grid. It shows three vectors: a vertical black arrow pointing up, a black arrow pointing down and to the right, and a red arrow pointing up and to the right. Below the first arrow is the label $(0,3)$ in green. Below the second arrow is the label $(1,-1)$ in green. Below the third arrow is the label $(1,2)$ in red. A plus sign is between the first and second arrows, and an equals sign is between the second and third arrows.

$$\begin{matrix} \uparrow & + & \searrow & = & \nearrow \\ (0,3) & & (1,-1) & & (1,2) \end{matrix}$$

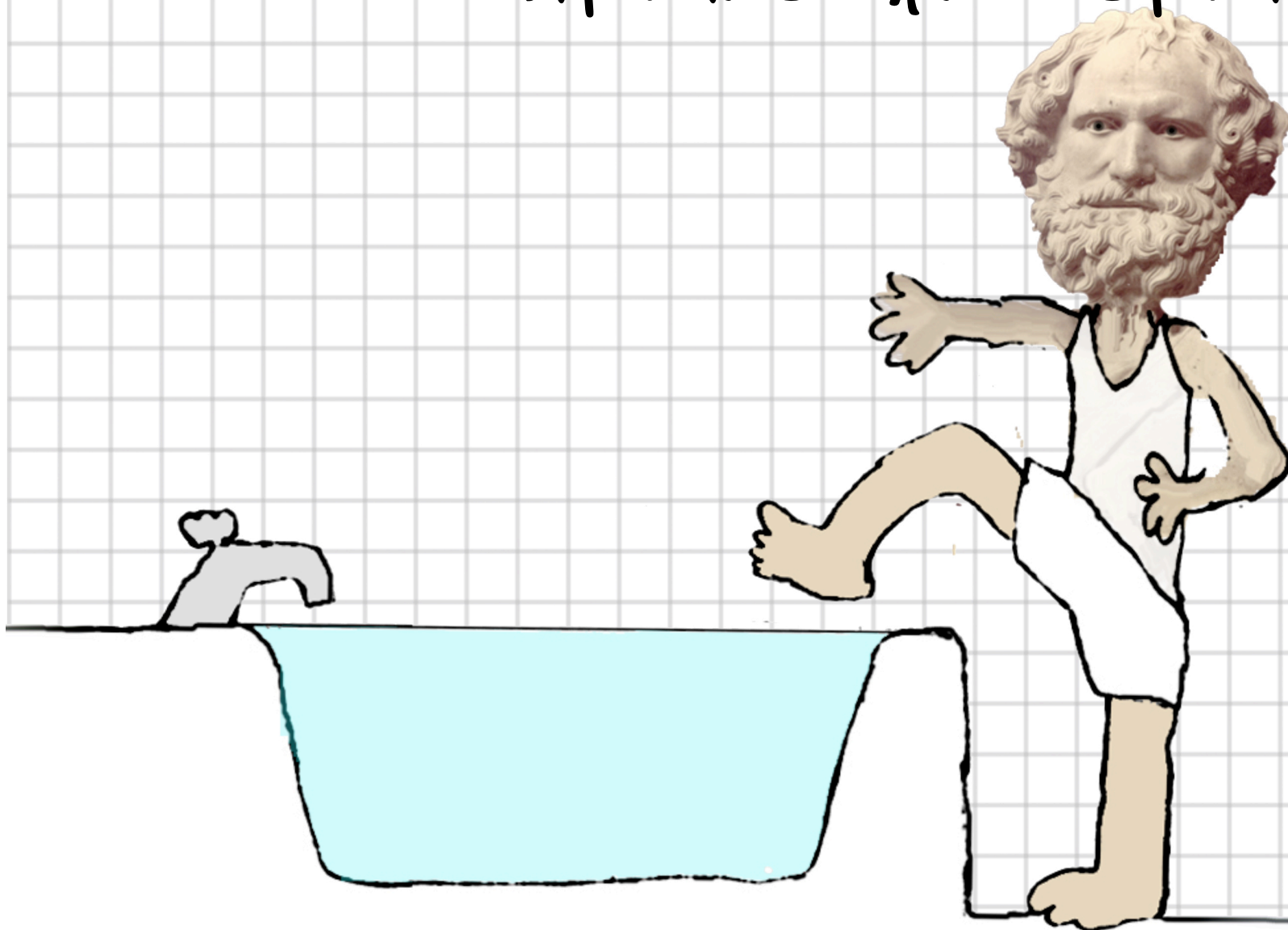
A diagram illustrating vector addition on a grid. It shows three vectors: a vertical black arrow pointing up, a black arrow pointing down and to the right, and a red arrow pointing up and to the right. To the left of the first arrow is the label 3 in blue. Above the second arrow is the label $\sqrt{2}$ in blue. To the right of the third arrow is the label $\sqrt{5}$ in red. A plus sign is between the first and second arrows, and an equals sign is between the second and third arrows.

$$\begin{matrix} \uparrow & + & \searrow & = & \nearrow \\ 3 & & \sqrt{2} & & \sqrt{5} \end{matrix}$$

Esperimenti di Matematica con Materiali Semplici e Storia

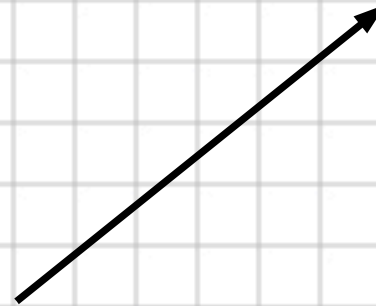
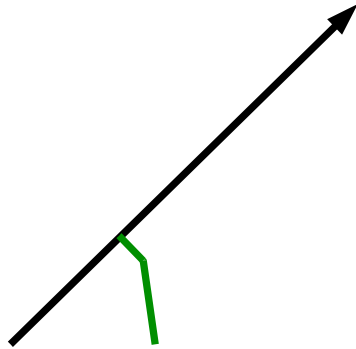


Esperimenti di Matematica con Materiali Semplici e Storia



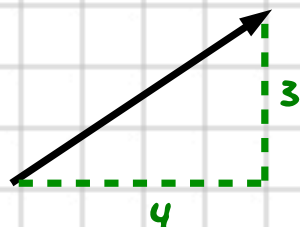
Esperimenti di Matematica con Materiali Semplici e Storia

DEFINIZIONI



DEFINIZIONI

DATE
LE COMPONENTI
RICAVA
MODULO E ANGOLO



$$a_x = 4$$

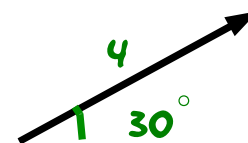
$$a_y = 3$$

segue

$$\text{Modulo} = 5$$

$$\text{Angolo} = \tan^{-1}(3/4) = 36,8^\circ$$

DATI
MODULO E ANGOLO
RICAVA
LE COMPONENTI



$$\text{Modulo} = 4$$

$$\text{Angolo} = 30^\circ$$

segue

$$a_x = a \cos(30) = 3,46$$

$$a_y = a \sin(30) = 2$$

DEFINIZIONI

DATE
LE COMPONENTI
RICAVA
MODULO E ANGOLO



$$a_x = 2$$

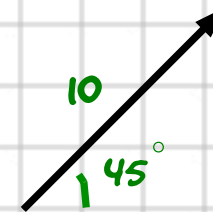
$$a_y = -1$$

segue

Modulo =

Angolo =

DATI
MODULO E ANGOLO
RICAVA
LE COMPONENTI



$$\text{Modulo} = 10$$

$$\text{Angolo} = 45^\circ$$

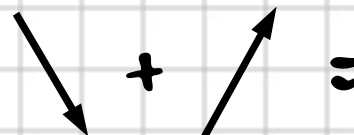
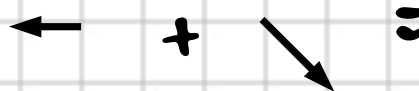
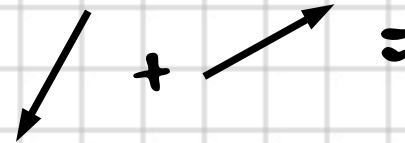
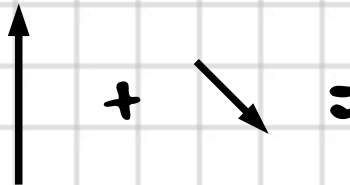
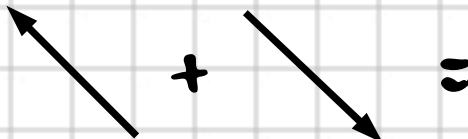
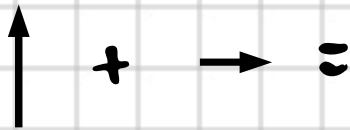
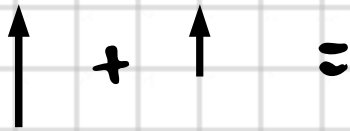
segue

$$a_x =$$

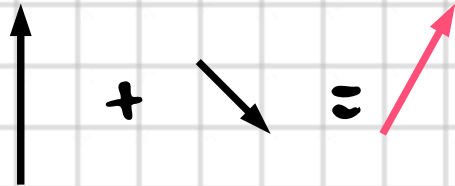
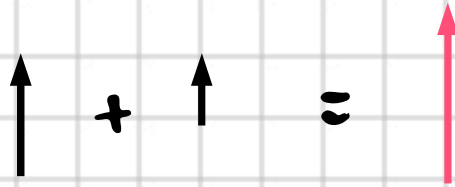
$$a_y =$$

SOMME

PhET Vector Addition



SOMME



SOMME

SCRIVI LE COMPONENTI

$$\begin{array}{c} \uparrow \\ (0,2) \end{array} + \begin{array}{c} \uparrow \\ (0,1) \end{array} = \begin{array}{c} \uparrow \\ (0,3) \end{array}$$

$$\begin{array}{c} \uparrow \\ (0,2) \end{array} + \begin{array}{c} \rightarrow \\ (1,0) \end{array} = \begin{array}{c} \nearrow \\ (1,2) \end{array}$$

$$\begin{array}{c} \swarrow \\ (-2,2) \end{array} + \begin{array}{c} \searrow \\ (2,-2) \end{array} = \begin{array}{c} \bigcirc \\ (0,0) \end{array}$$

$$\begin{array}{c} \uparrow \\ (0,3) \end{array} + \begin{array}{c} \searrow \\ (1,-1) \end{array} = \begin{array}{c} \nearrow \\ (1,2) \end{array}$$

$$\begin{array}{c} \swarrow \\ \end{array} + \begin{array}{c} \nearrow \\ \end{array} =$$

$$\begin{array}{c} \leftarrow \\ \end{array} + \begin{array}{c} \searrow \\ \end{array} =$$

$$\begin{array}{c} \swarrow \\ \end{array} + \begin{array}{c} \nearrow \\ \end{array} =$$

SOMME

SCRIVI I MODULI

$$2 \uparrow + \uparrow 1 = \uparrow$$

$$2 \uparrow + \rightarrow 1 = \nearrow$$

$$2\sqrt{2} \swarrow + \swarrow 2\sqrt{2} = 0$$

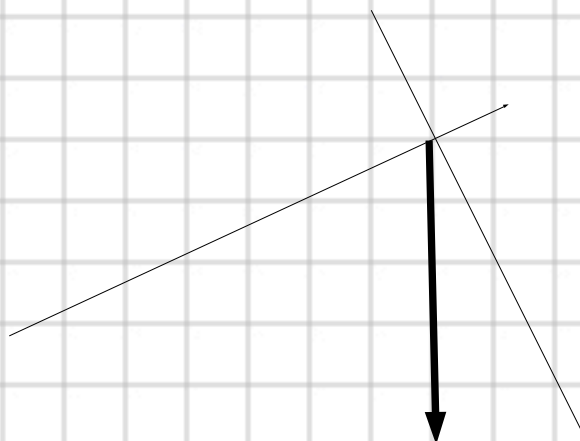
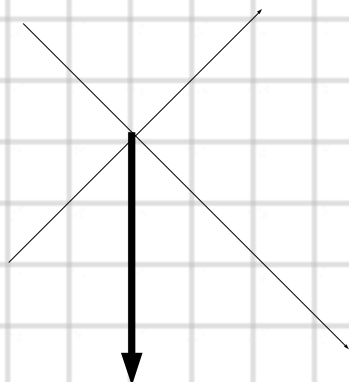
$$3 \uparrow + \swarrow \sqrt{2} = \nearrow \sqrt{5}$$

$$\swarrow + \nearrow = \searrow$$

$$\leftarrow + \searrow = \downarrow$$

$$\swarrow + \nearrow = \rightarrow$$

SCOMPOSIZIONE LUNGO DIREZIONI SCELTE



SOTTRAZIONI

$$\uparrow - \uparrow = \uparrow + \downarrow = \uparrow$$

$$\uparrow - \rightarrow =$$

$$\swarrow - \searrow =$$

$$\uparrow - \searrow =$$

$$\swarrow - \nearrow =$$

$$\leftarrow - \searrow =$$

$$\swarrow - \nearrow =$$

SOTTRAZIONI

SCRIVI LE COMPONENTI

$$\uparrow - \uparrow = \uparrow + \downarrow = \uparrow$$

$$\uparrow - \rightarrow = \rightarrow$$

$$\swarrow - \searrow = \searrow$$

$$\uparrow - \searrow = \searrow$$

$$\swarrow - \nearrow = \rightarrow$$

$$\leftarrow - \searrow = \swarrow$$

$$\swarrow - \nearrow = \rightarrow$$

PRODOTTI per SCALARE

$$2 \cdot \uparrow = \uparrow$$

$$-1 \cdot \nearrow =$$

$$-3 \cdot \rightarrow =$$

$$3 \cdot \searrow =$$

$$\frac{1}{2} \cdot \searrow =$$

$$0 \cdot \nearrow =$$

$$-2 \cdot \searrow =$$

PRODOTTI per SCALARE

SCRIVI LE COMPONENTI

$$2 \cdot \uparrow =$$

$$-1 \cdot \nearrow =$$

$$-3 \cdot \rightarrow =$$

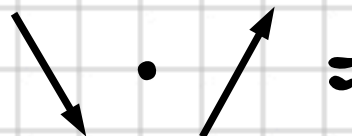
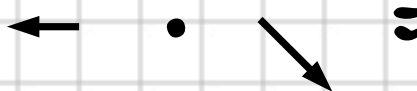
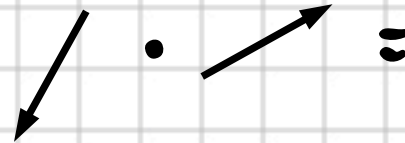
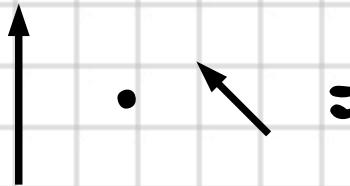
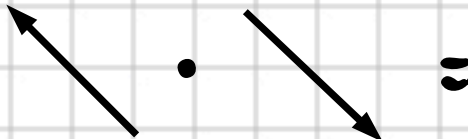
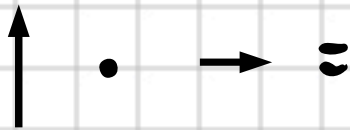
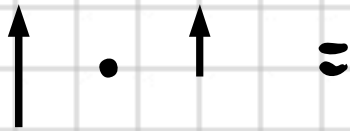
$$3 \cdot \searrow =$$

$$\frac{1}{2} \cdot \searrow =$$

$$0 \cdot \nearrow =$$

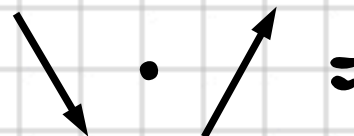
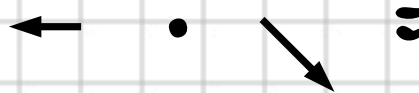
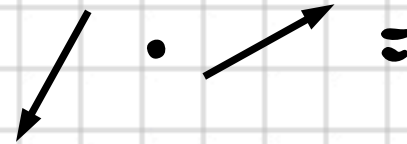
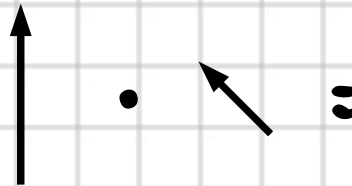
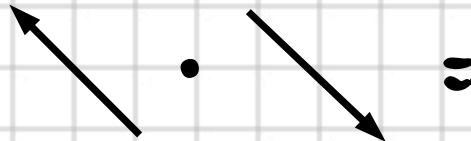
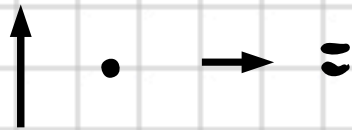
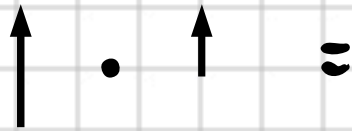
$$-2 \cdot \searrow =$$

PRODOTTI SCALARI



PRODOTTI SCALARI

SCRIVI LE COMPONENTI



$$\vec{a} \cdot \vec{b} = a_x b_x + a_y b_y$$

PRODOTTI VETTORIALI

$$\uparrow \times \uparrow =$$

$$\uparrow \times \rightarrow =$$

$$\swarrow \times \searrow =$$

$$\uparrow \times \swarrow =$$

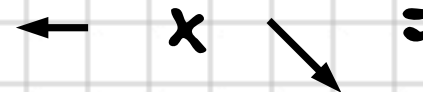
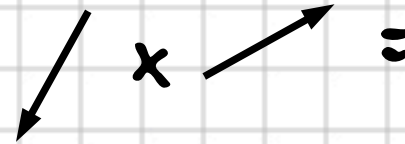
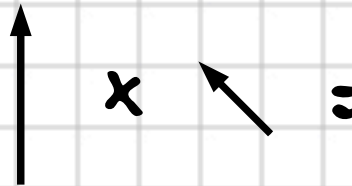
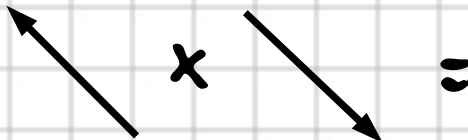
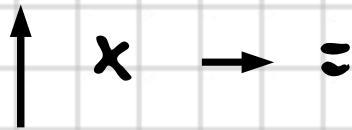
$$\swarrow \times \nearrow =$$

$$\leftarrow \times \searrow =$$

$$\swarrow \times \nearrow =$$

PRODOTTI VETTORIALI

SCRIVI LE COMPONENTI



$$\vec{a} \times \vec{b} = a_x b_y - a_y b_x$$

NEGATIVO
ENTRANTE