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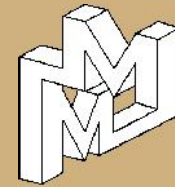
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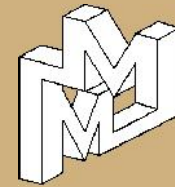
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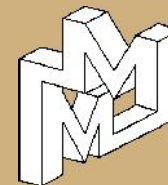


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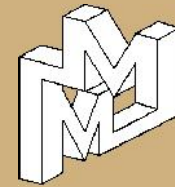
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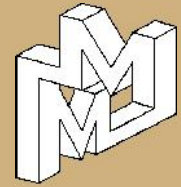
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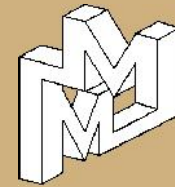
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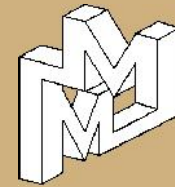
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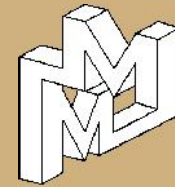
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$$(a + b)c = ac + bc$$

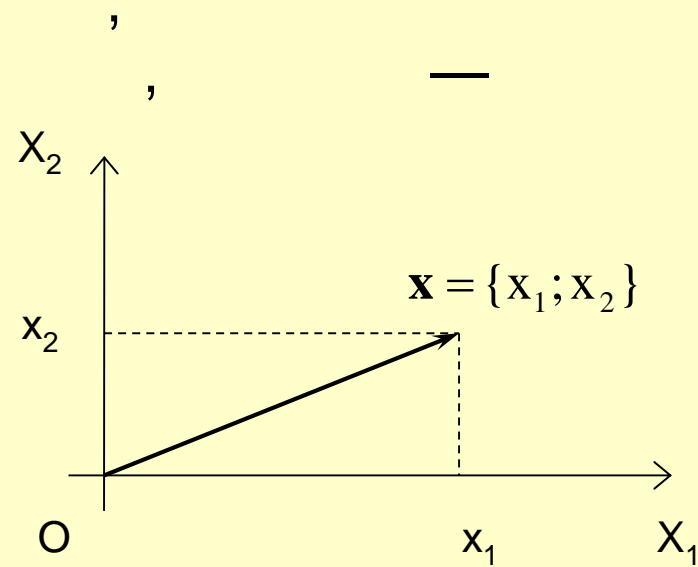
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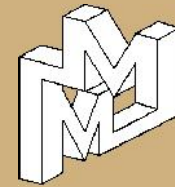
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$$\mathbf{x} = \{x_1; x_2; x_3\},$$



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 $\{x_1; x_2; x_3\} \neq \{x_2; x_3; x_1\}$

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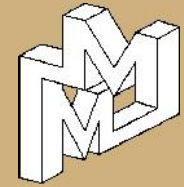


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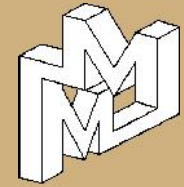
- « » , — (Simon Stevin, 1548—1620) 1580 ()



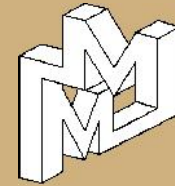
(1548-1620)



- : $\mathbf{x} = \{x_1; x_2; x_3\}, \mathbf{y} = \{y_1; y_2; y_3\}$



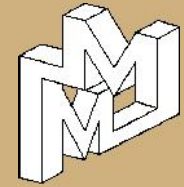
- $\mathbf{x} = \{x_1; x_2; x_3\}, \mathbf{y} = \{y_1; y_2; y_3\}$
- $\mathbf{x} + \mathbf{y} = \{x_1 + y_1; x_2 + y_2; x_3 + y_3\}$



- $\mathbf{x} = \{x_1; x_2; x_3\}, \mathbf{y} = \{y_1; y_2; y_3\}$

- $\mathbf{x} + \mathbf{y} = \{x_1 + y_1; x_2 + y_2; x_3 + y_3\}$

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- : $\mathbf{x} = \{x_1; x_2; x_3\}, \mathbf{y} = \{y_1; y_2; y_3\}$

- : $\mathbf{x} + \mathbf{y} = \{x_1 + y_1; x_2 + y_2; x_3 + y_3\}$

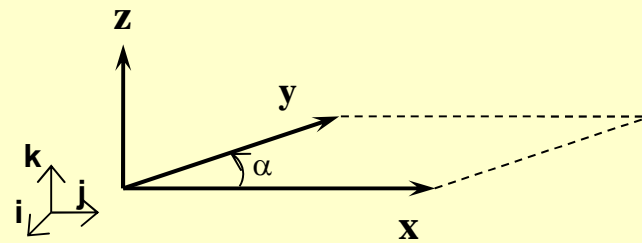
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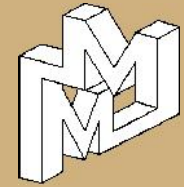
:
$$\mathbf{x} \cdot \mathbf{y} = \mathbf{y} \cdot \mathbf{x} = |\mathbf{x}| |\mathbf{y}| \cos \Gamma = x_1 y_1 + x_2 y_2 + x_3 y_3$$

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2) $\mathbf{z} = \mathbf{x} \times \mathbf{y}, \quad |\mathbf{z}| = |\mathbf{x}||\mathbf{y}|\sin \alpha$



$$\mathbf{x} \times \mathbf{x}$$



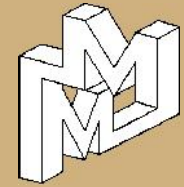
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$$\mathbf{x} \times \mathbf{y} \neq \mathbf{y} \times \mathbf{x}, \quad (\mathbf{a} \times \mathbf{b}) \times \mathbf{c} \neq \mathbf{a} \times (\mathbf{b} \times \mathbf{c})$$



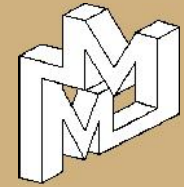
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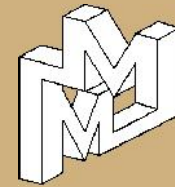
$$(a + b) \cdot c = a \cdot c + b \cdot c, \quad (a + b) \times c = a \times c + b \times c$$



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$$(a + b) \cdot c = a \cdot c + b \cdot c, \quad (a + b) \times c = a \times c + b \times c$$

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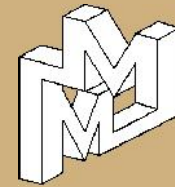
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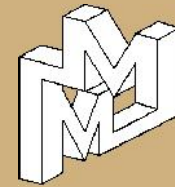
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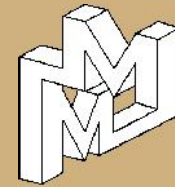
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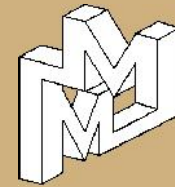
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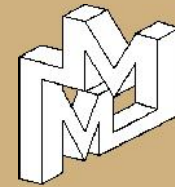
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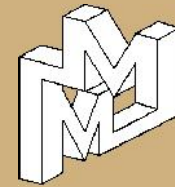
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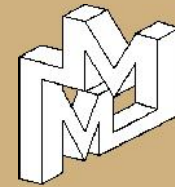
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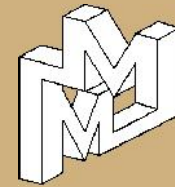
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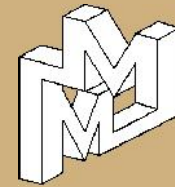
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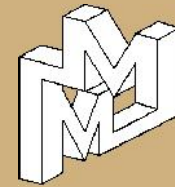
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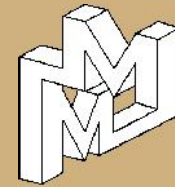
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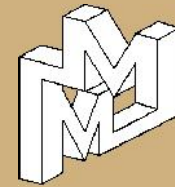
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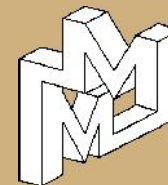
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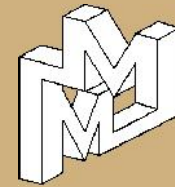
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$$S \equiv n \Delta S$$



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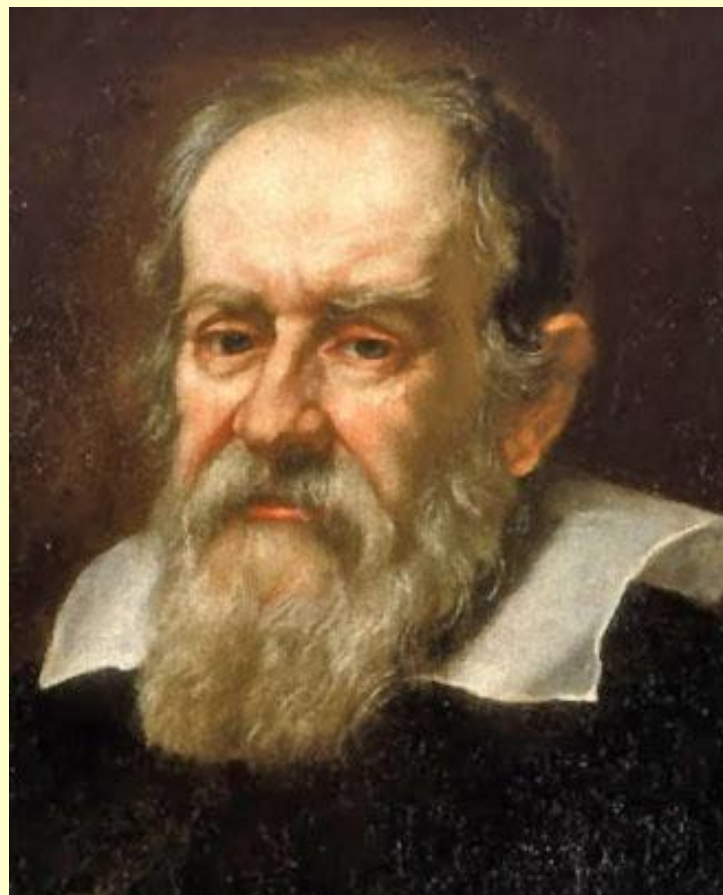
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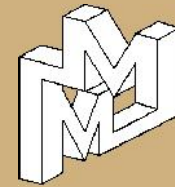
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(1564-1642)



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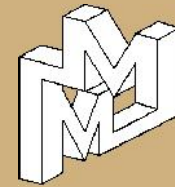
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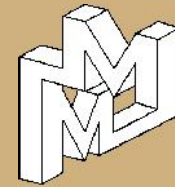
$$p = f / S$$



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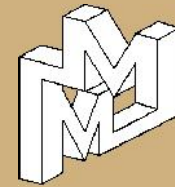
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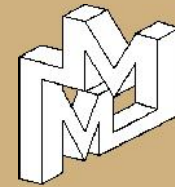
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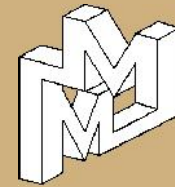
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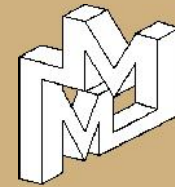
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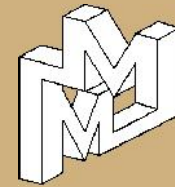
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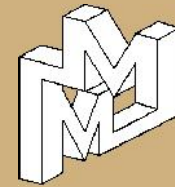
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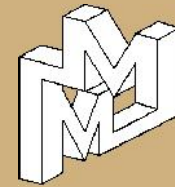
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$$S = n \Delta S$$

$$\Delta f$$

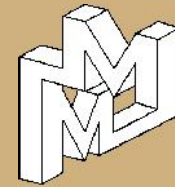


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$$S = n \Delta S$$

$$\Delta f$$

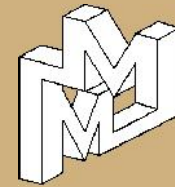
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$$p_n = \Delta f / \Delta S$$



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$$p_n = \Delta f / \Delta S$$

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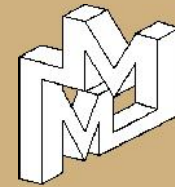
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$$p_n = \Delta f / \Delta S$$

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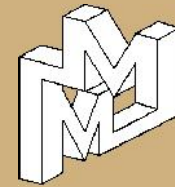
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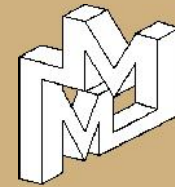
$$\mathbf{n} \cdot \mathbf{p}_n$$

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$\mathbf{n} \cdot \mathbf{p}_n$,

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$\mathbf{n} \quad \mathbf{p}_n$

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, $\{\mathbf{n}, \mathbf{p}_n\}$,

- \mathbf{n}, \mathbf{p}_n (« »), $\{\mathbf{n}, \mathbf{p}_n\}$,

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$$\mathbf{n} \otimes \mathbf{p}_n \neq \mathbf{p}_n \otimes \mathbf{n}$$

$$\mathbf{n} \otimes \mathbf{p}_n$$

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$\mathbf{a} \otimes (\dots)$



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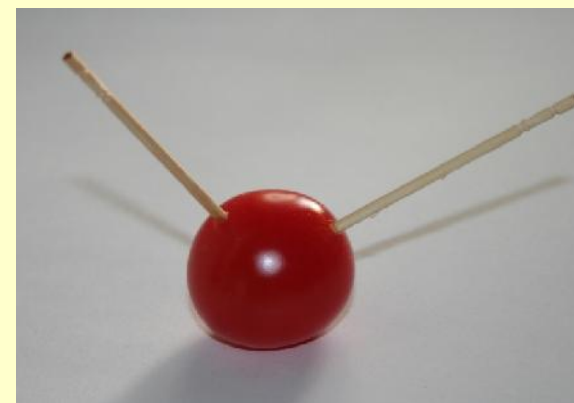
:

$a \otimes (\dots)$



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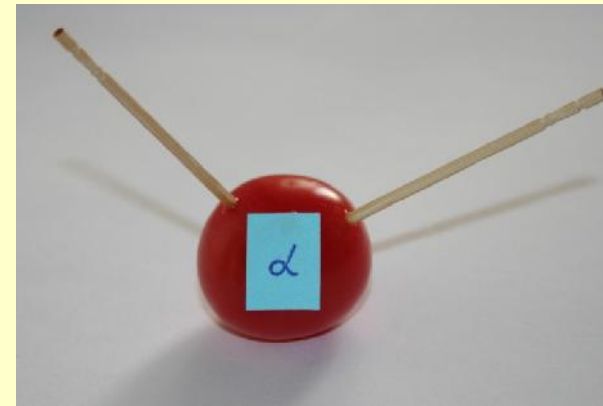
$a \otimes b$

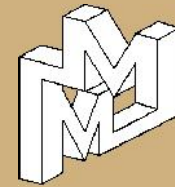


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$\alpha(\mathbf{a} \otimes \mathbf{b})$





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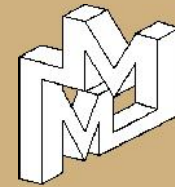
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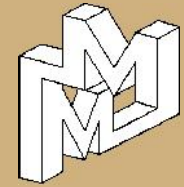
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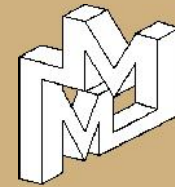
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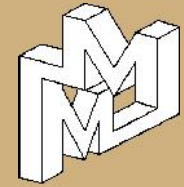
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- , « » $a \otimes b \otimes c$, ...



- **1758** (,)



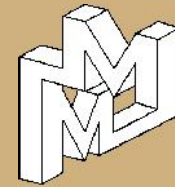
(1707-1783)



- **1758** (,)
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Woldemar Voight (1850-1919)



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(Augustin Louis Cauchy) **1822**

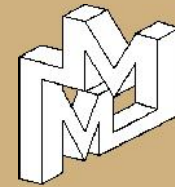
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(1789-1857)



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