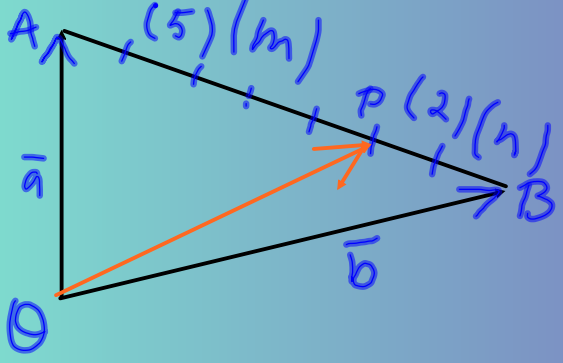
Jakosuhdelause

esim Pisteestä O lähtevät vektorit $\overrightarrow{OA} = \bar{a}$ ja $\overrightarrow{OB} = \bar{b}$.
Piste P jakaa janan AB suhteessa $5:2$ syntyneen kolmion kärjestä A lukien.
Määritä vektori $\overrightarrow{OP}$ vektoreiden $\bar{a}$ ja $\bar{b}$ avulla.



I tapa
"polkua pitkin periaate"

$$\overrightarrow{OP} = \overrightarrow{OB} + \overrightarrow{BP}$$
$$= \overrightarrow{OB} + \frac{2}{7}\overrightarrow{BA}$$
$$= \bar{b} + \frac{2}{7}(-\bar{b} + \bar{a})$$
$$= \bar{b} - \frac{2}{7}\bar{b} + \frac{2}{7}\bar{a}$$
$$\overrightarrow{OP} = \frac{5}{7}\bar{b} + \frac{2}{7}\bar{a} = \frac{2}{7}\bar{a} + \frac{5}{7}\bar{b}$$

$$\overrightarrow{OP} = \overrightarrow{OA} + \overrightarrow{AP}$$
$$= \overrightarrow{OA} + \frac{5}{7}\overrightarrow{AB}$$
$$= \bar{a} + \frac{5}{7}(-\bar{a} + \bar{b})$$
$$\overrightarrow{OP} = \frac{2}{7}\bar{a} + \frac{5}{7}\bar{b}$$

$$\overrightarrow{OP} = \overrightarrow{OA} + \overrightarrow{AP} \left(\overrightarrow{OB} + \overrightarrow{BP}\right)$$

$$= \bar{a} + \frac{5}{7}\overrightarrow{AB}$$

$$= \bar{a} + \frac{5}{7}\left(\bar{b} - \bar{a}\right)$$

$$= \bar{a} + \frac{5}{7}\bar{b} - \frac{5}{7}\bar{a}$$

$$\overrightarrow{OP} = \frac{2}{7}\bar{a} + \frac{5}{7}\bar{b}$$

II tapa kaasa

$$\overrightarrow{OP} = \frac{n\bar{a} + m\bar{b}}{n+m}$$

$$\overrightarrow{OP} = \frac{2\bar{a} + 5\bar{b}}{2+5}$$

$$= \frac{2\bar{a} + 5\bar{b}}{7}$$

$$\overrightarrow{OP} = \frac{2}{7}\bar{a} + \frac{5}{7}\bar{b}$$

Lineaarikombinaatio

Ogm 1 (48)

$\bar{u} = -3\bar{a} - (2\bar{b} - 3\bar{c})$

$\bar{v} = 2(\bar{a} - \bar{b}) - 3(\bar{b} - 2\bar{c})$

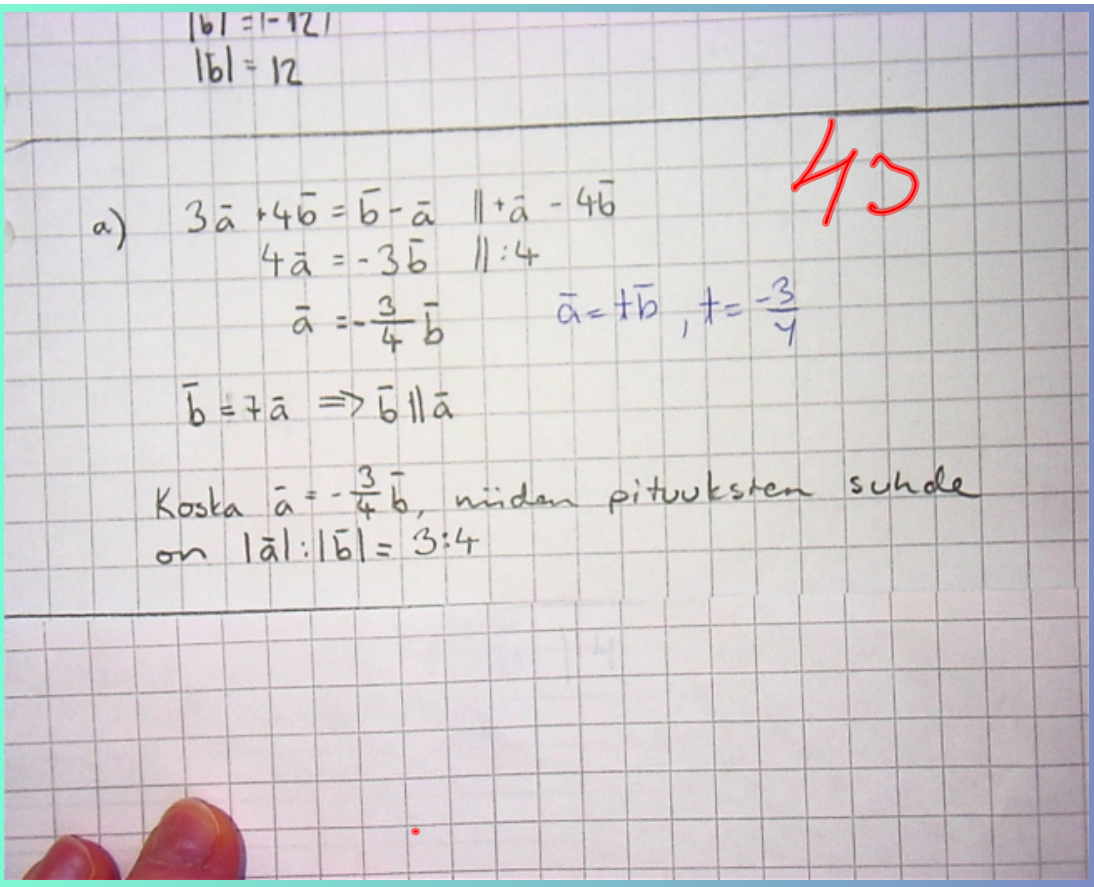
$\bar{w} = 2\bar{u} - 3\bar{v}$

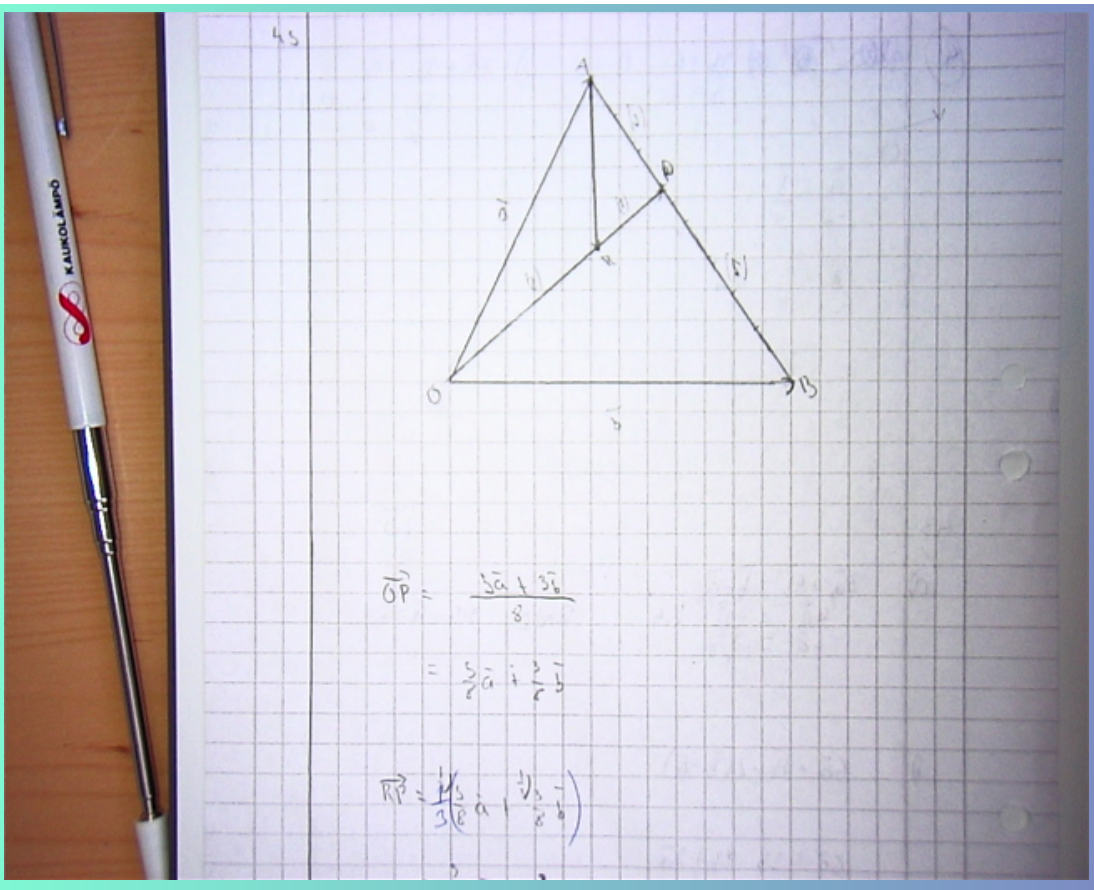
$\bar{w} = 2\bar{u} - 3\bar{v}$

$= 2(-3\bar{a} - (2\bar{b} - 3\bar{c})) - 3(2(\bar{a} - \bar{b}) - 3(\bar{b} - 2\bar{c}))$

$=$

$= -30\bar{a} + 11\bar{b} + 6\bar{c}$


|b| = |-12|
|b| = 12
43
a) 3ā + 4b̄ = b̄ - ā ||+ā - 4b̄
4ā = -3b̄ ||:4
ā = -3/4 b̄
ā = tb̄, t = -3/4
b̄ = 7ā ⇒ b̄ ∥ ā
Koska ā = -3/4 b̄, niiden pituuksien suhde
on |ā| : |b̄| = 3:4


KAUKOLÄMPÖ
A
P
O
B
$\vec{OP} = \frac{3\vec{a} + 3\vec{b}}{8}$
$= \frac{3}{8}\vec{a} + \frac{3}{8}\vec{b}$