Reiknum[illegible]garvigurs sem er gagnstefna vigrinum $\mathbf{a} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$.

La[illegible]

[illegible]igurinn er gagnstefna og því verða formerki hnita hans öfug við hnit **a**.



# Kafli 1.1. Vigrar

$$\overrightarrow{AB} = \begin{pmatrix} d_x \\ d_y \end{pmatrix} = \begin{pmatrix} x_2 - x_1 \\ y_2 - y_1 \end{pmatrix}$$

## Reikna $\overrightarrow{AB}$

1) a) $A = (1,4)$, $B = (3,2)$ ($x_1, y_1$; $x_2, y_2$)

$\overrightarrow{AB} = \begin{pmatrix} 3-1 \\ 2-4 \end{pmatrix} = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$

b) $A = (6,2)$, $B = (2,-3)$

$\overrightarrow{AB} = \begin{pmatrix} 2-6 \\ -3-2 \end{pmatrix} = \begin{pmatrix} -4 \\ -5 \end{pmatrix}$

2) a) $A = (3,-1)$, $B = (4,3)$

$\overrightarrow{AB} = \begin{pmatrix} 4-3 \\ 3-(-1) \end{pmatrix} = \overrightarrow{AB} = \begin{pmatrix} 1 \\ 4 \end{pmatrix}$

b) $A = (-2,-1)$, $B = (-5,3)$

$\overrightarrow{AB} = \begin{pmatrix} -5-(-2) \\ 3-(-1) \end{pmatrix} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$

3) a) $A = (-3,-4)$, $B = (1,-4)$

$\overrightarrow{AB} = \begin{pmatrix} 1-(-3) \\ -4-(-4) \end{pmatrix} = \begin{pmatrix} 4 \\ 0 \end{pmatrix}$

b) $A = (1,-5)$, $B = (5,1)$

$\overrightarrow{AB} = \begin{pmatrix} 5-1 \\ 1-(-5) \end{pmatrix} = \begin{pmatrix} 4 \\ 6 \end{pmatrix}$

4) a) $A = (-1,4)$, $B = (2,-4)$

$\overrightarrow{AB} = \begin{pmatrix} 2-(-1) \\ -4-4 \end{pmatrix} = \begin{pmatrix} 3 \\ -8 \end{pmatrix}$

b) $A = (3,2)$, $B = (3,5)$

$\overrightarrow{AB} = \begin{pmatrix} 3-3 \\ 5-2 \end{pmatrix} = \begin{pmatrix} 0 \\ 3 \end{pmatrix}$

5) a) $A = (3,-3)$, $B = (0,-1)$

$\overrightarrow{AB} = \begin{pmatrix} 0-3 \\ -1-(-3) \end{pmatrix} = \begin{pmatrix} -3 \\ 2 \end{pmatrix}$

b) $A = (-6,2)$, $B = (-2,8)$

$\overrightarrow{AB} = \begin{pmatrix} -2-(-6) \\ 8-2 \end{pmatrix} = \begin{pmatrix} 4 \\ 6 \end{pmatrix}$

Reiknaðu endapunkt vigursins $a=\begin{pmatrix}-2\\3\end{pmatrix}$ ef upphafspunktur er

7) a) $A=(2,1)$

$\begin{pmatrix}-2\\3\end{pmatrix}=\begin{pmatrix}x_2-2\\y_2-1\end{pmatrix}=$

$-2=x-2$ og $3=y-1$

$x=0$ $\quad 4=y$

$B=0,4$

b) $A=(-5,1)$

$\begin{pmatrix}-2\\3\end{pmatrix}=\begin{pmatrix}x_2-(-5)\\y_2-1\end{pmatrix}$

$-2=x+5$ $\quad 3=y-1$

$-7=x$ $\quad 4=y$

$B=-7,4$

8) a) $A=(4,-2)$

$\begin{pmatrix}-2\\3\end{pmatrix}=\begin{pmatrix}x_2-4\\y_2-(-2)\end{pmatrix}$

$-2=x-4$ $\quad 3=y+2$

$2=x$ $\quad 1=y$

$B=2,1$

b) $A=(5,5)$

$\begin{pmatrix}-2\\3\end{pmatrix}=\begin{pmatrix}x_2-5\\y_2-5\end{pmatrix}$

$-2=x-5$ $\quad 3=y-5$

$3=x$ $\quad 8=y$

$B=3,8$

9) a) $A=(-2,-2)$

$\begin{pmatrix}-2\\3\end{pmatrix}=\begin{pmatrix}x_2-(-2)\\y_2-(-2)\end{pmatrix}$

$-2=x+2$ $\quad 3=y+2$

$-4=x$ $\quad 1=y$

$B=-4,1$

b) $A=(-3,3)$

$\begin{pmatrix}-2\\3\end{pmatrix}=\begin{pmatrix}x_2-(-3)\\y_2-3\end{pmatrix}$

$-2=x+3$ $\quad 3=y-3$

$-5=x$ $\quad 6=y$

$B=-5,6$

Reikningur upphafspunkt vigursins $a = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$ ef endapunktur er:

10)

a) $B = (2, 1)$

$\begin{pmatrix} -2 \\ 3 \end{pmatrix} = \begin{pmatrix} 2 - x \\ 1 - y \end{pmatrix}$

$-2 = 2 - x \quad | \quad 3 = 1 - y$

$x = 4 \quad | \quad y = -2$

$A = (4, -2)$

b) $B = (-5, 1)$

$\begin{pmatrix} -2 \\ 3 \end{pmatrix} = \begin{pmatrix} -5 - x \\ 1 - y \end{pmatrix}$

$-2 = -5 - x \quad | \quad 3 = 1 - y$

$x = -3 \quad | \quad y = -2$

$A = (-3, -2)$

11)

a) $B = (4, -2)$

$\begin{pmatrix} -2 \\ 3 \end{pmatrix} = \begin{pmatrix} 4 - x_1 \\ -2 - y_1 \end{pmatrix}$

$-2 = 4 - x_1 \quad | \quad 3 = -2 - y_1$

$x_1 = 6 \quad | \quad y_1 = -5$

$A = (6, -5)$

b) $B = 5, 5$

$\begin{pmatrix} -2 \\ 3 \end{pmatrix} = \begin{pmatrix} 5 - x_1 \\ 5 - y_2 \end{pmatrix}$

$-2 = 5 - x_1 \quad | \quad 3 = 5 - y_2$

$x_1 = 7 \quad | \quad y_2 = 2$

$A = (7, 2)$

12)

a) $B = (-2, -2)$

$\begin{pmatrix} -2 \\ 3 \end{pmatrix} = \begin{pmatrix} -2 - x_1 \\ -2 - y_1 \end{pmatrix}$

$-2 = -2 - x_1 \quad | \quad 3 = -2 - y_1$

$x_1 = 0 \quad | \quad y_1 = -5$

$A = (0, -5)$

b) $B = (-3, 3)$

$\begin{pmatrix} -2 \\ 3 \end{pmatrix} = \begin{pmatrix} -3 - x_1 \\ 3 - y_1 \end{pmatrix}$

$-2 = -3 - x_1 \quad | \quad 3 = 3 - y_1$

$x_1 = 1 \quad | \quad y = 0$

$A = (1, 0)$

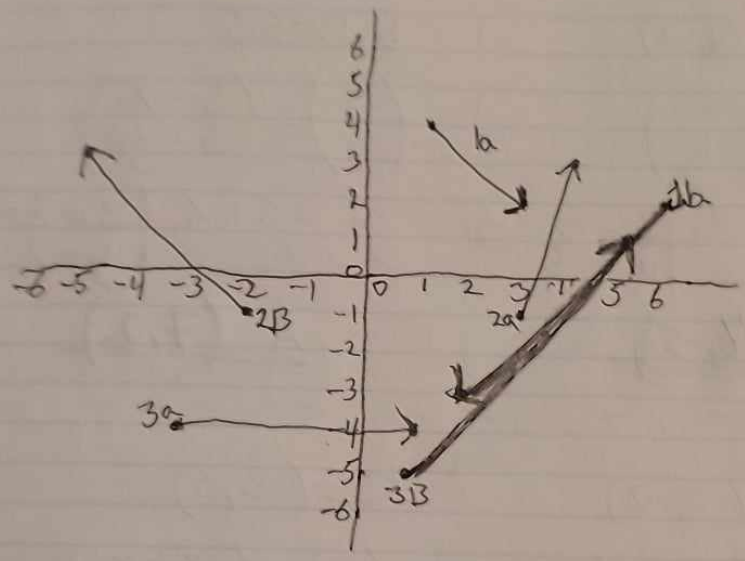
Reikna staðarvigur fyrir þessa punkta

13) a) $A=(2,5)$ $\overrightarrow{OA}=\begin{pmatrix}2\\5\end{pmatrix}$

b) $A=(-3,-1)$ $\overrightarrow{OA}=\begin{pmatrix}-3\\-1\end{pmatrix}$

14) a) $A=(5,-4)$ $\overrightarrow{OA}=\begin{pmatrix}5\\-4\end{pmatrix}$

b) $A=(-3,3)$ $\overrightarrow{OA}=\begin{pmatrix}-3\\3\end{pmatrix}$



# 1.3 Samkeyring Vigra

$a+b=\begin{pmatrix}a_1+b_1\\a_2+b_2\end{pmatrix}$ $\underline{a+b=c}$ Núllvigur $AA\begin{pmatrix}0\\0\end{pmatrix}$

víxlreglan $a+b=b+a$

tengireglan $(a+b)+c=a+(b+c)$

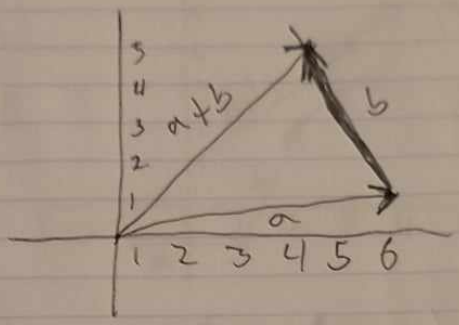
innskotsreglan $\overrightarrow{AB}+\overrightarrow{BC}=\overrightarrow{AC}$

Æfing 1.2?

1) $a=\begin{pmatrix}6\\1\end{pmatrix}$ $b=\begin{pmatrix}-2\\4\end{pmatrix}$

$a+b=\begin{pmatrix}6+(-2)\\1+4\end{pmatrix}$

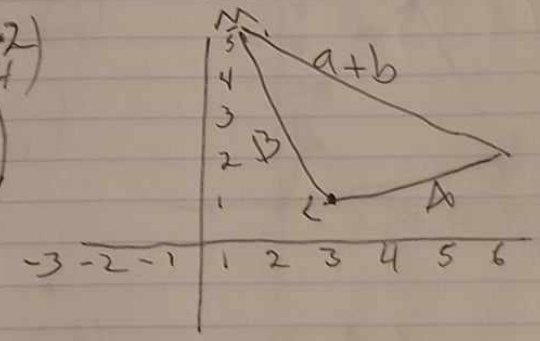
$a+b=\begin{pmatrix}4\\5\end{pmatrix}$




2) $a=\begin{pmatrix}-3\\-1\end{pmatrix}$, $b=\begin{pmatrix}-2\\4\end{pmatrix}$

$a+b=\begin{pmatrix}-3+(-2)\\-1+4\end{pmatrix}$

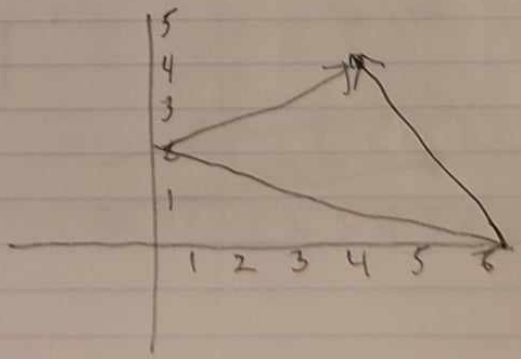
$a+b=\begin{pmatrix}-5\\3\end{pmatrix}$




3) $a=\begin{pmatrix}6\\-2\end{pmatrix}$ $b=\begin{pmatrix}-2\\4\end{pmatrix}$

$a+b=\begin{pmatrix}6+(-2)\\-2+4\end{pmatrix}$

$a+b=\begin{pmatrix}4\\2\end{pmatrix}$

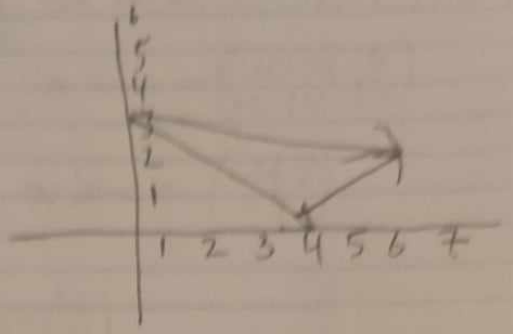


# Affine 1.2

4) $a=\begin{pmatrix}4\\-3\end{pmatrix}\ b\begin{pmatrix}2\\2\end{pmatrix}$

$a+b=\begin{pmatrix}4+2\\-3+2\end{pmatrix}$

$a+b=\begin{pmatrix}6\\1\end{pmatrix}$

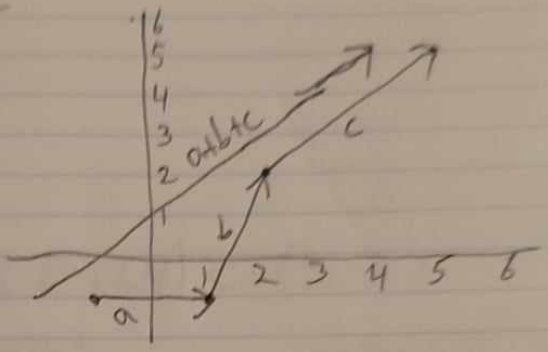



$a+b+c$

5) $a=\begin{pmatrix}2\\0\end{pmatrix}, b=\begin{pmatrix}1\\3\end{pmatrix}\ c=\begin{pmatrix}3\\3\end{pmatrix}$

$a+b+c=\begin{pmatrix}2+1+3\\0+3+3\end{pmatrix}$

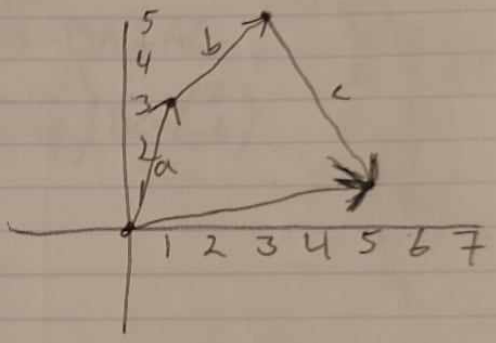
$a+b+c=\begin{pmatrix}6\\6\end{pmatrix}$




6) $a=\begin{pmatrix}1\\3\end{pmatrix}\ b=\begin{pmatrix}2\\2\end{pmatrix}\ c=\begin{pmatrix}2\\-4\end{pmatrix}$

$a+b+c=\begin{pmatrix}1+2+2\\3+2-4\end{pmatrix}$

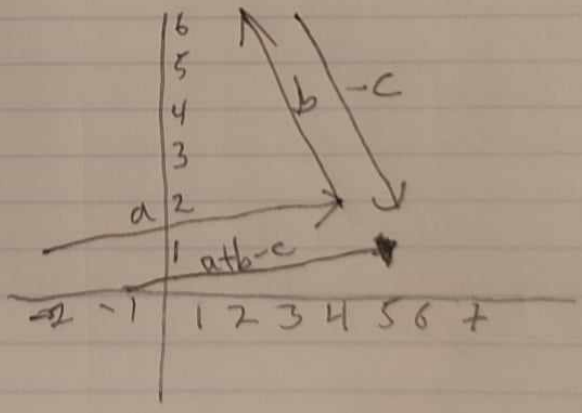
$a+b+c=\begin{pmatrix}5\\1\end{pmatrix}$




7) $a=\begin{pmatrix}6\\1\end{pmatrix}\ b=\begin{pmatrix}-2\\4\end{pmatrix}\ c=\begin{pmatrix}-2\\4\end{pmatrix}$

$a+b-c=\begin{pmatrix}6+(-2)-(-2)\\1+4-4\end{pmatrix}$

$a+b-c=\begin{pmatrix}6\\1\end{pmatrix}$



$\overrightarrow{AB}+\overrightarrow{BC}=\overrightarrow{AC}$

(8) $a-b+c$

$a=\begin{pmatrix}3\\-10\end{pmatrix}\ b=\begin{pmatrix}-7\\5\end{pmatrix}\ c=\begin{pmatrix}8\\14\end{pmatrix}$

$a-b+c=\begin{matrix}3+7+8\\-10-5+14\end{matrix}$

$a-b+c=\begin{pmatrix}18\\-1\end{pmatrix}$

(9) $a-b-c\quad a=\begin{pmatrix}-25\\12\end{pmatrix}\ b=\begin{pmatrix}14\\-4\end{pmatrix}\ c=\begin{pmatrix}8\\17\end{pmatrix}$

$a-b-c=\begin{pmatrix}-25-14-8\\12+4-17\end{pmatrix}$

$a-b-c=\begin{pmatrix}-47\\-1\end{pmatrix}$

(10) $a+b+c\quad a=\begin{pmatrix}3\\-10\end{pmatrix}\ b=\begin{pmatrix}-7\\5\end{pmatrix}\ c=\begin{pmatrix}8\\14\end{pmatrix}$

$a+b+c=\begin{pmatrix}3-7+8\\-10+5+14\end{pmatrix}$

$a+b+c=\begin{pmatrix}4\\9\end{pmatrix}$

(11) bitte punkte $A=(-3,-4)\ B=(2,4)\ C=(5,-2)$

a) $AC=\begin{pmatrix}5-(-3)\\-2-(-4)\end{pmatrix}$

$AB=\begin{pmatrix}8\\2\end{pmatrix}$

b) $AC+BA$

$AC+BA=BA+AC$

$BC=\begin{pmatrix}5-2\\-2-4\end{pmatrix}\ BC=\begin{pmatrix}3\\-6\end{pmatrix}$

c) $BC+AC+AB$

$AB+BC+AC$

$AC+AC$

$2\cdot AC$

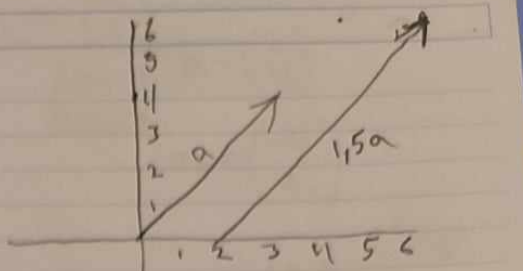
$2\cdot\begin{pmatrix}8\\2\end{pmatrix}$

$=\begin{pmatrix}16\\4\end{pmatrix}$

12) a) $a = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$

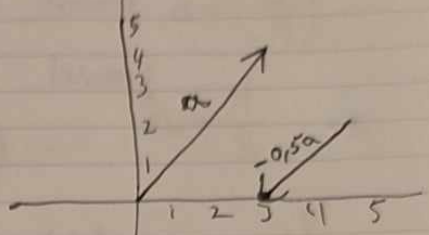
$a = 1{,}5a$

$a = 1{,}5 \cdot \begin{pmatrix} 3 \\ 4 \end{pmatrix} = \begin{pmatrix} 4{,}5 \\ 6 \end{pmatrix}$



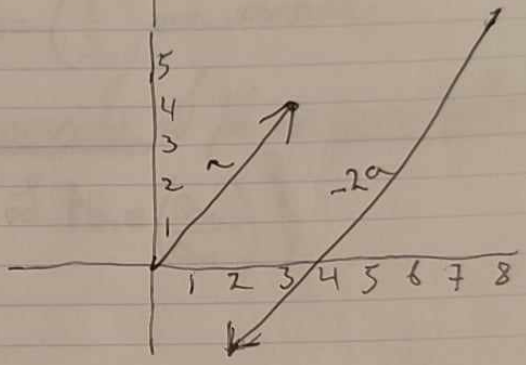

b) $a = -0{,}5a$

$a = -0{,}5 \cdot \begin{pmatrix} 3 \\ 4 \end{pmatrix} = \begin{pmatrix} -1{,}5 \\ -2 \end{pmatrix}$




c) $a = -2a$

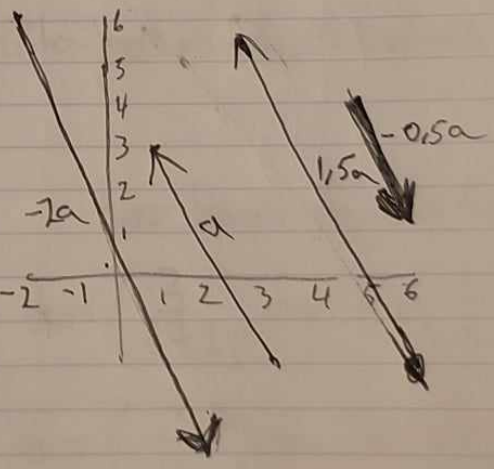
$a = -2 \cdot \begin{pmatrix} 3 \\ 4 \end{pmatrix} = \begin{pmatrix} -6 \\ -8 \end{pmatrix}$




13) $a = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$

a) $a = 1{,}5a$

$a = 1{,}5 \cdot \begin{pmatrix} -2 \\ 5 \end{pmatrix} = \begin{pmatrix} -3 \\ 7{,}5 \end{pmatrix}$




b) $a = -0{,}5a$

$a = -0{,}5 \cdot \begin{pmatrix} -2 \\ 5 \end{pmatrix} = \begin{pmatrix} 1 \\ -2{,}5 \end{pmatrix}$

c) $-2a$

$a = -2 \cdot \begin{pmatrix} -2 \\ 5 \end{pmatrix} = \begin{pmatrix} 4 \\ -10 \end{pmatrix}$

Fyrir vigurinn $a=\begin{pmatrix}a_1\\a_2\end{pmatrix}$

Hvenlagur: $a_\perp=\begin{pmatrix}-a_2\\a_1\end{pmatrix}$

dæmi: $a=\begin{pmatrix}2\\4\end{pmatrix}$

lausn: $a_\perp=\begin{pmatrix}-4\\2\end{pmatrix}$

Hallatala vigurs

$ax^2+bx+c=0$ $\quad h_a=\begin{pmatrix}a_2\\a_1\end{pmatrix}$

$d=b^2-4\cdot a\cdot c$

D-Reglan

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

dæmi: $a=\begin{pmatrix}5\\4\end{pmatrix}$

lausn: $h_a=\frac{4}{5}$

Vigrarnir $a=\begin{pmatrix}3\\t+1\end{pmatrix}$ og $b=\begin{pmatrix}t\\2\end{pmatrix}$ eru samsíða.

Reikna t og útskýrðu að þá er sama hallatala

$a\parallel b \Rightarrow h_a=h_b$ (muna að $h_a=\begin{pmatrix}a_2\\a_1\end{pmatrix}$)

$\frac{t+1}{3}=\frac{2}{t}$ → margf. í kross

$t(t+1)=2\cdot 3$

$t^2+t-6=0$ → Núna þáttar (líka hægt að nota d reglunna)

$(t+3)(t-2)=0$

tvær mögulegar lausnir:

$t+3=0$ & $t-2=0$

$t=-3$ $\quad t=2$

$t=\begin{cases}-3\\2\end{cases}$

tvær lausnir gefa okkur tvö vi

$a=\begin{pmatrix}3\\t+1\end{pmatrix}$ og $b=\begin{pmatrix}t\\2\end{pmatrix}$

$a=\begin{pmatrix}3\\-2\end{pmatrix}$ og $b=\begin{pmatrix}-3\\2\end{pmatrix}$

$a=\begin{pmatrix}3\\3\end{pmatrix}$ og $b=\begin{pmatrix}2\\2\end{pmatrix}$

Lengd vigurs $= |a| = \sqrt{a_1^2 + a_2^2}$

Reikna lengd vigurs $a = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$

$|a| = \sqrt{(-3)^2 + 4^2} = \sqrt{9+16} = \sqrt{25}$

$|a| = \sqrt{25} = 5$

Reikna y-hnit vigurs $a = \begin{pmatrix} 12 \\ a_2 \end{pmatrix}$ og lengd $= 13$

$13 = \sqrt{12^2 + a_2^2}$

setj báðar hliðar í annað veldi til að losna við $\sqrt{}$

$169 = 144 + a_2^2$

$a_2 = \pm\sqrt{169 - 144}$

$a_2 = \pm\sqrt{25} = 5$

Æfing 1.3

Reiknaðu lengd, hallatölu og þvervigur eftirfarandi vigra:

1. a) $a=\begin{pmatrix}3\\5\end{pmatrix}$ Lengd $=|a|$ Hallatala $h_a=\frac{a_2}{a_1}$

$|a|=\sqrt{3^2+5^2}$ $h_a=\frac{5}{3}=1\frac{2}{3}$

$|a|=\sqrt{9+25}$

$|a|=\sqrt{34}$

Þvervigur $a_\perp=\begin{pmatrix}-a_2\\a_1\end{pmatrix}=a_\perp=\begin{pmatrix}-5\\3\end{pmatrix}$

b) $b=\begin{pmatrix}-2\\3\end{pmatrix}$ $|b|=\sqrt{(-2)^2+3^2}$ $a_\perp=\begin{pmatrix}-3\\-2\end{pmatrix}$

$h_b=\frac{3}{-2}=-1\frac{1}{2}$ $|b|=\sqrt{4+9}$

$|b|=\sqrt{13}$

c) $c=\begin{pmatrix}-4\\-10\end{pmatrix}$ $|c|=\sqrt{(-4)^2+(-10)^2}$ $c_\perp=\begin{pmatrix}10\\-4\end{pmatrix}$

$h_c=\frac{-10}{-4}=2{,}5$ $|c|=\sqrt{16+100}$

$|c|=\sqrt{116}$

$|c|=2\sqrt{29}$

2. a) $a=\begin{pmatrix}-12\\-5\end{pmatrix}$ $|a|=\sqrt{(-12)^2+(-5)^2}$ $a_\perp=\begin{pmatrix}5\\-12\end{pmatrix}$

$h_a=\frac{-5}{-12}=\frac{5}{12}$ $|a|=\sqrt{144+25}$

$|a|=\sqrt{169}$

$|a|=13$

b) $b=\begin{pmatrix}8\\-6\end{pmatrix}$ $|b|=\sqrt{8^2+(-6)^2}$ $b_\perp=\begin{pmatrix}6\\8\end{pmatrix}$

$h_b=\frac{-6}{8}\,/2=\frac{-3}{4}=-\frac{3}{4}$ $|b|=\sqrt{64+36}$

$|b|=\sqrt{100}$

$|b|=10$

c) $c=\begin{pmatrix}13\\12\end{pmatrix}$ $|c|=\sqrt{13^2+12^2}$

$h_c=\frac{12}{13}$ $|c|=\sqrt{169+144}$

$|c|=\sqrt{313}$

# Æfing 1.3 framhald

③ y hnit $a=\begin{pmatrix}5\\a_2\end{pmatrix}$ og lengd = 13

$13=\sqrt{5^2+a_2^2}$

$169=25+a_2^2$

$a_2^2=169-25$

$a_2^2=144$

$a_2=\pm\sqrt{144}$

$a_2=\pm 12$

④ x hnit $a=\begin{pmatrix}a_1\\-7\end{pmatrix}$ lengd = 8

$8=\sqrt{a_1^2+7^2}$

$64=a_1^2+49$

$a_1^2=64-49$

$a_1^2=15$

$a_1=\pm\sqrt{15}$

⑤ y hnit $a=\begin{pmatrix}-5\\a_2\end{pmatrix}$ lengd = 11

$11=\sqrt{(-5)^2+a_2^2}$

$11=\sqrt{25+a_2^2}$

$121=25+a_2^2$

$a_2^2=121-25$

$a_2^2=96$

$a_2=\pm\sqrt{96}$

$a_2=\pm 4\sqrt{6}$

⑥ gildi t vigrar $a=\begin{pmatrix}2\\t-2\end{pmatrix}$ og $b=\begin{pmatrix}3\\2\end{pmatrix}$ eru jafnlangir

$|a|=|b|$

$\sqrt{2^2+(t-2)^2}=\sqrt{3^2+2^2}$

$4+(t-2)^2=13$

$4+t^2-4t+4=13$

$t^2-4t+8-13=0$

$t^2-4t-5=0$

$t=\frac{-(-4)\pm\sqrt{(-4)^2-4\cdot 1\cdot(-5)}}{2\cdot 1}$

$t=\frac{4\pm\sqrt{36}}{2}$

$t=\frac{4\pm 6}{2}$

$t=5$ $\quad a=\begin{pmatrix}2\\3\end{pmatrix}$

$t=-1$ $\quad a=\begin{pmatrix}2\\-3\end{pmatrix}$

$(t-2)(t-2)=t^2-4t+4$

# Æfing 1.3 framhald 2

(7) gildi t vigrar $a=\begin{pmatrix}2\\t-2\end{pmatrix}$ og $b=\begin{pmatrix}3\\2\end{pmatrix}$ samsíða

$\bar{a}\parallel\bar{b} \Rightarrow h_a = h_b$

Hallatala a = hallatala b

$\frac{t-2}{2}=\frac{2}{3}$ ⟩ $3(t-2)=2\cdot 2$

$3t-6=4$

$3t=4+6$

$3t=10$

$t=10/3=3\frac{1}{3}$

$h_a=\frac{a_2}{a_1}$

(8) gildi t vigrar $a=\begin{pmatrix}2t\\2\end{pmatrix}$ og $b=\begin{pmatrix}t+2\\t\end{pmatrix}$ jafnlangir

$|\bar{a}|=|\bar{b}|$

$\sqrt{(2t)^2+2^2}=\sqrt{(t+2)^2+t^2}$

$4t^2+4=t^2+4t+4+t^2$

$4t^2-2t^2-4t+4-4=0$

$2t^2-4t=0$

$2t(t-2)=0$ →

$2t=0$ $\quad t=\frac{2}{0}=0$ $\quad t=0$

$t-2=0$ $\quad t=2$

$t=\begin{cases}0\\2\end{cases}$

(9) gildi t vigrar $a=\begin{pmatrix}2t\\2\end{pmatrix}$ og $b=\begin{pmatrix}t+2\\t\end{pmatrix}$ og eru samsíða

$a\parallel b \Rightarrow h_a = h_b$

$h_a=\frac{a_2}{a_1}$

$\frac{2}{2t}=\frac{t}{t+2}$ ⟩ $2(t+2)=2t\cdot t$

$2t+4=2t^2$

$-2t^2+2t+4=0$

$t=\frac{-2\pm\sqrt{2^2-4\cdot(-2)\cdot 4}}{2\cdot(-2)}$

$t=\begin{cases}-1\\2\end{cases}$

$t=\frac{-2\pm\sqrt{36}}{-4}$

$t=\frac{-2\pm 6}{-4}$

$t=\frac{-2+6}{-4}$ $\quad t=\frac{4}{-4}=-1$

$t=\frac{-2-6}{-4}$ $\quad t=\frac{-8}{-4}=2$

Æfing 1.3 framh. 3

10) Hvít vigur a sem er samsíða línunni $y = 2x + 1$ lengd 5

$|a| = 5$

$y = kx + q$

$k_a = \frac{a_2}{a_1} = 2$

$a_2 = 2a_1$ (jafna 1)

$5 = \sqrt{a_1^2 + a_2^2}$

$25 = a_1^2 + a_2^2$ (jafna 2)

innsetning:

$25 = a_1^2 + (2a_1)^2$

$25 = a_1^2 + 4a_1^2$

$25 = 5a_1^2$

$\frac{25}{5} = \frac{5a_1^2}{5}$

$a_1^2 = 5$

$a_1 = \pm\sqrt{5}$

$a_2 = \pm 2 \cdot \sqrt{5}$

$a_2 = \pm 2\sqrt{5}$

svar: $\begin{pmatrix}\sqrt{5}\\2\sqrt{5}\end{pmatrix}, \begin{pmatrix}-\sqrt{5}\\-2\sqrt{5}\end{pmatrix}$

eða $\pm\begin{pmatrix}\sqrt{5}\\2\sqrt{5}\end{pmatrix}$

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11) Hvít vigur a samsíða línunni $y = \frac{1}{2}x + 1$ og lengd $= 10$

$|a| = 10$

$k_a = \frac{a_2}{a_1} = \frac{1}{2}$

$a_2 = \frac{1}{2}a_1$ (jafna 1)

$10 = \sqrt{a_1^2 + a_2^2}$

$100 = a_1^2 + a_2^2$

$100 = a_1^2 + (\frac{1}{2}a_1)^2$

$100 = a_1^2 + \frac{1}{4}a_1^2$

$100 = \frac{4}{4}a^2 + \frac{1}{4}a^2$

$100 = \frac{5}{4}a^2$ margf. m/ 4 hlið/lausna við nefnara

$4 \cdot 100 = 4 \cdot \frac{5}{4}a^2$

$400 = 5a^2$

$\frac{400}{5} = a^2$

$a^2 = 80$

$a = \pm\sqrt{80}$

$a_1 = \pm 4\sqrt{5}$

$a_2 = \pm\frac{1}{2}4\sqrt{5}$ ⇒ Deila með 2 og lesum við nefnara

$a_2 = \pm 2\sqrt{5}$

svar: $a = \pm\begin{pmatrix}4\sqrt{5}\\2\sqrt{5}\end{pmatrix}$