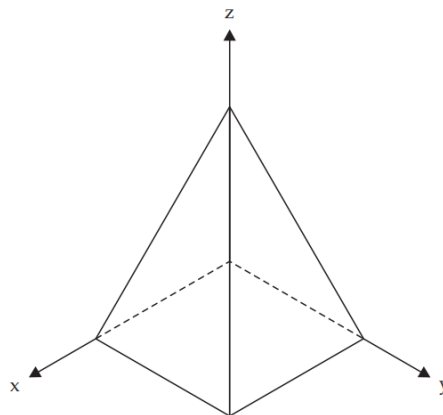|	Navn:		Skole:	
	Klasse: 20		Dato: 24. november 2021	Fag: Matematik A

Opgave 501

$$h = 5$$
$$s = 3$$

Vi finder vektorer som ligger langs siderne

$$\vec{V_1} = \begin{pmatrix} s \div 2 \\ s \div 2 \\ h \end{pmatrix} = \begin{pmatrix} 1.5 \\ 1.5 \\ 5 \end{pmatrix}$$
$$\vec{V_2} = \begin{pmatrix} s \div 2 \\ -s \div 2 \\ h \end{pmatrix} = \begin{pmatrix} 1.5 \\ -1.5 \\ 5 \end{pmatrix}$$
$$\vec{V_3} = \begin{pmatrix} -s \div 2 \\ s \div 2 \\ h \end{pmatrix} = \begin{pmatrix} -1.5 \\ 1.5 \\ 5 \end{pmatrix}$$
$$\vec{V_4} = \begin{pmatrix} -s \div 2 \\ -s \div 2 \\ h \end{pmatrix} = \begin{pmatrix} -1.5 \\ -1.5 \\ 5 \end{pmatrix}$$

Vinkel mellem modstående sider

$$\vec{n_1} = \vec{V_2} \times \vec{V_1}$$
$$\vec{n_1} = \begin{pmatrix} 1.5 \\ -1.5 \\ 5 \end{pmatrix} \times \begin{pmatrix} 1.5 \\ 1.5 \\ 5 \end{pmatrix} = \begin{pmatrix} -15 \\ 0 \\ 4,5 \end{pmatrix}$$

$$\vec{n_2} = \vec{V_3} \times \vec{V_4}$$
$$\vec{n_2} = \begin{pmatrix} -1.5 \\ 1.5 \\ 5 \end{pmatrix} \times \begin{pmatrix} -1.5 \\ -1.5 \\ 5 \end{pmatrix} = \begin{pmatrix} 15 \\ 0 \\ 4,5 \end{pmatrix}$$

Formel for vinkel mellem vektorer

$$v = \cos^{-1}\left(\frac{x_1 \cdot x_2 + y_1 \cdot y_2 + z_1 \cdot z_2}{\sqrt{x_1^2 + y_1^2 + z_1^2} \cdot \sqrt{x_2^2 + y_2^2 + z_2^2}} \right)$$

$$v_{modstående} = \cos^{-1}\left(\frac{(-15) \cdot 15 + 0 \cdot 0 + 4.5 \cdot 4.5}{\sqrt{(-15)^2 + 0^2 + 4.5^2} \cdot \sqrt{15^2 + 0^2 + 4.5^2}} \right) \approx 146,6015$$

Nu skal vi finde vinkel mellem de hosliggende sider

$$\vec{n_3} = \vec{V_4} \times \vec{V_2}$$

$$\vec{n_3} = \begin{pmatrix} -1.5 \\ -1.5 \\ 5 \end{pmatrix} \times \begin{pmatrix} 1.5 \\ -1.5 \\ 5 \end{pmatrix} = \begin{pmatrix} 0 \\ 15 \\ 4,5 \end{pmatrix}$$

$$v_{hosliggende} = \cos^{-1}\left(\frac{\vec{n_1} \bullet \vec{n_3}}{|\vec{n_1}| \cdot |\vec{n_3}|}\right)$$

$$v_{hosliggende} = \cos^{-1}\left(\frac{(-15) \cdot 0 + 0 \cdot 15 + 4.5 \cdot 4.5}{\sqrt{(-15)^2 + 0^2 + 4.5^2} \cdot \sqrt{0^2 + 15^2 + 4.5^2}}\right) \approx 85,26376$$