

V prostoru E^3 je daný $\triangle ABC$. Spočítejte velikosti úhlů v $\triangle ABC$ a obsah $\triangle ABC$.

ZADÁNÍ

a)
 $A = [1, 6, 0]$,
 $B = [3, -5, -3]$,
 $C = [3, -5, 2]$,

b)
 $A = [0, -1, -4]$,
 $B = [1, -5, 1]$,
 $C = [-2, -4, -1]$,

c)
 $A = [3, 1, 0]$,
 $B = [7, -1, 1]$,
 $C = [0, -2, 2]$,

d)
 $A = [-2, 4, -2]$,
 $B = [-4, 4, 1]$,
 $C = [2, -4, -4]$,

e)
 $A = [0, 0, -2]$,
 $B = [-6, 1, -1]$,
 $C = [0, -7, -4]$,

ŘEŠENÍ

$$\begin{aligned}\cos(\angle ABC) &= \frac{15}{5\sqrt{134}} = 0.259, \\ \cos(\angle BCA) &= \frac{10}{5\sqrt{129}} = 0.176, \\ \cos(\angle CAB) &= \frac{119}{\sqrt{134}\sqrt{129}} = 0.905, \\ \text{obsah} &= \frac{25\sqrt{5}}{2}\end{aligned}$$

$$\begin{aligned}\cos(\angle ABC) &= \frac{17}{14\sqrt{3}} = 0.701, \\ \cos(\angle BCA) &= \frac{-3}{\sqrt{14}\sqrt{22}} = -0.171, \\ \cos(\angle CAB) &= \frac{25}{\sqrt{42}\sqrt{22}} = 0.822, \\ \text{obsah} &= \frac{\sqrt{299}}{2}\end{aligned}$$

$$\begin{aligned}\cos(\angle ABC) &= \frac{25}{\sqrt{21}\sqrt{51}} = 0.764, \\ \cos(\angle BCA) &= \frac{26}{\sqrt{51}\sqrt{22}} = 0.776, \\ \cos(\angle CAB) &= \frac{-4}{\sqrt{21}\sqrt{22}} = -0.186, \\ \text{obsah} &= \frac{\sqrt{446}}{2}\end{aligned}$$

$$\begin{aligned}\cos(\angle ABC) &= \frac{27}{\sqrt{13}\sqrt{125}} = 0.67, \\ \cos(\angle BCA) &= \frac{98}{\sqrt{125}\sqrt{84}} = 0.956, \\ \cos(\angle CAB) &= \frac{-14}{\sqrt{13}\sqrt{84}} = -0.424, \\ \text{obsah} &= 4\sqrt{14}\end{aligned}$$

$$\begin{aligned}\cos(\angle ABC) &= \frac{47}{\sqrt{38}\sqrt{109}} = 0.73, \\ \cos(\angle BCA) &= \frac{62}{\sqrt{109}\sqrt{53}} = 0.816, \\ \cos(\angle CAB) &= \frac{-9}{\sqrt{38}\sqrt{53}} = -0.201, \\ \text{obsah} &= \frac{\sqrt{1933}}{2}\end{aligned}$$