3. Základy vektorovej algebry

3.1. a) $\vec{a} = (-3,-1)$, $|\vec{a}| = \sqrt{10}$, $\overrightarrow{e_a} = \left(\frac{-3}{\sqrt{10}}, \frac{-1}{\sqrt{10}}\right)$, $\vec{b} = (-8,4)$, $|\vec{b}| = 4\sqrt{5}$, $\overrightarrow{e_b} = \left(\frac{-2}{\sqrt{5}}, \frac{1}{\sqrt{5}}\right)$
b) $\vec{a} = (4,2,0)$, $|\vec{a}| = 2\sqrt{5}$, $\overrightarrow{e_a} = \left(\frac{2}{\sqrt{5}}, \frac{1}{\sqrt{5}}, 0\right)$, $\vec{b} = (5,-2,-9)$, $|\vec{b}| = \sqrt{110}$, $\overrightarrow{e_b} = \left(\frac{5}{\sqrt{110}}, \frac{-2}{\sqrt{110}}, \frac{-9}{\sqrt{110}}\right)$

3.2. a) $(-11,12)$ b) $(0,-3,18)$ c) nemá zmysel d) $\left(\frac{-137}{7}, \frac{-173}{7}, \frac{233}{7}\right)$

3.3. a) $\vec{c} = 82\vec{a} + 59\vec{b}$ b) $\vec{c} = 10\vec{a} - 3\vec{b}$ c) $\vec{c} = \frac{34}{25}\vec{a} + \frac{1}{25}\vec{b}$ d) $\vec{c} = 3\vec{a}$

3.4. a) $\vec{d} = \vec{a} + \vec{b} - \vec{c}$ b) $\vec{d} = 4\vec{a} - \vec{c}$ c) $\vec{d} = -2\vec{a} - 3\vec{b} - 5\vec{c}$

3.5. vektory $\vec{b}, \vec{c}$ sú kolineárne

3.6. a) $m = -1$, $n = 4$ b) $m = -2$, $n = -2{,}5$ alebo $m = 0{,}4$, $n = 0{,}5$

3.7. a) 10 b) 25 c) 16 d) 21 e) 304 f) -76

3.8. a) $x = 2$ b) $x = 8$ alebo $x = 2$

3.9. a) $\varphi = 41°\ 48'\ 39''$ b) $\varphi = 94°\ 04'\ 27''$

3.10. a) $\alpha = 90°$, $\beta = \gamma = 45°$ b) $\alpha = 63°\ 36'\ 43''$, $\beta = 86°\ 27'\ 08''$, $\gamma = 29°\ 56'\ 09''$
c) $\alpha = 104°\ 10'\ 36''$, $\beta = \gamma = 37°\ 52'\ 42''$

3.11. je štvorec

3.12. a) $\vec{x} = (-2,2,2)$ b) $\vec{x} = \left(\frac{26}{15}, \frac{-101}{15}, \frac{-61}{15}\right)$

3.13. a) 3 b) 0 c) 15

3.14. a) $\frac{\sqrt{38}}{2}$ b) $\sqrt{833}$

3.15. a) $(6,-135,-12)$, $(-252,96,42)$, 75 , 75 b) $(-10,11,-2)$, $(-15,-9,7)$, -25 , -25

3.16. 31 , -31

3.17. platí, že $\vec{a}.\left(\vec{b} \times \vec{c}\right) = 0$