

**Zadatak 20.** Točke  $E$ ,  $F$  i  $G$  pripadaju stranicama  $\overline{BC}$ ,  $\overline{AC}$  i  $\overline{AB}$  trokuta  $\triangle ABC$ ,  $A(-1, 2)$ ,  $B(2, -4)$ ,  $C(7, 6)$ , te je:  $|BE| : |EC| = 2 : 3$ ,  $|AF| : |FC| = 3 : 1$ ,  $|AG| : |GB| = 1 : 2$ . Izračunaj površinu trokuta  $\triangle EFG$ .

*Rješenje.*

$$A(-1, 2), B(2, -4), C(7, 6)$$

$$E \in \overline{BC}$$

$$F \in \overline{AC}$$

$$G \in \overline{AB}$$

$$|BE| : |EC| = 2 : 3 \implies \lambda_1 = \frac{2}{3}$$

$$|AF| : |FC| = 3 : 1 \implies \lambda_2 = 3$$

$$|AG| : |GB| = 1 : 2 \implies \lambda_3 = \frac{1}{2}$$

$$x_E = \frac{x_B + \lambda_1 x_C}{1 + \lambda_1} = \frac{2 + \frac{2}{3} \cdot 7}{1 + \frac{2}{3}} = \frac{\frac{20}{3}}{\frac{5}{3}} = 4$$

$$y_E = \frac{y_B + \lambda_1 y_C}{1 + \lambda_1} = \frac{-4 + \frac{2}{3} \cdot 6}{1 + \frac{2}{3}} = 0$$

$$E(4, 0)$$

$$x_F = \frac{x_A + \lambda_2 x_C}{1 + \lambda_2} = \frac{-1 + 3 \cdot 7}{1 + 3} = \frac{20}{4} = 5$$

$$y_F = \frac{y_A + \lambda_2 y_C}{1 + \lambda_2} = \frac{2 + 3 \cdot 6}{1 + 3} = \frac{20}{4} = 5$$

$$F(5, 5)$$

$$x_G = \frac{x_A + \lambda_3 x_B}{1 + \lambda_3} = \frac{-1 + \frac{1}{2} \cdot 2}{1 + \frac{1}{2}} = 0$$

$$y_G = \frac{y_A + \lambda_3 y_B}{1 + \lambda_3} = \frac{2 + \frac{1}{2} \cdot (-4)}{1 + \frac{1}{2}} = 0$$

$$G(0, 0)$$

$$\begin{aligned} P_{EFG} &= \frac{1}{2} |x_E(y_F - y_G) + x_F(y_G - y_E) + x_G(y_E - y_F)| \\ &= \frac{1}{2} |4(5 - 0) + 5(0 - 0) + 0(0 - 5)| \\ &= \frac{1}{2} |20| = 10 \end{aligned}$$