

Rješenja 4. kpz - grupe 1, 3, 5, 7, 9 - B

1. ZADATAK

$$V = abc = \frac{36}{5}, a = \frac{2}{3}b$$

$$V = \frac{2}{3}a^2c = \frac{36}{5}$$

$$c = \frac{24}{5a^2}$$

$$P = ab + 2bc + 2ac = \frac{2}{3}a^2 + 2\frac{3}{2}a\frac{24}{5a^2} + 2a\frac{24}{5a^2} = \frac{3}{2}a^2 + \frac{24}{a}$$

$$P' = \frac{3}{2}2a - \frac{24}{a^2} = 0$$

$$3a^3 - 24 = 0$$

$$a = 2$$

$$P'' = 3 + \frac{48}{a^3}, P''(2) = 3 + 6 = 9 > 0$$

$$P_{min} = \frac{3}{2}4 + \frac{24}{2} = 18$$

2. ZADATAK

$$\int \frac{x-3}{2-\sqrt{x}} dx = (\text{supstitucija } t = 2 - \sqrt{x}, dt = -\frac{dx}{2\sqrt{x}}) = \int \frac{(2-t)^2-3}{t} 2(t-2) dt =$$

$$\int (2t^2 - 8t + 18 - 4\frac{1}{t}) dt = \frac{2}{3}t^3 - 4t^2 + 18t - 4\ln t + C =$$

$$\frac{2}{3}(2 - \sqrt{x})^3 - 4(2 - \sqrt{x})^2 + 18(2 - \sqrt{x}) - 4\ln|2 - \sqrt{x}| + C$$

3. ZADATAK

$$\int_{1/2}^1 \operatorname{arch} \frac{1}{x} =$$

$$(u = \operatorname{arch} \frac{1}{x}, \quad dv = dx$$

$$du = \frac{-|x|dx}{x^2\sqrt{1-x^2}}, \quad v = x)$$

$$= (x \operatorname{arch} \frac{1}{x})|_{1/2}^1 + \int_{1/2}^1 \frac{x|x|}{x^2\sqrt{1-x^2}} dx = (x > 0) = (x \operatorname{arch} \frac{1}{x})|_{1/2}^1 + \int_{1/2}^1 \frac{dx}{\sqrt{1-x^2}} =$$

$$(x \operatorname{arch} \frac{1}{x})|_{1/2}^1 + \arcsin x|_{1/2}^1 = -\frac{1}{2} \operatorname{arch} 2 + \frac{\pi}{3}$$