Vypočítajte integrály pomocou transformácie do polárnych súradníc:

1. $\iint_M \sqrt{x^2+y^2}dxdy$, ak $M = \{(x,y) \in \mathbb{R}^2; x^2+y^2 \leq 4\}$ $\left[\frac{16}{3}\pi\right]$

2. $\iint_M \sqrt{1-x^2-y^2}dxdy$, ak $M = \{(x,y) \in \mathbb{R}^2; x^2+y^2 \leq 1, x \geq 0, y \geq 0\}$ $\left[\frac{\pi}{6}\right]$

3. $\iint_M \ln(1+x^2+y^2)dxdy$, ak $M = \{(x,y) \in \mathbb{R}^2; x^2+y^2 \leq 9, x \geq 0, y \geq 0\}$ $\left[(10\ln 10 - 9)\frac{\pi}{4}\right]$

4. $\iint_M \sqrt{\frac{1-x^2-y^2}{1+x^2+y^2}}dxdy$, ak $M = \{(x,y) \in \mathbb{R}^2; x^2+y^2 \leq 1, x \geq 0, y \geq 0\}$ $\left[\frac{\pi}{4}(\frac{\pi}{2}-1)\right]$

5. $\iint_M \frac{\ln(x^2+y^2)}{x^2+y^2}dxdy$, ak $M = \{(x,y) \in \mathbb{R}^2; 1 \leq x^2+y^2 \leq \mathrm{e}\}$ $\left[\frac{\pi}{2}\right]$

6. $\iint_M \sin\sqrt{x^2+y^2}dxdy$, ak $M = \{(x,y) \in \mathbb{R}^2; \pi^2 \leq x^2+y^2 \leq 4\pi^2\}$ $\left[-6\pi^2\right]$

7. $\iint_M 2(x^2+y^2)dxdy$, ak $M = \{(x,y) \in \mathbb{R}^2; 1 \leq x^2+y^2 \leq 4, y \geq |x|\}$ $\left[\frac{15}{4}\pi\right]$

8. $\iint_M \operatorname{arctg}\left(\frac{y}{x}\right)dxdy$, ak $M = \{(x,y) \in \mathbb{R}^2; 1 \leq x^2+y^2 \leq 9, \frac{x}{\sqrt{3}} \leq y \leq \sqrt{3}x\}$ $\left[\frac{\pi^2}{6}\right]$

9. $\iint_M \sqrt{x^2+y^2}dxdy$, ak $M = \{(x,y) \in \mathbb{R}^2; x^2+y^2 \leq 2x\}$ $\left[\frac{32}{9}\right]$

10. $\iint_M xy^2dxdy$, ak $M = \{(x,y) \in \mathbb{R}^2; 2y \leq x^2+y^2 \leq 4y, x \leq 0\}$ $\left[-\frac{124}{5}\right]$

Vypočítajte plošný obsah množiny $M = \{(x,y) \in \mathbb{R}^2; x^2+y^2 \leq 2x, 0 \leq y \leq x\}$. $\left[\frac{\pi}{4}+\frac{1}{2}\right]$