№14. $u(x,y,z) = (x^2+y^2+z^2)^{\frac{3}{2}}$; $M_0(0;-3;4)$; $S:\ 2x^2-y^2+z^2=7$

$u'_l|_{M_0} = u'_x|_{M_0}\cdot\cos\alpha + u'_y|_{M_0}\cos\beta + u'_z|_{M_0}\cos\gamma$

$u'_x|_{M_0} = 3x(x^2+y^2+z^2)^{\frac{1}{2}}|_{M_0} = 3\cdot 0\cdot\ldots = 0.$

$u'_y|_{M_0} = 3y(x^2+y^2+z^2)^{\frac{1}{2}}|_{M_0} = -45$ $\qquad$ $\operatorname{grad} u = (0; -45; 60)$

$u'_z|_{M_0} = 3z(x^2+y^2+z^2)^{\frac{1}{2}} = 60$

$F(x,y,z) = 2x^2-y^2+z^2-7$

$F'_x|_{M_0} = 4x|_{M_0} = 0$; $F'_y|_{M_0} = -2y = 6$; $F'_z|_{M_0} = 2z = 8$ $\qquad$ $\bar{n} = (0; 6; 8)$

$\bar{n}_0 = \frac{\bar{n}}{\sqrt{36+64}} = (0; \frac{3}{5}; \frac{4}{5}) \Rightarrow u'_l = 0 - \cancel{45}^{9}\cdot\frac{3}{\cancel{5}} + \cancel{60}^{12}\cdot\frac{4}{\cancel{5}} = 21$

Ответ: 21.