Hw # 14

15.5 # 20

$S(u,v) = 4u\cos v\, i + 4u \sin v\, j + u^2 k \quad , \quad 0 \le u \le 2, \quad 0 \le v \le 2\pi$

$z = \dfrac{x^2+y^2}{16}$

The paraboloid is „wider". The top is now the circle $x^2+y^2 = 64$

It was $x^2+y^2 = 4$

15.5 # 24

$x = \sqrt{16y^2+z^2}$

$r(y,z) = \sqrt{16y^2+z^2}\, i + yj + zk$

or,

$r(u,v) = ui + \frac{1}{4}u\cos v\, j + u\sin v\, k$

$u \ge 0, \quad 0 \le v \le 2\pi$

15.5 # 26

$4x^2 + y^2 = 16$

$r(u,v) = 2\cos u\, i + 4\sin u\, j + v\, k$

15.6 # 12

$S: \; z = \sqrt{a^2-x^2-y^2}$

$\rho(x,y,z) = kz$

$$m = \iint_S kz\, dS = \iint_R k\sqrt{a^2-x^2-y^2}\sqrt{1+\left(\frac{-x}{\sqrt{a^2-x^2-y^2}}\right)^2+\left(\frac{-y}{\sqrt{a^2-x^2-y^2}}\right)^2}\, dA =$$

$$= \iint_R k\sqrt{a^2-x^2-y^2}\left(\frac{a}{\sqrt{a^2-x^2-y^2}}\right) dA = \iint_R ka\, dA = ka\iint_R dA = ka(\pi a^2) = ka^3\pi$$