

- (a) Since the sphere touches the  $xy$ -plane, its radius is the distance from its center,  $(1, -3, 6)$ , to the  $xy$ -plane, namely  $6$ . Therefore  $r = 6$  and an equation of the sphere is

$$(x - 1)^2 + (y + 3)^2 + (z - 6)^2 = 6^2 = 36.$$

- (b) The radius of this sphere is the distance from its center  $(1, -3, 6)$  to the  $yz$ -plane, which is  $1$ . Therefore, an equation is

$$(x - 1)^2 + (y + 3)^2 + (z - 6)^2 = 1.$$

- (c) Here the radius is the distance from the center  $(1, -3, 6)$  to the  $xz$ -plane, which is  $3$ . Therefore, an equation is

$$(x - 1)^2 + (y + 3)^2 + (z - 6)^2 = 9.$$