

Volume of  $z = 29 - 3x^2 - 3y^2$  and  $z = 17$

13.3.21

$$r^2 = x^2 + y^2$$

$$z = 29 - 3(x^2 + y^2)$$

$$z = 29 - 3r^2 = f(r, \theta) - 17$$

$$\int_a^b \int_a^b f(r, \theta) r dr d\theta$$

$$\int_0^{2\pi} \int_0^2 12r - 3r^3 dr d\theta$$

$$z = 29 - 17 - 3r^2$$
$$= 12 - 3r^2$$

Find max radius:

$$12 - 3r^2 = 0$$
$$\frac{12}{3} = \frac{3r^2}{3} \quad \frac{3r^2}{3}$$

$$4 = r^2$$

$$r = 2$$