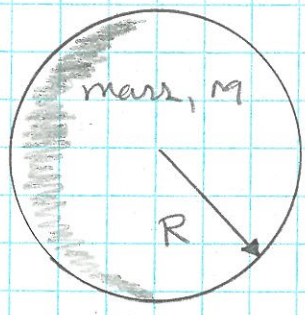
Planet Z



← at surface
$g_z = 8\ m/s^2$

$R = 5000\ km$

a.) Acceleration of mass m, $a = \frac{1}{m} F_G$ at r

$$= \frac{1}{m} \frac{GMm}{r^2}$$

$$a = \frac{GM}{r^2}$$

At $r = R$: $a = g_z$

$$M = \frac{g_z R^2}{G} = \underline{2.998 \times 10^{24}\ kg}$$

b.) at altitude $h = 10{,}000\ km$,

$$r = R + h$$

So, $$a = \frac{GM}{r^2} = \frac{GM}{(R+h)^2} = \underline{0.889\ m/s^2}$$