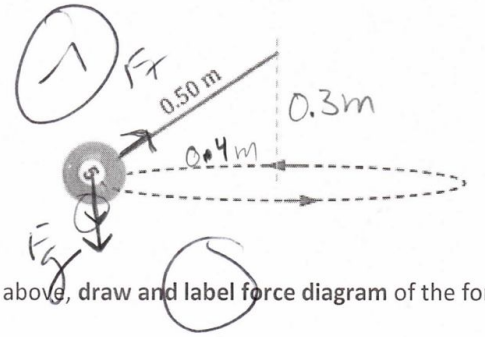
$F_g = mg$ $F_g = Gm_1m_2 / r^2$ $\Sigma F = F_c = mv^2 / r$ $a_c = v^2 / r$ $F_f = \mu F_N$ $v = 2\pi r / T$ $T = 1/f$

$R_{earth}=6.4x10^6 m$ $M_{earth} = 6.0x10^{24} kg$ $v^2 = rg\tan\theta$ $T^2 = 4\pi^2 r^3 / GM$ SOHCAHTOA

7) A billiard ball (mass m = 0.150 kg) is attached to a light string that is 0.50 meters long and swung so that it travels in a horizontal, circular path of radius 0.40 m, as shown.



a) On the diagram above, **draw and label force diagram** of the forces acting on the billiard ball.

b) Calculate the force of tension in the string as the ball swings in a horizontal circle. Show all work including equations used, substitution and final answer.

$r = 0.4m$ $F_C = \frac{mv^2}{r}$ $F_C = 0.15$ $F_T = \frac{mv^2}{r}$ $v^2 = rg\tan\theta$ ← not correct formula

$v^2 = 0.4(9.8)\frac{0.4}{0.3}$ $v^2 = 5.23$

2 $F_{TY} = mg$ $F_T = \frac{.15 \cdot 5.23}{0.4}$ $F_T = 1.96N$ 2.45N

c) Calculate the speed of the ball motion. Show all work including equations used, substitution and final answer.

$v^2 = 5.23$

13 correct answer by accident $v = \sqrt{5.23}$

$v = 2.29 m/s$