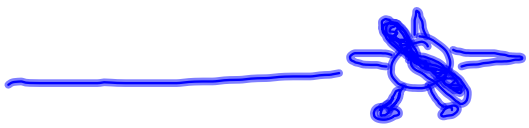
1 m = r

4.8 m/s = v

0.75 m = r

v_f = ?

$L = I\omega$



$L = mr^2\frac{v}{r}$

$mrv_1 = mrv_2$

1 m, 1.6, 6.4 m/s, .75 m, v_2

44) 0.5 kg

$r = 0.8\,m$

$r = ?$

$L = I\omega$

ω_1

$\omega_2 = \frac{1}{2}\omega_1$

$\cancel{m} r^2 \omega_1 = \cancel{m} r^2 \frac{1}{2}\omega_2$

r^2: 0.8_2

$\frac{1}{2}$: $\frac{1}{2} = \frac{1}{3}$

46) $m = 4.37\,kg$

$r = 6.25\,cm$

$\omega = 37.3\,rad/sec$

$L = 0.186\,kg\,m^2/s$

$P = ?$

$L = I\omega$

$L = \frac{2}{5}mr^2\omega$

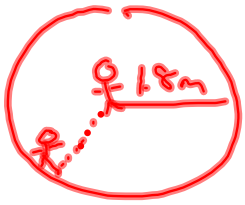
$0.186\,kg\,m^2/s = \frac{2}{5}(4.37\,kg)(.0625)^2(37.3)$

$0.186 = 0.257$

48-52, 55 $I_i = I_f$

48) 200kg = m 36 kg

1.8m $0.25 \frac{rev}{sec}(2\pi) = 1.57 \frac{rad}{sec}$



$\omega_i \frac{1}{2} m r^2 = \frac{1}{2} m r^2 \omega_f$

ω_i: 1.57 m: 200

$\omega_f = 1.57 \frac{rad}{sec}$

49) 0.14kg, 12in, 45 rev/min

0.019J

$KE = \frac{1}{2} I \omega^2$

$I = \frac{1}{2} m r^2$ (m = disk, r = .15m)

$\omega = 45 \frac{rev}{min} \cdot \frac{2\pi}{60}$

50) 0.25m
145kg
13.5 rev/s × 2π

$KE = \frac{1}{2} I \omega^2$

I: $\frac{1}{2}mr^2$

16300J

51) . 66m
4kg
$15\,km/hr \times \frac{1}{3.6} = m/s$

$KE = \frac{1}{2} I \omega^2$

35J

$\frac{1}{2}\left(\frac{1}{2} m r^2\right) \omega^2$

$\frac{1}{2}\left(\frac{1}{2} m r^2\right) \frac{v^2}{r^2}$

54) $I = 1/2\ mr^2$ $I = mr^2$

$$v = \sqrt{\frac{(2)9.81(3m)}{(1 + 1/2)}} = 6.3 \text{ m/s}$$

$$v = \sqrt{\frac{(2)\ 9.81(3m)}{(1 + 1)}} = 5.4 \text{ m/s}$$

55) $I = \frac{1}{2}mr^2$ $I = mr^2$

$I = \frac{1}{2}(1)(.25)^2$ $I = 1(.5)^2$

$$V = \sqrt{\frac{2(9.8)(2.5m)}{1 + \frac{\frac{1}{2}(.25)^2}{1(.25)^2}}} = 5.7mg$$

$$V = \sqrt{\frac{2(9.8)(2.5)}{1 + \frac{1(.5)^2}{1(.5)^2}}} = 5\,m/s$$

56) $V = 4.52\ m/s$

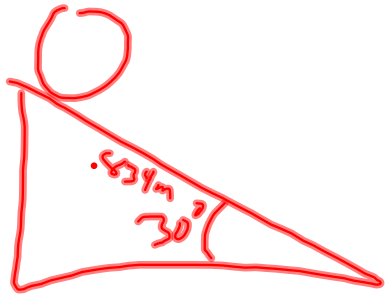
$$mgh = \frac{1}{2}m(4.52\ m/s)^2 + \frac{1}{2}\left(\frac{1}{2}mr^2\right)\omega^2$$

$$gh = \frac{1}{2}(4.52)^2 + \frac{1}{4}v^2$$

$v \approx 4.52\ m/s$

$$h = 1.56\ m$$

61)



$$V = \sqrt{\frac{2(9.81)\sin(30)(.834)}{1 + \frac{\frac{1}{2}mr^2}{mr^2}}}$$

$$V = 2.34 \text{ m/s}$$

$$\frac{1}{2}ms^2\left(\frac{v^2}{r^2}\right) = \frac{1}{4}mv^2$$

$$\frac{KE_{ROT}}{KE_{TOT}} = \frac{\frac{1}{2}\left(\frac{1}{2}mr^2\right)\omega^2}{\frac{1}{2}mv^2 + \frac{1}{2}\left(\frac{1}{2}mr^2\right)\omega^2} = \frac{\frac{1}{4}mv^2}{\frac{1}{2}mv^2 + \frac{1}{4}mv^2} = \frac{1}{3}$$

62) $1.5\ \frac{rad}{s}$ hoop $\qquad 5\ \frac{rad}{s}$

$KE_i = \frac{1}{2} I_i \omega_i^2$

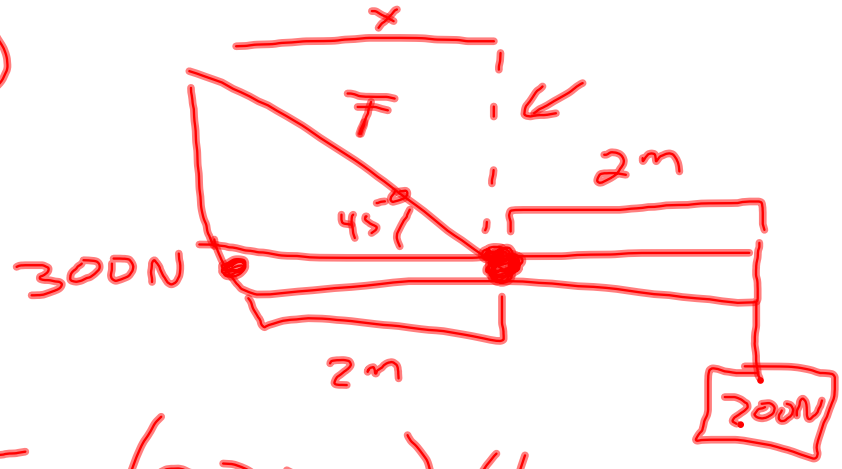
$KE_f = I_f \omega_f^2$

$$\frac{\frac{1}{2} I_f \omega_f^2}{\frac{1}{2} I_i \omega_i^2} = \frac{5}{1.5}$$

I: no change in I

3.3

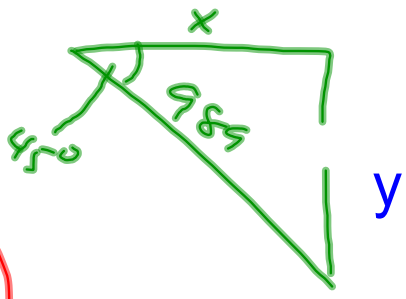
73)



$-\tau_s = (200N)\,4m$

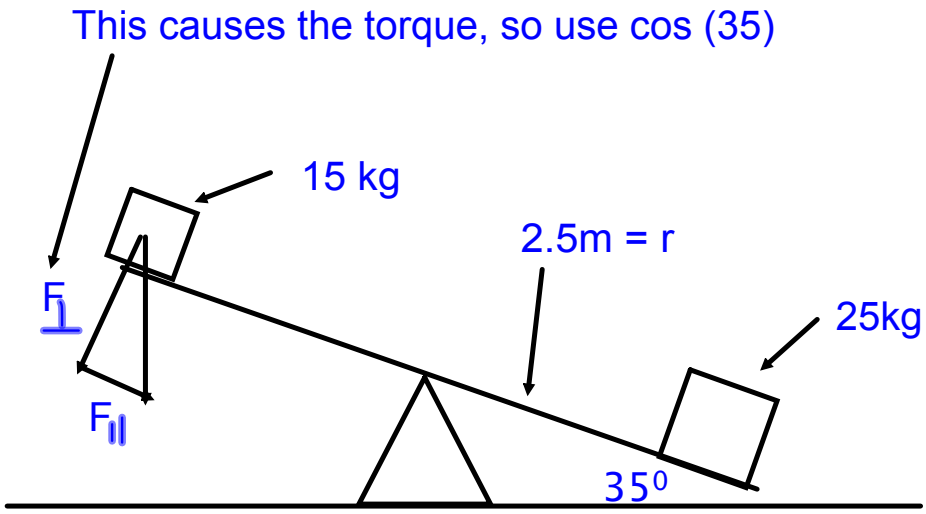
$-\tau_R = (300N)(2m)$

$\tau_c = 2\ T\sin(45^\circ)$



TEST REVIEW PROBLEM

What is the net torque on the seesaw in the following diagram?

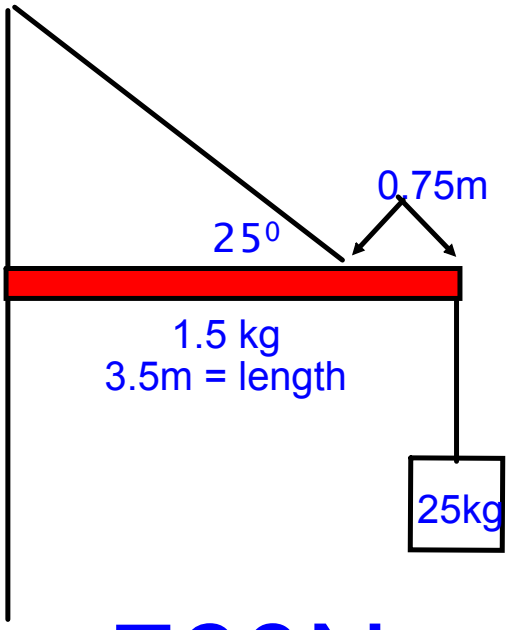


$$\tau = -201 Nm$$

$$15kg\ (9.81)\ (2.5m)\cos(35) - 25kg\ (2.5m)\ (9.81)\ \cos(35) = \tau$$

TEST REVIEW PROBLEM

What is the tension in the wire if a heavy plant is suspended from the rod?



760N

2.75 Sin(25) T = 1.5kg 1.75m
(9.81) + 25kg(9.81)3.5m