

# Final Review

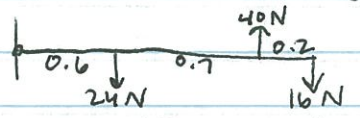
TYPO #31 - change "weight"  
to 2 kg mass

## Unit 8 - Rotation

(22) net  $F = 0$  and net  $\tau = 0$

(23)  $r = 1 \text{ m}$   $\tau = Fr = (200)(1) = \boxed{200 \text{ Nm CCW}}$

(24)  $\tau = Fr \sin \theta = (25)(.25) \sin 30^\circ = \boxed{3.13 \text{ Nm}}$

(25)  net  $\tau = 40(1.3) - 24(0.6) - 16(1.5)$   
net  $\tau = \boxed{13.6 \text{ Nm CCW}}$

(26) ~~32(2.5)~~ net  $\tau = -125(.25) + 25(.75) = \boxed{12.5 \text{ Nm C}}$

(27)  $32(2.5) = m_{\text{DAD}}(\dots) \rightarrow m_{\text{DAD}} = \boxed{80 \text{ kg}}$

(28) net  $\tau = 0$   $-3(15) + 4(25) + 2r = 0 \rightarrow r = 27.5$

2N should be placed 27.5 cm right of the middle

(29)  $\tau_{\text{CW}} = \tau_{\text{CCW}}$

$85(9.8)(4) + 20(9.8)(6) = F_2(11)$

$\boxed{F_2 = 410 \text{ N}}$

$F_{\text{up}} = F_{\text{down}}$

$F_1 + 410 = 85(9.8) + 20(9.8)$

$\boxed{F_1 = 619 \text{ N}}$

(30)  $\tau_{\text{CW}} = \tau_{\text{CCW}}$

$20,000(20) + 15,000(60) + 12,000(100) = 150 F_2$

$\boxed{F_2 = 16,667 \text{ N}}$

$F_{\text{up}} = F_{\text{down}}$

$F_1 + 16,667 = 47,000$

$\boxed{F_1 = 30,333 \text{ N}}$

(31) 

F	r	$\tau$
$(0.35)(9.8) = 3.43$	50	171.5
$2(9.8) = 19.6$	80	1568
23.03		1739.5

$CG = \frac{1739.5}{23.03} = \boxed{75.5 \text{ cm}}$

(32) 

F	r	$\tau$
500	3.5	1750
100	2	200
75	4	300
90	6	540
765 N		2790 Nm

500 3.5 1750

100 2 200

75 4 300

90 6 540

765 N 2790 Nm

$CG = \frac{2790}{765} = \boxed{3.65 \text{ m}}$