

Notes: Apparently a lot of people forgot to do Townsend 5.1 and 5.6, which were part of HW 15. Even though I have already passed out solutions, turn those in with this HW.

I did not get far enough to assign Townsend 9.1 and 9.2.

Therefore your only new HW for Wednesday is this:

1(a) Knight Chapter 12, Problem 5, p.330.

I photographed problem 5 and the associated data.
See attached pages.

1(b) Compare the Moon's mass (in kg) with the Earth-Moon system's reduced mass

$$\mu_{ME} = \frac{m_M m_E}{m_M + m_E}$$

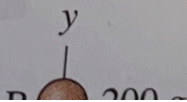
1(c) Does the Earth-Moon system satisfy the assumption's of Monday's proof. (Answer is subtle!)

1(d) If not, why not?

- b. What length of chain passes over the top of the sprocket during this interval?

Section 12.2 Rotation About the Center of Mass

5. | How far from the center of the earth is the center of mass of the earth + moon system? Data for the earth and moon can be found inside the back cover of the book.
6. | The three masses shown in **FIGURE EX12.6** are connected by massless, rigid rods. What are the coordinates of the center of mass?



y

B

Astronomical Data

Planetary body	Mean distance from sun (m)	Period (years)	Mass (kg)	Mean radius (m)
Sun	—	—	1.99×10^{30}	6.96×10^8
Moon	3.84×10^8 *	27.3 days	7.36×10^{22}	1.74×10^6
Mercury	5.79×10^{10}	0.241	3.18×10^{23}	2.43×10^6
Venus	1.08×10^{11}	0.615	4.88×10^{24}	6.06×10^6
Earth	1.50×10^{11}	1.00	5.98×10^{24}	6.37×10^6
Mars	2.28×10^{11}	1.88	6.42×10^{23}	3.37×10^6
Jupiter	7.78×10^{11}	11.9	1.90×10^{27}	6.99×10^7
Saturn	1.43×10^{12}	29.5	5.68×10^{26}	5.85×10^7
Uranus	2.87×10^{12}	84.0	8.68×10^{25}	2.33×10^7
Neptune	4.50×10^{12}	165	1.03×10^{26}	2.21×10^7

*Distance from earth