

Chapter 10 Torque

# Example Problems

## 10.1 Torque

- Example 1:

- Ned tightens a bolt in his car engine by exerting 12 N of force on his wrench at a distance of 0.40 m from the fulcrum. How much torque must Ned produce to turn the bolt?

*What are the givens and unknowns?*

*Write your formula(s) and show your work*

$\tau =$

$F =$

$r =$

- Example 2:

- A water faucet is turned on when a force of 2.0 N is exerted on the handle, at a distance of 0.060 m from the pivot point. How much torque must be produced to turn the handle?

*What are the givens and unknowns?*

*Write your formula(s) and show your work*

$\tau =$

$F =$

$r =$

- Example 3:

-The cylinder head bolts of an engine requires tightening to a torque of 80 m\*N. If a wrench is 30 cm (0.3 m) long, what perpendicular force must be applied to the wrench?

*What are the givens and unknowns?*

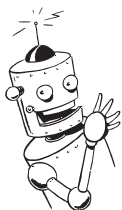
*Write your formula(s) and show your work*

$\tau =$

$F =$

$r =$

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### Chapter 10 Torque

- Example 4:

- Most doorknobs are placed on the side of the door opposite the hinges instead of in the center of the door. a) Why is this so? b) If a torque of 1.2 Nm is required to open a door, how much force must be exerted on a doorknob 0.76 m from the hinges compared to a doorknob in the middle of the door, 0.38 m from the hinges?

*What are the givens and unknowns?*

*Write your formula(s) and show your work*

$\tau =$

$F =$

$r =$

- Example 5:

- Nancy, whose mass is 60.0 kg, is working at a construction site and she sits down for a bite to eat at noon. If Nancy sits on the very end of a 3.00-m-long plank pivoted in the middle on a saw horse, how much torque must her co-worker provide on the other end of the plank in order to keep Nancy from falling on the ground?

*What are the givens and unknowns?*

*Write your formula(s) and show your work*

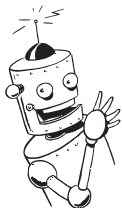
$F_R =$

$r_R =$

$F_L =$

$r_L =$

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- Example 6:
  - Dingbat and Goofball are seesawing on the school playground and decide to see if they can move to the correct location to make the seesaw balance. Dingbat weighs 400-N and sits 2.00 m from the fulcrum of the seesaw. Where should 450.-N Goofball sit to balance the seesaw?

*What are the givens and unknowns?*

*Write your formula(s) and show your work*

$$F_R =$$

$$r_R =$$

$$F_L =$$

$$r_L =$$

- Example 7:
  - Mo, whose mass is 43 kg, sits 1.8 m from the center of a seesaw. Joe, whose mass is 52 kg, wants to balance Mo. Where should Joe sit?

*What are the givens and unknowns?*

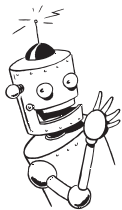
*Write your formula(s) and show your work*

$$F_R =$$

$$r_R =$$

$$F_L =$$

$$r_L =$$



### Chapter 10 Torque

- Example 8:

- A monkey, whose mass is 60.0 kg, is working at a construction site and sits down for a bite to eat at noon. If the monkey sits on the very end of a 3.00-m-long plank that pivoted in the middle on a saw horse, how much torque must his co- worker provide on the other end of the plank in order to keep the monkey from falling to the ground?

*What are the givens and unknowns?*

*Write your formula(s) and show your work*

$$F_R =$$

$$r_R =$$

$$F_L =$$

$$r_L =$$

- Example 9:

-A meterstick (1.0 m) is suspended at its midpoint (0.5-m) and two blocks are attached along its length. A 10-N block is attached 0.2 m to the left of the midpoint. Where must a 40-N block be placed in order to keep the meter stick in balance?

*What are the givens and unknowns?*

*Write your formula(s) and show your work*

$$F_R =$$

$$r_R =$$

$$F_L =$$

$$r_L =$$

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