



**FIGURE P9-3**

Automotive differential planetary gear train for Problem 9-27

\*†9-27 Figure P9-3 shows a planetary gear train used in an automotive rear-end differential (not to scale). The car has wheels with a 15-inch rolling radius and is moving forward in a straight line at 50 mph. The engine is turning 2000 rpm. The transmission is in direct drive (1:1) with the driveshaft.

- a. What is the rear wheels' rpm and the gear ratio between ring and pinion?
- b. As the car hits a patch of ice, the right wheel speeds up to 800 rpm. What is the speed of the left wheel? Hint: The average of both wheels' rpm is a constant.
- c. Calculate the fundamental train value of the epicyclic stage.

\* Answers in Appendix F.

† These problems are suited to solution using *Mathcad*, *Matlab*, or *TKSolver* equation solver programs.