

PROBLEM SOLVING

EXAMPLES 1 and 3

on pp. 859–861
for Exs. 48–50

48. **ASTRONOMY** In astronomy, the *terminator* is the day-night line on a planet that divides the planet into daytime and nighttime regions. The terminator moves across the planet's surface as the planet rotates. It takes about 4 hours for Earth's terminator to move across the continental United States. Through what angle has Earth rotated during this time? Give the answer in both degrees and radians.

TEXAS @HomeTutor for problem solving help at classzone.com



49. **CD PLAYER** When a CD player reads information from the outer edge of a CD, the CD spins about 200 revolutions per minute. At that speed, through what angle does a point on the CD spin in one minute? Give the answer in both degrees and radians.

TEXAS @HomeTutor for problem solving help at classzone.com

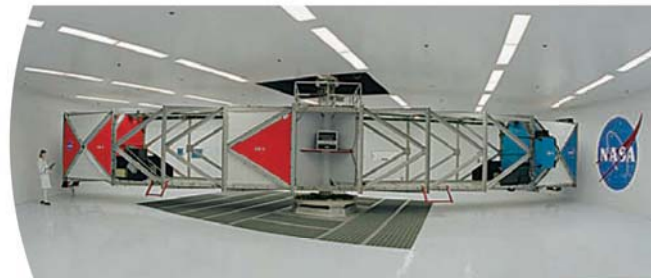
50. **TAKS REASONING** You work every Saturday from 9:00 A.M. to 5:00 P.M. Draw a diagram that shows the rotation completed by the hour hand of a clock during this time. Find the measure of the angle generated by the hour hand in both degrees and radians. *Compare* this angle with the angle generated by the minute hand from 9:00 A.M. to 5:00 P.M.

EXAMPLE 4

on p. 862
for Exs. 51–53

51. **MULTI-STEP PROBLEM** A scientist performed an experiment to study the effects of gravitational force on humans. In order for humans to experience twice Earth's gravity, they were placed in a centrifuge 58 feet long and spun at a rate of about 15 revolutions per minute.

- Through how many radians did the people rotate each second?
- Find the length of the arc through which the people rotated each second.



52. **MULTI-STEP PROBLEM** In the shot put event at the 2004 Summer Olympic Games, the winning shot was 21.16 meters. For a shot put to be fair, it must land within a sector having a central angle of 34.92° .
- If the officials drew an arc across the fair landing area marking the farthest throw, how long would the arc be?
 - All fair shot puts in the 2004 Olympics landed within a sector bounded by the arc from part (a). What is the area of this sector?
53. **TAKS REASONING** A spiral staircase has 15 steps. Each step is a sector with a radius of 42 inches and a central angle of $\frac{\pi}{8}$.
- What is the length of the arc formed by the outer edge of a step?
 - Through what angle would you rotate by climbing the stairs? Include a sixteenth turn for stepping up on the landing. *Explain* your reasoning.
 - How many square inches of carpeting would you need to cover the 15 steps?

Animated Algebra at classzone.com