LESSON 3.6

NAME _____ DATE _____

Challenge: Skills and Applications

For use with pages 166–172

1. Find the population density for each country in the table. Round to the nearest tenth of a person per square mile.

Country	*Population (in millions)*	*Area (in hundred thousand square miles)*	*Population density (in people per square mile)*
Germany	84.1	1.38	
India	967.6	12.22	
Japan	125.7	1.46	
Turkey	63.5	3.01	
United States	268.0	36.75	

2. About how many times more crowded is the most crowded country in the table than the least crowded one?

3. If a person is chosen randomly from the population of the 5 countries in the table, what is the probability the person lives in Germany? Round to the nearest thousandth.

For Exercises 4–8, use the following information.

A satellite is in orbit around Earth, travelling at a rate of 85.4 minutes per orbit. A space shuttle enters the same orbit, travelling at a rate of 93.6 minutes per orbit. The shuttle is 0.25 orbits behind the satellite, travelling toward it.

4. Let x be the number of orbits the shuttle makes before the shuttle and the satellite first meet. Which expression below might represent the number of orbits the satellite makes in the same time? (*Hint:* Think about the starting positions and about which vehicle makes more orbits in a given time.)

A. $x - 0.25$ **B.** $x + 0.25$ **C.** $x - 0.75$ **D.** $x + 0.75$

5. Use your answer to Exercise 4 to write expressions for the time the shuttle travels and for the time the satellite travels before they first meet. Then write an equation that relates the two expressions.

6. Solve the equation from Exercise 5. Round to the nearest hundredth. About how many orbits does each spacecraft make before they first meet?

7. Explain how you can use the minutes per orbit of the two spacecrafts to find the number of orbits the satellite makes as the shuttle makes n orbits, for any value of n. Use this method to check your answer to Exercise 6.

8. How many hours and minutes will it take before the satellite and the shuttle first meet? Round to the nearest whole minute.