

Lesson 2.1.2: 1185.3 Is a Crowd**Theme: Citizenship****Specific Objectives**

Students will understand

- the concept of population density as a ratio.
- what is meant by *proportional* or change based on a constant ratio.

Students will be able to

- calculate a unit rate.
- solve a proportion by first finding a unit rate and then multiplying appropriately.

Problem Situation: Estimating Population Densities

You will compare the populations of different states and explore how population density affects a states' representation in the U.S. Congress. You calculated population densities of some states in your out-of-class experience. Now, you will develop strategies for estimating population densities.

- (1) Check your answers from the out-of-class experience with your group. Now discuss strategies you can use to estimate the population density of the states without using a calculator. Use your strategies to divide the states into the categories shown in the table below.

Density > 1,000 people/mi ²	100–1,000 people/mi ²	10–100 people/mi ²	Density < 10 people/mi ²
Rhode Island	Washington	South Dakota	Alaska
New Jersey	Louisiana	New Mexico	Wyoming
	Wisconsin	Idaho	Montana
	Kentucky	Nebraska	North Dakota
	New Hampshire	Nevada	
	South Carolina	Kansas	
	Tennessee	Oregon	
	Georgia	Maine	
	Michigan	Colorado	
	Indiana	Iowa	
	North Carolina	Oklahoma	
	Virginia	Arkansas	
	Hawaii	Arizona	
	Illinois	Mississippi	
	California	Minnesota	
	Ohio	Vermont	
	Pennsylvania	West Virginia	
	Florida	Missouri	
	New York	Alabama	
	Delaware	Texas	
	Maryland	Utah	
	Connecticut		
	Massachusetts		

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- (2) Find which state has the greatest population density. What is that population density? Round to the nearest tenth.
- (3) Find which state has the least population density. What is that population density? Round to the nearest tenth.
- (4) If your campus had the same population density as the state with the greatest population density, how many people would be on campus? What if your campus had the same population density as the state with the least population density?
- (5) Most of the world outside the United States uses the metric system of measurement, so it is often useful to be able to make comparisons between the American system and the metric system. Bangladesh has a population density of 1,127 people/square kilometer. (**Note:** 1 kilometer = 0.62 mile¹)
- (a) If you converted the density of Bangladesh to square miles, would the measure be larger or smaller than 1,127? Explain your reasoning.
- (b) Which of the following statements is the most accurate description of the relationship between a square kilometer and a square mile?
- (i) A square kilometer is about one-sixth of a square mile.
- (ii) A square kilometer is about two-thirds of a square mile.
- (iii) A square kilometer is about one-third of a square mile.
- (iv) A square kilometer is about six-tenths of a square mile.
- (c) How many people would be on your campus if the population density were the same as Bangladesh?

Making Connections

Record the important mathematical ideas from the discussion.

¹Retrieved from http://en.wikipedia.org/wiki/List_of_sovereign_states_and_dependent_territories_by_population_density