

Algebra 2

Data Updates

Chapter 4

Lesson 4.1, page 205, Exercises 45–47, U.S. Population

The matrices show the number of people (in thousands) who lived in each region of the United States in 2000 and the number of people (in thousands) projected to live in each region in 2010. The regional populations are separated into three age categories.

	2000			2010		
	0–17	18–65	Over 65	0–17	18–65	Over 65
Northeast	12,808	32,110	7,189	12,493	33,822	7,377
Midwest	16,167	39,062	8,273	15,840	41,095	8,980
South	24,836	60,329	12,448	25,428	67,337	14,832
Mountain	4,822	10,842	2,061	5,094	12,420	2,707
Pacific	12,148	26,799	4,739	13,655	31,125	5,511

45. The total population in 2000 was 274,634,000 and the projected total population in 2010 is 297,716,000. Rewrite the matrices to give the information as percents of the total population. (Hint: Multiply each matrix by the reciprocal of the total population (in thousands), and then multiply by 100.)
46. Write a matrix that gives the projected change in the percent of the population in each region and age group from 2000 to 2010.
47. Based on the results of Exercise 46, which region(s) and age group(s) are projected to show relative growth from 2000 to 2010?

Answers:

45.

	2000			2010		
	0–17	18–65	Over 65	0–17	18–65	Over 65
Northeast	4.7	11.7	2.6	4.2	11.4	2.5
Midwest	5.9	14.2	3.0	5.3	13.8	3.0
South	9.0	21.9	4.5	8.5	22.6	5.0
Mountain	1.8	3.9	0.8	1.7	4.2	0.9
Pacific	4.4	9.8	1.7	4.6	10.5	1.9

46.

	0–17	18–65	Over 65
$\left[\begin{array}{l} -0.5 \\ -0.6 \\ -0.5 \\ -0.1 \\ 0.2 \end{array} \right]$	$\begin{array}{l} -0.3 \\ -0.4 \\ 0.7 \\ 0.3 \\ 0.7 \end{array}$	$\begin{array}{l} -0.1 \\ 0 \\ 0.5 \\ 0.1 \\ 0.2 \end{array}$	

47. South: 18–65, over 65
 Mountain: 18–65, over 65
 Pacific: 0–17, 18–65, over 65

Lesson 4.2, page 212, Exercises 35 and 36, Agriculture

The percents of the total 2000 world production of wheat, rice, and maize are shown in the matrix for the four countries that grow the most grain: China, India, France, and the United States. The total 2000 world population (in thousands of metric tons) of wheat, rice, and maize was 576,317, 598,852, and 590,791, respectively.

Grain Production			
	W	R	M
China	17.2%	31.7%	17.8%
India	12.9%	22.4%	1.9%
France	6.5%	0.02%	2.8%
U.S.	10.5%	1.4%	42.9%

Answers:

35.

Grain Production			
	W	R	M
China	0.172	0.317	0.178
India	0.129	0.224	0.019
France	0.065	0.0002	0.028
U.S.	0.105	0.014	0.429

36.

$$\begin{bmatrix} 0.172 & 0.317 & 0.178 \\ 0.129 & 0.224 & 0.019 \\ 0.065 & 0.0002 & 0.028 \\ 0.105 & 0.014 & 0.429 \end{bmatrix} \begin{bmatrix} 576,317 \\ 598,852 \\ 590,791 \end{bmatrix} = \begin{bmatrix} 394,123.406 \\ 219,712.77 \\ 54,122.5234 \\ 322,346.552 \end{bmatrix}$$

China produced about 394,100,000 metric tons of grain, India, about 219,700,000 metric tons of grain, France, about 54,100,000 metric tons of grain, and the U.S. about 322,300,000 metric tons of grain.