

North Carolina Grade 7 Sample Open Response Test

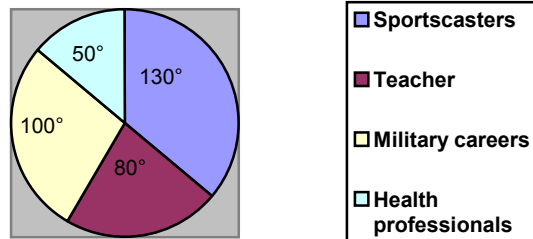
1. Susan's seventh-grade class took a survey and discovered that the most popular future occupations included sportscasters, health professionals, military careers, and teachers. They took a second survey to find each student's preference among these four types of occupations. The results from the 180 students surveyed are in the table below.

Popular Occupations			
Sportscasters	Health professionals	Military careers	Teachers
65	25	50	40

- Create a circle graph to display the data. Determine how many degrees should be in each sector and label each sector appropriately using a key. Give a title for the graph. If necessary, round each decimal to the nearest whole number.
- Explain how to find the number of degrees for a sector in a circle graph. Use the given data as a reference.

Solution

Occupation Preferences



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- To find the number of degrees for a sector in a circle graph, divide the number of people who prefer each occupation by the total number of students surveyed. Then multiply that quotient by 360. Since there are 360° in a circle, the sectors must add up to 360° .

For example, there were 50 students who would prefer military careers. Divide 50 by 180, the total number of students surveyed.

$$\frac{50}{180} \approx 0.278$$

Multiply 0.28 and 360 to find the number of degrees this sector of the circle should be.

$$0.278 \times 360 \approx 100^\circ$$

Course 2, Lesson 1-5

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2. Annie's long distance telephone plan costs \$8.85 per month plus 10¢ per minute for phone calls. In June, her long distance bill was \$45.15. How many minutes were spent on long distance calls in June?

Define a variable. Then write an equation and solve it to answer the question. Show all your work.

SOLUTION

Let n = the number of minutes

$$\begin{array}{r} 8.85 + 0.1n = 45.15 \\ \underline{-8.85} \qquad \underline{-8.85} \\ 0.1n = 36.3 \\ n = 363 \end{array}$$

Annie used 363 minutes on long distance calls in June.

Course 2, Lesson 2-8

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3. Julie and Janie are best friends and are both traveling to the same vacation home. Julie lives 350 miles east of the vacation home, and Janie lives 450 miles west of the vacation home.
- a. If both Julie's and Janie's families are traveling 55 mi/h, how long will it take each family to get to the vacation destination, and who will arrive first if they depart at the same time? Give your answer to the nearest minute. Explain your reasoning.
- b. If Julie's mom drives 50 mi/h, how fast does Janie's dad have to drive to be at the vacation home at the same time as Julie's family?
- c. How far apart do Julie and Janie live? Express this distance in feet.

SOLUTION

a. Julie's family: $\frac{55 \text{ miles}}{1 \text{ hour}} = \frac{350 \text{ miles}}{x \text{ hours}}$

$$55x = 350 \times 1$$

$$x = \frac{350}{55} \approx 6.36 \text{ hours, or 6 hours and 22 minutes}$$

Janie's family: $\frac{55 \text{ miles}}{1 \text{ hour}} = \frac{450 \text{ miles}}{x \text{ hours}}$

$$55x = 450 \times 1$$

$$x = \frac{450}{55} \approx 8.18 \text{ hours or 8 hours and 11 minutes}$$

Julie's family will arrive first because the two families are travelling at the same speed but Julie's family lives closer to the vacation home.

- b. Set up a proportion.

$$\frac{50}{350} = \frac{x}{450}$$

$$350x = 22,500$$

$$x \approx 64.3 \approx 64 \text{ miles per hour}$$

- c. To find the distance between the two girls, add the distances to the vacation home. Because this distance is expressed in miles, use the conversion factor to convert from miles to feet.

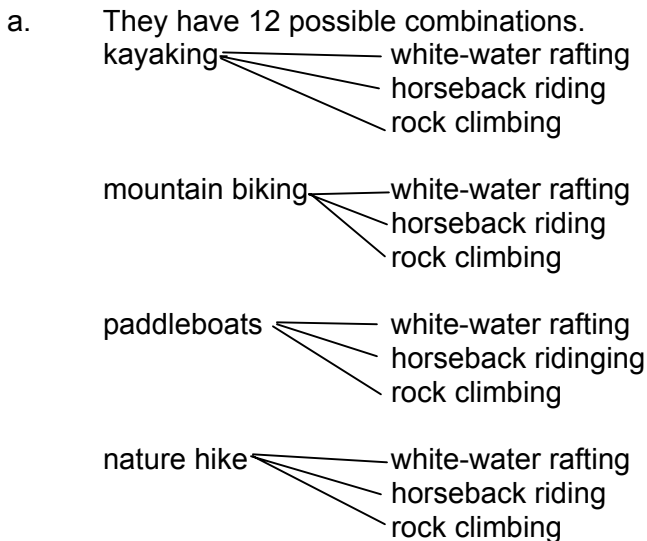
Julie and Janie live 800 miles apart, or $800 \text{ miles} \times \frac{5,280 \text{ feet}}{1 \text{ mile}} = 4,224,000 \text{ feet}$.

Course 2, Lessons 5-3 and 5-4

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4. A mountain resort offers different activities and adventures for their guests. The resort activities include kayaking, mountain biking, riding paddleboats, and going on a nature hike. The resort adventure excursions include white-water rafting, horseback riding, and rock climbing.
- a. If the Smith family wanted to do one activity and one adventure excursion, how many different choices would they have? Make a tree diagram or list showing all the possible combinations.
- b. The resort offers a discount if you let them randomly assign you an activity and an adventure excursion. What is the probability that you would be assigned kayaking and rock climbing?

SOLUTION

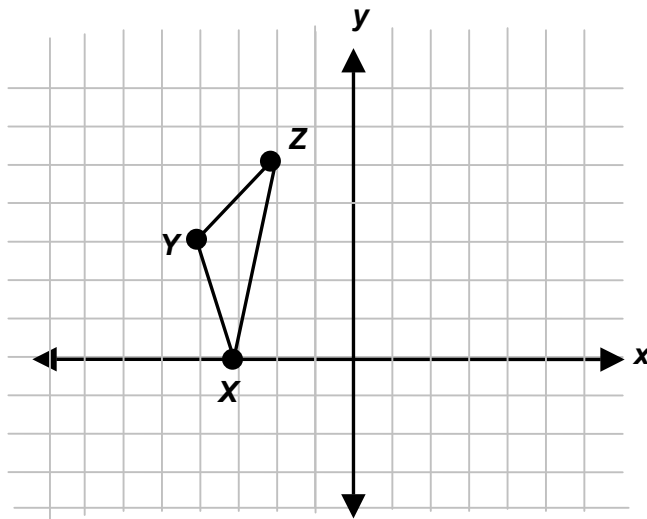


- b. $\frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$ The probability that you would be assigned kayaking and rock climbing is $\frac{1}{12}$.

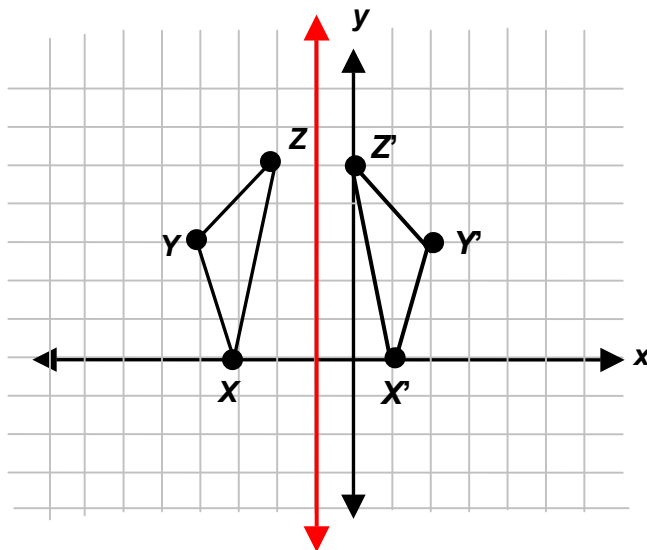
Course 2, Lessons 10-5 and 10-6

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5. Graph the line $x = -1$ on the grid below. Then reflect triangle XYZ across $x = -1$. Give the coordinates of the new figure.



SOLUTION



The new coordinates after the reflection is $X'(1,0)$, $Y'(2, 3)$, and $Z'(0, 5)$.

Course 2, Lesson 7-10

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6. Michael is moving to Raleigh, North Carolina. He can use two different sizes of boxes to packing his belongings.

Box A measures 40 in. by 24 in. by 36 in.

Box B measures 36 in. by 36 in. by 36 in.

- a. Determine which box has the greatest volume in cubic feet. This is the box that Michael will use.
- b. How many of these boxes can Michael load into a moving van with dimensions of the cargo space are 36 ft by 12 ft by 15 ft.

SOLUTION

- a. The volume of Box A is 34560 in^3 . To convert to ft^3 you must divide 34560 by 12^3 or $1,728$. The volume of Box A is 20 ft^3 .

The volume of Box B is $46,656 \text{ in}^3$. To convert to ft^3 you must divide by $46,656$ by 12^3 or $1,728$. The volume of Box B is 27 ft^3 .

Box B has the greatest volume per cubic foot.

- b. Twelve boxes can fit along the length of the moving van, and 4 rows of these 12 boxes can fit along the width for a total of 48 boxes. Boxes can also be stacked 5 levels high for a total of 240 boxes.

The moving van can hold 240 boxes.

Course 2, Lesson 9-2