Sports and Hobbies Math

Topics Include:

Making Choices, Mind Games, Hobbies, Clubs, Sports, Camping, Travel, Extending Family



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Making Choices

Preview

How You Will Use This Unit

As you think about recreational choices, you will consider many different things. You might thing about going to a concert or to a movie. You may consider karaoke or just getting a video and staying in. As you compare options and make choices, you will often use math. The math skills you use include mental math and estimation, basic operations and equations, ratios and proportions, probability, statistics, measurements, and geometry.



What You Will Do in This Unit

In this unit, math steps demonstrate how to solve problems. These steps can help you answer questions such as these:

You price tickets for a fall concert series. You compare three different sets of prices and select the set of ticket prices that are proportional to the popularity of the artist.

You say that you only watch about one and a half hours of television per day. On a rainy Saturday you watch 6 hours of sports. How many hours can you watch per day for the rest of the week to keep your average unchanged?

You and your two cousins visit a popular water park. Children under 6 get in for free. This year your cousins are 5 and 11. How many entry tickets do you buy?

You use a decibel meter to monitor the volume at a karaoke concert. You notice that the meter reading is within 5 decibels of 80 decibels. What decibel range is maintained?

What You Can Learn from This Unit

When you complete this unit, you will have used mathematics to work problems related to recreational choices. These problems are similar to those that may actually occur in your daily life.

- Concerts & Movies

Example Rory is pricing tickets for a fall concert series. He lists the four most popular artists with ticket prices. He compares three different sets of prices for various performances. For which set are the prices in proportion to the ranking of the artist?

Artist	Ranking	Ticket Prices Set 1	Ticket Prices Set 2	Ticket Prices Set 3
Elaine's Keyboard	1	\$15	\$15	\$15
Boots	2	\$25	\$30	\$30
The Songwriters	3	\$40	\$45	\$60
JaZZit	4 (most popular)	\$60	\$60	\$120

Solve

Step 1: For each set of prices, write the ratio comparing the ticket price and the ranking of the artist. Simplify the fractions.

	Set 1	Set 2	Set 3
$\begin{array}{c} \text{Elaine's} \\ \text{Keyboard} \end{array} \rightarrow$	$\frac{\$15}{1}$	$\frac{\$15}{1}$	$\frac{\$15}{1}$
Boots \rightarrow	$\frac{\$25}{2} = \frac{\$12.5}{1}$	$\frac{\$30}{2} = \frac{\$15}{1}$	$\frac{\$30}{2} = \frac{\$15}{1}$
The \rightarrow Songwriters	$\frac{\$40}{3} = \frac{\$13.3}{1}$	$\frac{\$45}{3} = \frac{\$15}{1}$	$\frac{\$60}{3} = \frac{\$20}{1}$
JaZZit \rightarrow	$\frac{\$60}{4} = \frac{\$15}{1}$	$\frac{\$60}{4} = \frac{\$15}{1}$	$\frac{\$120}{4} = \frac{\$30}{1}$

Step 2: Read down each set to find the one where these ratios are all equal.

- Set 1: Only Elaine's Keyboard and JaZZit are equal.
- Set 2: All ticket prices as in the same ratio, $\frac{\$15}{1}$.
- Set 3: Only Elaine's Keyboard and Boots are equal.

Answer the Question

Step 3: For Set 2, the ratios are all equal, so these prices are all proportional to the ranking of the artist.

> Now try these problems.

Refer to the information in the example as you work the first problem.

1. Rory looks at his ticket pricing options again. For which set of ticket prices would price graphed against popularity ranking be a straight line? Explain your answer.

Answer:

- 2. Donna sees a contest for concert tickets. She enters right away!
 - a. If 15,000 teens send in their entries, what is the probability that Donna will win the grand prize?

ENTER NOW! Get one of the year's hottest tickets! One grand prize → Two-day, one-night, all-expensepaid trip to a concert by the magazine's "Artist of the Year." Twenty-five first prizes → "Artist of the Year" CD collection.

Answer: The probability for the grand prize is _

b. What is the probability that she will win one of the first prizes?

Answer: The probability for the CD collection is _____.

3. The school band holds a free outdoor concert to benefit local families. About 150 people come to listen. The band collects \$750 in donations. What is the mean (average) donation per person at the concert?

A \$1 **B** \$5 **C** \$6 **D** \$10

4. Libby's mother wins tickets for the family to an out-of-town movie festival. The tickets are free. But, they have to pay for the hotel, meals, and gas for the car. The total bill comes to \$445. Of this, \$172 is for hotel rooms and \$229 is for meals. They pay about \$1.60 per gallon for gas. The round trip is 500 miles and takes three full tanks of gas. Use these steps to find the number of miles to the gallon they get.

Amount of money they spend on gas = \$445 - ____ = \$____

Number of gallons of gas that this money buys =

_____ ÷ _____ = _____

Number of miles to the gallon they get = $___$ = $___$

Challenge Problem You may want to talk this one over with a partner.

You put five gallons of gas into your car. The gas tank indicator goes from $\frac{1}{2}$ to $\frac{3}{4}$. What is the total capacity of the gas tank? Explain how you got your answer.

- Keeping Up with Things

Example Orson says he only watches an average of about one and a half hours of television per day. On Saturday he watches 6 hours of sports programs. To keep his weekly average (mean), what is the mean number of hours per day he could watch for the remaining days?



Solve

Step 1: Use *x* to represent the mean daily number of hours Orson watches for the other six days of the week. Write an expression for the total number of hours that he watches television during this week.

(6x + 6)

Step 2: Next, write an equation for the mean number of hours that he watches television per day during the seven-day period.

 $(6x + 6) \div 7 = 1\frac{1}{2}$

Step 3: Now, solve for x.

 $6x + 6 = 1\frac{1}{2} \times 7$ $6x = 10\frac{1}{2} - 6$ $x = \frac{9}{2} \div 6$ $x = \frac{3}{4}$ Apply properties to isolate the term with x.

Answer the Question

Step 4: The mean number of hours per day that Orson can watch to keep his weekly average is $\frac{3}{4}$.

Show try these problems.

1. Keon says he only watches about half an hour of television per day. Today he watches $3\frac{1}{2}$ hours of a program showing this year's entertainment awards. What mean number of hours can he watch per day to keep his weekly average?

Answer: The mean number of hours that he can watch per day

is _____

2. Rihana picks out a new entertainment center for her bedroom. The entertainment center is 6 feet long by 2 feet wide by 4 feet tall. She plans to put the long side against one wall. She also wants at least two feet of walking space in front of it. Draw and label a diagram to show the minimum floor area that she needs for the entertainment center. What is this area?

Answer: _____

A 3 ounces

B 7 ounces

3. Leah gets ready to watch the X-Games on television. She pulls out a new box of popcorn. The box contains 30 ounces of unpopped popcorn. An advertisement on the side of the box says that the box will serve 21 people. Six friends are coming over to watch the games with her. How many ounces should she pop for all seven of them?



4. Carey scans the *It'sOver* section of a magazine. His eye catches the first entry that says that two popular stars have parted ways after dating for three years. He reads that three years is four times as long as most stars stay together. How long do most stars stay together? Mark a segment of the line that represents this answer.

C 10 ounces

D 21 ounces

\therefore Challenge Problem You may want to talk this one over with a partner.

As you roam the Internet, you spot a segment on films. The segment says that the summer's highest-grossing film took in more than \$400 million. Suppose you earn \$15 per hour, and work 40 hours per week, 50 weeks per year. At this rate of pay, how many years would it take to reach this record?

Answer: It would take _____ years.

► Parks & Fairs

Example Bowen, Marie, and their sons, Tristan and Matt, visit a popular water park every year. The entry prices are posted at the gate. Children under 6 years old get in for free. This year, Tristan is 5 and Matt is 11. They line up at the gate to buy tickets for two days. Which is the most cost-effective entry package for them?

Entry package	Price
Single, one day	\$15
Single, two days	\$25
Family, one day	\$50
Family, two days	\$90

Solve

- Step 1: Calculate the entry price for three two-day singles.
 (Tristan gets in for free).
 \$25 × 3 = \$75
- Step 2: Compare this to the two-day entry price for a family. \$75 < \$90</p>

Answer the Question

Step 3: The most cost-effective entry package is three two-day singles.

> Now try these problems.

Refer to the information in the Example as you work the first problem.

1. Bowen, Marie, Tristan, and Matt, visit the water park again a few years later. They notice that the entry prices have not changed. This time the most cost-effective entry price for two days is \$90. What is the minimum number of years since the last time they visited? Explain your answer.

Answer:		years.
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2. Whenever a ticket-booth line gets longer than 10 people, the fairground people open up another entry line. On average, it takes 3 minutes to process an entry. Vernon notices that there are 45 people waiting at the ticket booths to enter the fair-ground. Draw a diagram to show how the fairground people

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will handle this many people. How long will it take for the 45th person to get into the fairground?

Answer: It will take the 45th person _____ minutes to get into the fairground.

- **3.** A water ride at the park takes 5 minutes. Each boat carries a load of four people. It takes two minutes to unload, one minute to cross to the loading platform, and two minutes to load. One boat unloads people while the boat in front of it loads people.
 - **a.** How often does a boat take off with a new load of people?
 - **b.** How many people can experience the ride in one hour?
 - A every two minutes; 48 people
 - **B** every three minutes; 80 people
 - **C** every four minutes; 48 people
 - **D** every five minutes; 80 people
- **4.** Marcie pays 50 cents to drop 6 washers onto a four-by-four checkerboard. If she drops all six washers onto black squares, she wins a prize. The probability of a washer landing on any of the squares is equal. What is the theoretical probability that Marcie will win a prize?



Answer: _____

☆ Challenge Problem You may want to talk this one over with a partner.

If 3 is a triangular number, and 4 is a square number, what are 6 and 9? Draw a diagram to show why you think so.

Answer:

Diagram:

A Board Game (for Two or More Players)

The goal of this game is to capture the most territories. First, you build territories. Next, you assign values to them. Then, you capture them.

Materials

Paper and pencils

Directions

- Place a piece of paper on a table. Sit with players around the table. Player 1 draws a territory on the paper and labels it with an initial. For example, Kyla puts a k in each territory she draws. Each player then takes a turn, drawing a territory that touches a previously drawn territory. Each player draws and initials ten territories, one at a time.
- 2. Players then take turns labeling any one of their territories with a number before their initial. The total of each player's territories cannot exceed 100. A player can label some territories with 0.
- **3.** A territory or block of territories is captured when it is surrounded by territories that belong to another player and total more than the surrounded block or territory. A territory that has been captured belongs to the capturing player. Cross out the original initial and substitute that of the capturer.
- **4.** The game is over when no more territories can be captured. The winner is the player with the most territories.

Before you play the game, try these warm-up problems.

1. In the sample game, Dominique adds a 7*d* to her 6*d*, 9*d*, and 17*d* labels. Her opponent, Kyla, has already played 5*k*, 14*k*, 15*k*, and 16*k*. What has Dominique accomplished?

Answer:

- **2.** Why doesn't Kyla capture the block consisting of 2*d*, 6*d*, 7*d*, 16*d*, and 17*d*?
 - **A** 2d is open to the outside.
 - **B** They are not surrounded.
 - **C** The *d* territories total more than the surrounding k territories.
 - **D** The *d* territories total less than the surrounding k territories.