

# Beginning-of-Course Diagnostic Test

1. Write the place value of the underlined digit in  $5\underline{2}3,411,396$ .

2. Write the place value of the underlined digit in  $40\underline{2},659$ .

3. Round 742 to the tens place.

4. Round 4,078 to the hundreds place.

5. Round 116,830 to the thousands place.

**Add.**

$$\begin{array}{r} 6. \quad 4,208 \\ + 6,967 \\ \hline \end{array}$$

7.  $591 + 79$

$$\begin{array}{r} 8. \quad 7,223 \\ + 4,279 \\ \hline \end{array}$$

9.  $3,208 + 564$

10. four thousand sixty-two plus nine hundred eighteen

**Subtract.**

$$\begin{array}{r} 11. \quad 57 \\ - 42 \\ \hline \end{array}$$

12.  $79 - 31$

$$\begin{array}{r} 13. \quad 8,841 \\ - 3,194 \\ \hline \end{array}$$

$$\begin{array}{r} 14. \quad 116,493 \\ - 90,287 \\ \hline \end{array}$$

15.  $2,051 - 988$

16. nine thousand minus five hundred thirty eight

**Multiply.**

17.  $594 \times 8$

18.  $1,174 \times 6$

19. six thousand eighty-one times seven

20.  $54 \times 917$

21.  $806 \times 255$

22. one thousand sixty-nine times  
forty-eight

23. one hundred thirty-three times four  
thousand, two hundred eighty-six

**Divide.**

24.  $6 \overline{)822}$

25.  $964 \div 6$

26. one thousand, two hundred eighty-seven  
divided by nine

27.  $6,432 \div 24$

28.  $504 \div 24$

29.  $1,756 \div 29$

30.  $5 \overline{)1,016}$

**Multiply using mental math.**

31.  $4,729 \times 10$

32.  $462 \times 10,000$

33.  $706,215 \times 100$

**Divide using mental math.**

34.  $120 \div 10$

35.  $17,000 \div 1,000$

36.  $8,203,000 \div 100$

## Draw a Picture

**When to Use This Strategy** Drawing a picture can help you visualize and understand a word problem.

**Volleyball** A volleyball tournament will be held on a soccer field that is 110 yards long and 80 yards wide. Each volleyball court is 25 yd long by 15 yd wide. How many courts will fit on the field?

### Understand

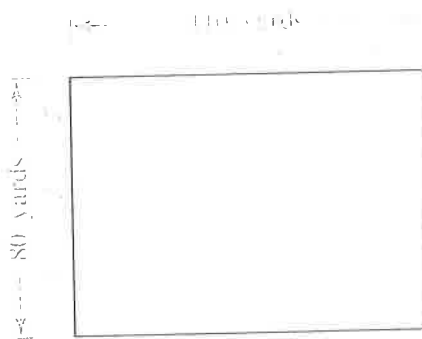
The field is 110 yd by 80 yd. Each volleyball court is 25 yd by 15 yd. You are asked to find how many courts will fit on the field.

### Plan

To help decide, first *draw a picture* of the field. Then show how many courts will fit on the field.

### Carry Out

Mark off 7 courts along the length of the field and 3 courts along the width of the field. Since  $3 \times 7 = 21$ , you can fit 21 courts in the field.



### Check

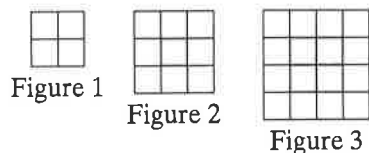
Check the answer by dividing the area of the field by the area of a court. Use the formula  $\text{area} = \text{length} \times \text{width}$ .

$$\frac{\text{soccer field}}{\text{volleyball court}} \rightarrow \frac{110 \text{ yards} \times 80 \text{ yards}}{25 \text{ yards} \times 15 \text{ yards}} \rightarrow \frac{8,800 \text{ square yards}}{375 \text{ square yards}} \approx 23$$

So 21 courts is a reasonable answer.

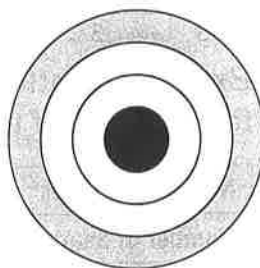
## ● Practice

1. A bookcase is made from wood that is 3 in. thick. The bookcase has four shelves, including the top. The space between shelves is 20 inches. Find the height of the bookcase.
2. Lights are placed every 2 feet along both sides of a 14-foot driveway. How many lights are needed?
3. A rectangular garden is 4 feet by 3 feet. A landscaper plants flowers 1 ft apart along the edges and corners. How many plants does the landscaper need?
4. A bricklayer is finishing a section of a patio that is 60 in. wide by 60 in. long. Each brick is 10 in. wide by 12 in. long. How many bricks will it take to complete the patio?
5. Look at the figures below.



How many white squares will Figure 7 have?

6. A dartboard manufacturer makes dartboards with a black center. How many different dartboards can be made using the colors blue, yellow, and orange for the different rings? Each color can only be used once. *Hint: One combination is shown below.*



## Look for a Pattern

**When to Use This Strategy** In problems where more objects are added, you can *look for a pattern* to solve the problem.

**Seating** A rectangular table seats two people on each end and three on each side. How many seats are available if you push the ends of five tables together?

### Understand

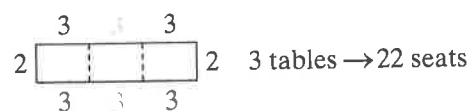
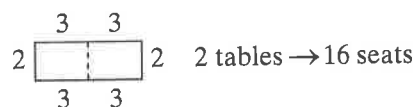
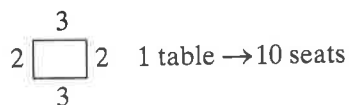
There are five rectangular tables. Each table seats two people on each end and three on a side.

### Plan

To find the number of seats when five tables are pushed together, start by finding the number of seats when there are fewer tables.

### Carry Out

Start with 1, 2, and 3 tables.



Extend the pattern by adding six seats for each new table, three for each side of the new table.

<b>Number of Tables</b>	1	2	3	4	5
<b>Number of Seats</b>	10	16	22	28	34

### Check

Five tables pushed together seat  $5 \times 6$ , or 30, people on the sides and 2 people on each end, or  $30 + 2 + 2 = 34$ .



## ● Practice

- Multiple Choice** A high school student has started a new job. He plans to save \$1 in the first week, \$2 in the second week, \$4 in the third week, and \$8 in the fourth week. If this pattern of savings could continue, how much would he save in the tenth week?

A. \$10  
B. \$128  
C. \$256  
D. \$512
- A rectangular table seats four people on each side and three on each end. How many seats are available if the ends of seven tables are pushed together?
- Your younger brother is pulling a sled up a hill. Each minute he moves forward 20 feet but also slides back 3 feet. How long will it take him to pull his sled 130 feet up the hill?
- Look at the figures below. How many squares will be in Figure 8?



Figure 1

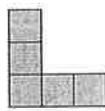


Figure 2

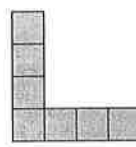
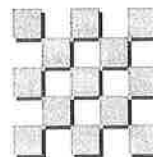


Figure 3

- Multiple Choice** Continue the pattern 1, 4, 16, 64...

A. 256, 1004, 4016  
B. 256, 924, 3696  
C. 256, 1024, 4086  
D. 256, 1024, 4096

- Draw the next 2 figures in the pattern below.



## Make a Table

**When to Use This Strategy** Organizing data in a table can help you see connections.

**Exercise** Tara wants to walk in a charity event. In her first week of training, she walks three miles each day. Each week after that, she adds  $\frac{3}{4}$  mile to her daily distance. In which week of training does Tara walk six miles per day?

### Understand

During the first week, Tara walks three miles each day. Each week, she walks an additional  $\frac{3}{4}$  mile. You need to find the week in which her daily walk is six miles.

### Plan

*Make a table* that shows weeks and distance. Add rows until the distance reaches six miles.

### Carry Out

Label the first column Week and the second column Distance. Fill in the values for each week.

Week	Distance (miles/day)
1	3
2	$3 + \frac{3}{4} = 3\frac{3}{4}$
3	$3\frac{3}{4} + \frac{3}{4} = 4\frac{1}{2}$
4	$4\frac{1}{2} + \frac{3}{4} = 5\frac{1}{4}$
5	$5\frac{1}{4} + \frac{3}{4} = 6$

Tara walks 6 miles during her fifth week of training.

### Check

You can check by working backward. In five weeks there were 4 increases of  $\frac{3}{4}$  mile.  $\frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} = 3$ . So the total increase was 3 miles. The 3 miles plus the original 3 miles per day is 6 miles.

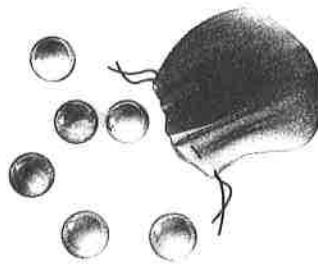


## ● Practice

1. In how many ways can you make 25 cents using pennies, nickels, and dimes?



2. Find the smallest number that meets both of these conditions.
  - When you divide the number by 7, the remainder is 1.
  - When you divide the number by 9, the remainder is 7.
3. A certain farm has both chickens and goats. Each chicken has 2 legs. Each goat has 4 legs. There are 35 animals on the farm. All together the chickens and goats have 100 legs. How many chickens and how many goats does the farm have?
4. A family is taking a vacation. They travel 248 miles on the first day. Each day after that, they travel 45 additional miles. On which day will they have traveled 563 total miles?
5. A bag full of 10 red and blue marbles spills out on the floor as shown.



How many possible groups of red and blue marbles are still in the bag?



## Write an Equation

**When to Use This Strategy** To *write an equation* is one way of organizing the information needed to solve a problem.

**Discount** A bicycle is on sale for \$139.93. This is 30% off the regular price. What is the regular price of the bicycle?

### Understand

The sale price of the bicycle, \$139.93, is 30% off the regular price. You need to find the regular price.

### Plan

Translate the words into an equation. You will pay  $100\% - 30\% = 70\%$  of the regular price.

### Carry Out

The percent you pay times the regular price equals the sale price.

**Words** percent you pay times regular price equals sale price

Let  $r$  = the regular price.

**Equation**

$$70\% \quad \times \quad r \quad = \quad \$139.93$$

$$0.7r = 139.93 \quad \leftarrow \text{Write } 70\% \text{ as a decimal: } 0.7.$$

$$0.7r \div 0.7 = 139.93 \div 0.7 \quad \leftarrow \text{Divide each side by } 0.7 \text{ to find } r.$$

$$r = \$199.90 \quad \leftarrow \text{Simplify.}$$

The regular price of the bicycle is \$199.90.

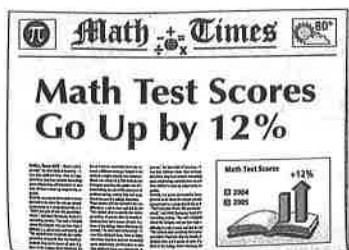
### Check

The regular price is about \$200. The sale price is about 70% of \$200, or \$140. This is close to the sale price.



## ● Practice

1. A magazine has 5,580,000 subscribers this year. This number is down 7% from last year. How many subscribers were there last year?
2. A “light” popcorn has 120 Calories per serving. This is 25% fewer Calories than a serving of regular popcorn. How many Calories does each serving of regular popcorn have?
3. The sign at the entrance of a store reads, “30% off all winter apparel! Discount given at the register.” The price tag of a coat is missing. The register rings up a price before tax of \$55.93. What is the regular price of the coat?
4. You earned \$13 doing yard work for your neighbor. You now have \$91 dollars. Write an equation to find how much money you had before doing the yard work. How much money did you have to begin with?
5. A local newspaper writes that math test scores have gone up 12% from last year. The average test score is now 560. What was the average test score last year?



6. A store is selling a hat and scarf set for 15% off the marked price. How much will you pay for the set?

