


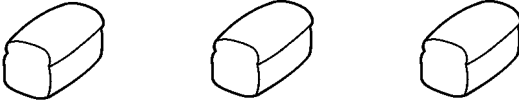

**Facts to Know**

Some problems can be solved by recognizing a pattern. Making a table can help you.

**Sample A**

David arranged loaves of bread on 6 shelves in the bakery. He put 1 loaf on the top shelf, 3 loaves on the second shelf, and 5 loaves on the third shelf. If he continues this pattern, how many loaves will he put on the 6th shelf?

If you make a table, you'll see a pattern.

<b>Top Shelf</b>					
<b>2nd Shelf</b>					
<b>3rd Shelf</b>					

Notice there are 2 more loaves on each shelf. If you complete the pattern, you'll know how many loaves are on the 6th shelf. (11 loaves)

**Sample B**

Monday through Thursday, Teresa exercises for 30 minutes after coming home from work. On the weekends, she goes swimming for 1 hour on Saturday. Teresa does not exercise on Friday and Sunday. At the end of 2 weeks, how much time will she have spent exercising?

If you make a table or chart, you'll see the pattern and be able to calculate how much time Teresa will have exercised in 2 weeks. (6 hours)

**Week 1**

Days of the Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>Exercise Time</b>	30 minutes	30 minutes	30 minutes	30 minutes	no exercise	1 hour	no exercise

**Week 2**

Days of the Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
<b>Exercise Time</b>	30 minutes	30 minutes	30 minutes	30 minutes	no exercise	1 hour	no exercise

**Directions:** Using the information on page 29, solve the problems on this page.

1. David is trying to crack a mysterious code. He's made a chart, but there are missing numbers. Look at the chart and fill in the numbers.

He knows that the key is to find a pattern. (*Hint:* Look at the columns.)

**Code Box**

4	5	9	___	___	___	16	___	7
2	2	4	___	5	7	___	1	___
2	3	5	6	___	8	___	2	4
4	6	20	42	25	___	63	2	12

2. An ice-cream stand has nine different flavors. A group of children come to the stand and each buys a double-scoop cone with two flavors of ice cream. If none of the children choose the same combination of flavors and every different combination of flavors is chosen, how many children are there? \_\_\_\_\_

**Ice Cream List**

1 Vanilla	4 Marble Mocha	7 Coffee
2 Butter Pecan	5 Raspberry	8 Chocolate Mint
3 Chocolate	6 Strawberry	9 Cherry Vanilla

*Hint:* The number of children = number of different combinations of two different flavors. Continue this pattern:

1,2	2,3	3,4	4,5	5,6	6,7	7,8	8,9
1,3	2,4	___,___	4,6	___,___	___,___	___,___	
1,4	___,___	___,___	___,___	5,8	6,9		
1,5	___,___	___,___	___,___	5,9			
1,6	2,7	___,___	4,9				
___,___	___,___	___,___					
___,___	___,___						
___,___							

3. a. If you saved \$2.00 on January 1, \$4.00 on February 1, \$6.00 on March 1, \$8.00 on April 1, and so on, how much money would you save in one year? \_\_\_\_\_
- b. If you saved \$2.00 on January 1, \$4.00 on February 1, \$8.00 on March 1, \$16.00 on April 1, and so on. How much money would you save in one year? \_\_\_\_\_

*Hint:* Notice the patterns of the amounts in the two questions.

4. Rob wanted an allowance. His father gave him a choice of getting it on a weekly or on a daily basis. He said he would either pay him \$1.25 a week or pay him in the following manner for a week: On Monday he would give him \$0.01; on Tuesday \$0.02; on Wednesday \$0.04; and on through Sunday. What would you tell Rob to do so he can get more allowance?

*Hint:* Continue the pattern of doubling the number of cents through Sunday.

5. Suppose today is Tuesday. What day of the week is it 100 days from now?

*Hint:* Start by dividing 100 by 7 because every seventh day is a Tuesday.

6. Mr. Grimly rents apartments. He carefully keeps track of his building's daily use of kilowatt hours of electricity as he rents more and more apartments. Complete his table:

<b>Renters</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>Kilowatt hours</b>	<b>2</b>	<b>5</b>	<b>7</b>	<b>10</b>	<b>12</b>					

7. Art Ringwald's Auto World sent letters to 5,000 residents offering them the chance to win a free car. Art received 200 replies. A month later, he sent 6,000 letters and received 240 replies. If the pattern continues, how many replies can the company expect to receive if it sends 8,000 notices? \_\_\_\_\_

*Hint:* Figure the amount for 7,000 first.

8. Bill Phelps is a gas meter reader. It takes him 10 minutes to read 30 meters. He can read 60 meters in 20 minutes, and 90 meters in 30 minutes. If the pattern continues, how long does it take him to read 150 meters? \_\_\_\_\_

*Hint:* The key is "It takes him 10 minutes to read 30 meters."

9. The women who belong to the library book club met on May 17, June 14, and July 12. If this pattern continues, when is their next meeting? \_\_\_\_\_

*Hint:* Use a calendar.

10. Leonardo Fibonacci, an Italian mathematician who lived from about 1180 to 1250, found a pattern in numbers. Mathematicians are still discovering that this pattern can be seen in nature in the way things grow. Here is the pattern:

**0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233,** \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

Do you recognize the pattern? What goes in the blanks?

*Hint:*  $2 + 3 = 5$

11. As you come into the Museum of Technology, you notice a rocket on a platform that turns. The rocket always points north at 9 A.M.; east at 9:15 A.M.; south at 9:30 A.M.; west at 9:45 A.M.; and north again at 10 A.M. Which direction will it be pointing at 6:15 P.M., more than 9 hours later? \_\_\_\_\_

12. Can you solve this magic square?

Put the remaining numbers from 0 to 15 in the 16 small squares. The sum of the four numbers in each row, column, and two diagonals must be 30.

15			12
	10	9	
			11
3			0

13. Five friends exchange valentines on Valentine's Day. How many valentines are exchanged?

*Hint:* Start with a smaller number as an experiment. What if there were only one person? Then no valentines exchanged—zero. What if there were only two friends instead of five? Then there would be 2 valentines exchanged. Three friends—there would be 6 exchanged. Four friends—there would be 12.

What's the pattern? 0, 2, 6, 12,...? \_\_\_\_\_

14. What is the syllable pattern of this limerick, and what is the rhyme pattern? \_\_\_\_\_

There was an Old Man with a nose,  
Who said, "If you choose to suppose,  
That my nose is too long,  
You are certainly wrong!"  
That remarkable Man with a nose.

15. Cans of tuna are arranged in a display that has 4 rows. Each row has one more can than the row above it. If the last row has 10 cans, how many cans are in the display?



# Answer Key

## Pages 7 and 8

- Step #1: c  
Step #2: f  
Step #3: i  
Step #4: m
- Step #1: a  
Step #2: e  
Step #3: j  
Step #4: o
- Step #1: c  
Step #2: g  
Step #3: j  
Step #4: n

## Pages 10–12

- c
- (given)
- h
- j  
1,753 (2nd year)  
 $- 152$  (less 3rd year)  
1,601 (3rd year total)  
  
1,572  
1,753  
 $+ 1,601$   
4,926
- d
- g
- 110–95  
130–95  
116–95
- j  
110 – 95 = 15 cookies leftover  
130 – 95 = 35 fudge leftover  
116 – 95 = 21 peanut butter squares left over
- d
- g
- (given)
- j  
Each day the grasshopper goes  $\frac{1}{8}$  m until the day when the grasshopper is at 1.75 m in the morning. He gets out of the hole that day.  
 $1.75 / (\frac{1}{8}) = 14$  and 14 + 1 more day = 15 days.
- b
- (given)
- h
- i  
 $7 \text{ (days)} \times \$191,781 \text{ (per day)} = \$1,342,467$
- 24,000 kilometers/32 kilometers per gallon = 750 gallons in 1 year  
 $750 \text{ gallons} \times .05 = 37.5 \text{ gallons}$   
You could save 37.5 gallons in 1 year.
- Convert the 5 pounds into ounces by multiplying 5 pounds by 16 ounces (1 pound). Five pounds is 80 ounces. There are 8 families.  $80/8$  is 10.

- Each family gets 10 ounces of cheese.
- 1 billion seconds  $\times 1 \text{ min}/60 \text{ sec} = 16,666,667$  minutes  
 $16,666,667 \text{ minutes} \times 1 \text{ hour}/60 \text{ min} = 277,778$  hours  
 $277,778 \text{ hours} \times 1 \text{ day}/24 \text{ hours} = 11,574$  days  
 $11,574 \text{ days} \times 1 \text{ year}/365 \text{ days} = 32$  years.  
A billion seconds is 32 years old.
  - 1 hour 10 minutes is 70 minutes.  
 $28 \text{ seedlings} \div 40 \text{ min} = .7$  of a seedling per minute  
.7 of a seedling  $\times 70$  minutes = 49 seedlings

## Pages 14–16

- d
- g
- (given)
- l  
 $9:00 \text{ A.M.} - (15 \text{ minutes} + 20 \text{ minutes} + 35 \text{ minutes})$   
 $9:00 \text{ A.M.} - 70 \text{ minutes, or}$   
1 hour 10 minutes = 7:50 A.M.
- c
- h
- (given)
- l  
 $85 \div 2 = 42.5$ , but page numbers go in order; pages 42 and 43
- d
- h
- k
- n
- b
- (given)
- h
- k  
 $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 = 64$  strawberries  
 $64 + 8$  (taken out earlier) = 72 strawberries at the start
- d
- e
- i
- o  
3 trips with 10 cars + 2 trips with 6 trucks  
 $30 \text{ cars} + 12 \text{ trucks} = 42$  vehicles

## Pages 19 and 20

- 540 minutes
- $1,000 - 1,200$  people
- front-end estimation
- compatible numbers
- $\$9,000 - \$11,000$
- a. greater  
b. Henry 240; April 210; Felicia 260  
c. April and Felicia

- 115 and 120
- 730
- $\$1,000 - \$1,200$
- front-end estimation
- 700 (by rounding down)
- $412 + 629 \sim 1000$   
 $325 + 685 \sim 1000$   
 $879 \sim 900$   
estimate: 2,900
- $1,400 - 1,600$
- Colleen 8, Andrea 5
- 13 paved, 8 unpaved

## Pages 22–24

- d
- h
- i
- m
- c
- g
- $(1,000 \times \frac{3}{4}) - 200 = 550$
- j  
 $\frac{3}{4}$  of 1000 is 750 cars in on Tuesday. 750 cars – 200 compact cars = 550 standard-size cars
- d
- f
- (given)
- j  
 $t \text{ (time)} = 1.0 \text{ miles}$   
 $(\text{distance}) \div \frac{1}{5} \text{ mile per min (rate)} = 5 \text{ min}$
- b
- h
- i
- m
- b
- e
- i
- o  
If it costs 77 cents to produce 35 cars, then each car costs:  $77/35 = 2.2$  cents. It costs 2.2 cents to make each car. So  $385 \text{ cars} \times 2.2 \text{ cents}$  for each car = 847 cents, or \$8.47 to produce 385 cars.

## Page 28

- $2 \frac{1}{2}$  cookies each
- \$55.75
- \$14,756.75
- \$148.00
- 16
- 50, 100
- 68
- 225
- \$50
- \$32.50

## Pages 30–32

- First column  $4 = 2 + 2$   
 $2 \times 2 = 4$   
Second column  $5 = 2 + 3$   
 $2 \times 3 = 6$   
  
4 5 9 13 10 15 16 3 7  
2 2 4 7 5 7 7 1 3  
2 3 5 6 5 8 9 2 4  
4 6 20 42 25 56 63 2 12

- 1,2 2,3 3,4 4,5 5,6 6,7 7,8 8,9  
1,3 2,4 3,5 4,6 5,7 6,8 7,9  
1,4 2,5 3,6 4,7 5,8 6,9  
1,5 2,6 3,7 4,8 5,9  
1,6 2,7 3,8 4,9  
1,7 2,8 3,9  
1,8 2,9  
1,9  
 $36 = 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1$

There are 36 children.

- a.  $2 + 4 + 6 + 8 + 10 + 12 + 14 + 16 + 18 + 20 + 22 + 24 = \$156.00$   
b. \$8190.00
- $.01 + .02 + .04 + .08 + .16 + .32 + .64 = \$1.27 > \$1.25$   
Rob should ask for a daily allowance.

- Every 7 days it's another Tuesday. So start by dividing 100 by 7 to get 14 with a remainder of 2. So in 100 days, 14 Tuesdays will go by + 2 extra days, making it Thursday.

6. Renters	Kilowatt Hours
1	2
2	5
3	7
4	10
5	12
6	15
7	17
8	20
9	22
10	25

- 320
- 50 minutes
- August 9th
- Each member in the series is the sum of the two numbers before it.  
The next numbers are 377, 610, 987
- East! It always points east at a quarter past.
- 

15	1	2	12
4	10	9	7
8	6	5	11
3	13	14	0