

6-5 Problem-Solving Investigation: Look for a Pattern - Analyze the Strategy

1. Explain when you would use the *look for a pattern* strategy to solve a problem.

Sample answer: Use this strategy when the change between events is the same.

2. **WRITING IN MATH** Write a problem that can be solved by looking for a pattern. Then write the steps you would take to find the solution.

Sample answer: Suppose the doctor says you need to walk every day after your surgery, starting with 1 block. After every 2 days, increase the amount by 2 blocks. How many blocks would you be walking after 2 weeks? First find the number of 2-day periods in 2 weeks. There are 7 increases. You start with 1 and each increase is 2, so $1 + 7(2) = 1 + 14 = 15$ blocks.

6-5 Problem-Solving Investigation: Look for a Pattern - Mixed Problem Solving

Use the *look for a pattern* strategy.

3. **MONEY** Every year, Miguel receives \$20 for his birthday, plus \$1 for each year of his age. Lauren receives \$10 for her birthday and \$2 for each year of her age. In 2009, Miguel is 10, and Lauren is 8. In what year will they both receive the same amount of money?

Explore: You know that Miguel's birthday money increases by \$1 each year and that Lauren's birthday money increases by \$2 each year. Use the pattern.

Plan: Find the amount that Miguel and Lauren will receive for subsequent years till the two are equal.

Solve:

Year	2009	2010	2011	2012	2013
Miguel	\$30	\$31	\$32	\$33	\$34
Lauren	\$18	\$20	\$22	\$24	\$26

Both Miguel and Lauren will both receive \$34 in birthday money in 2013.

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5. **NUMBER SENSE** Describe the pattern below. Then find the missing number.
3, 6, 10, 15, 21, ■, ■, ■,

Explore: We know there is a pattern in the numbers. We need to describe the pattern and find the missing number.

Plan: Use addition to identify the pattern in the numbers. Then use the pattern to find the missing number.

Solve: $3 + 3 = 6$

$6 + 4 = 10$

$11 + 5 = 15$

$15 + 6 = 21$

$21 + 7 = 28$

$28 + 8 = 36$

$36 + 9 = 45$

Check: Add 3, then increase the number added by 1 for each number; 28, 36, 45

Use any strategy to solve. Some strategies are shown below.

PROBLEM-SOLVING STRATEGIES

- Guess and check.
- Look for a pattern.
- Act it out.

7. **MONEY** The admission for a fair is \$6 for adults, \$4 for children, and \$3 for senior citizens. Twelve people paid a total of \$50 for admission. If 8 children attended, how many adults and senior citizens attended?

Explore: We know that 12 people, 8 of whom were children, paid a total of \$50. We also know that adults pay \$6, children pay \$4, and senior citizens pay \$3. We need to know how many adults and senior citizens attended the health fair.

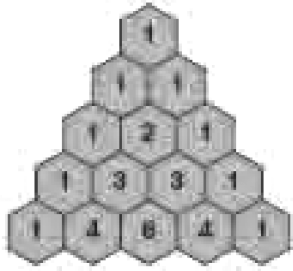
Plan: Subtract the number of children from the number of people to find the total number of adults and senior citizens. Subtract the children's admissions from the total paid to find the total amount paid by adults and senior citizens. Use guess and check to find the number of adults and senior citizens.

Solve: There are a total of $12 - 8$ or 4 adults and senior citizens. The children's admissions total 8×4 or \$32, so the adults and senior citizens together paid $50 - 32$ or \$18. Guess 2 adults and 2 senior citizens. Check: $2 + 2 = 4$ people and $2 \times 6 + 2 \times 3 = \18 .

Check: There are 2 adults, 8 children, and 2 senior citizens, and $2 \times 6 + 8 \times 4 + 2 \times 3 = \50 .

Name: School: Grade: Class:

9. **NUMBER THEORY** The triangle below is known as Pascal's Triangle. If the pattern continues, what will the numbers in the next row be from left to right?

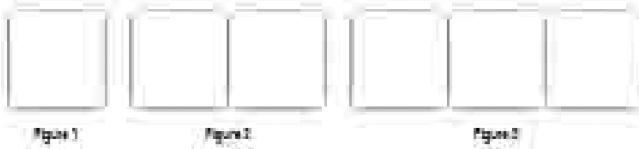


Explore: You know that the first number and last number is 1. We need to find the next row of numbers.

Plan: Use addition to find the pattern.

Solve: $4 + 1 = 5$, $4 + 6 = 10$, $6 + 4 = 10$, and $4 + 1 = 5$.

11. **PATTERNS** Find the number of toothpicks needed to create figure 8 in the pattern below.



To create figure 1; 4 toothpicks were needed. To create figure 2; 7 toothpicks were needed. To create figure 3; 10 toothpicks were needed. The pattern is to add 3.

4; 13

5; 16

6; 19

7; 22

8; 25

13. **TRAVEL** Mr. Ishikawa left Kansas City, Missouri, at 3:00 P.M. and arrived in Tulsa, Oklahoma, at 8:00 P.M., driving a distance of approximately 240 miles. During his trip, he took a one-hour dinner break. What was Mr. Ishikawa's average speed?

Divide; You need to divide the distance he drove by the hours he drove to find the average speed. He drove 4 hours since he took a one-hour dinner break. $240 \text{ mph} \div 4 \text{ h} = 60 \text{ mph}$