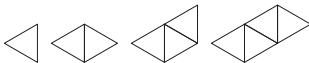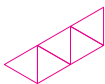## page 1

1-1 Additional Problems
Patterns and Expressions

Problem 1

Describe the pattern. What would the next figure in the pattern look like?

Answers may vary. Sample: Each figure has one more equilateral triangle. The next figure will have 5 triangles, arranged like this:

Problem 2

These figures are made with toothpicks.

a. How many toothpicks are in the 20th figure? Use a table of values with a process column to justify your answer.

b. What expression describes the number of toothpicks in the nth figure?
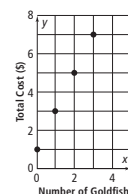
100; 5n

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1-1 Additional Problems (continued)
Patterns and Expressions

Problem 3

You buy a bag of fish food and some goldfish. The graph shows the total cost depending on how many goldfish you buy.

What is your total cost if you buy the food plus 9 goldfish? Use a table to find the answer. **$19**

page 3

1-2 Additional Problems
Properties of Real Numbers

Problem 1

Bankers and investors use "The rule of 72," which is modeled by $y = \frac{72}{x}$, where x is the percent interest rate and y is the years it takes an investment to double. Which set of numbers best describes the number of years y it takes for an investment to double when x is a natural number? **Rational numbers**

Problem 2

What is the graph of the numbers $-\frac{5}{3}$, $-\sqrt{8}$, and $-2.\overline{3}$?

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1-2 Additional Problems (continued)
Properties of Real Numbers

Problem 3

How do $\sqrt{85}$ and 8.9 compare? Use $>$ or $<$. **$\sqrt{85} > 8.9$**

Problem 4

What property is illustrated by each of the following equations?

a. $xyz = xzy$
b. $(fg)h = f(gh)$
c. $(p + q)r = (q + p)r$
d. $(5 + y)x = x(5 + y)$
e. $8 + 0 = 0 + 8$
f. $v + 0 + w = v + w$

'a,' and 'd' show the Commutative Property of Multiplication; 'b' shows the Associative Property of Multiplication; 'c' and 'e' show the Commutative Property of Addition; 'f' shows the Identity Property of Addition.

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1-3 Additional Problems
Algebraic Expressions

Problem 1

Which algebraic expression models the word phrase *one less than the product of six and w*? **C**

A. $1 - 6 \cdot w$ **C.** $6 \cdot w - 1$

B. $w \cdot 1 - 6$ **D.** $1 \cdot 6 - w$

Problem 2

You are on a bicycle trip. You traveled 52 miles the first day. Since then, your average rate has been 12 miles per hour. What algebraic expression models the distance you traveled so far?
$52 + 12h$; h represents the number of hours since the first day.

Problem 3

What is the value of the expression for the given values of the variables?

a. $2r + 5(s + 6) - 1$ for $r = 3$ and $s = -9$

b. $c^3 - \frac{d}{8}$ for $c = \frac{1}{4}$ and $d = 1$

a. **−10**

b. **$-\frac{7}{64}$**

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1-3 Additional Problems (continued)
Algebraic Expressions

Problem 4

Ticket prices for admission to a museum are $8 for adults, $5 for children, and $6 for seniors.

a. What algebraic expression models the total number of dollars collected in ticket sales?

b. If 20 adult tickets, 16 children's tickets, and 10 senior tickets are sold one morning, how much money is collected in all?

a. **The expression $8a + 5c + 6s$ models the total number of dollars collected; a is the number of adult tickets; c is the number of children's tickets; and s is the number of senior tickets.**

b. **The total amount collected is $300.**

Problem 5

What is the simplified form of each expression?

a. $2a^2 + 3b^2 + 6b^2 + 5a^2$

b. $-(x + 4y) + 5(3x - y)$

a. **$7a^2 + 9b^2$**

b. **$14x - 9y$**

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1-4 Additional Problems
Solving Equations

Problem 1

What is the solution of $x - 8 = -10$?   **$x = -2$**

Problem 2

What does y equal in $-2(y - 1) = -16 + y$?   **$y = 6$**

Problem 3

The map shows distances between towns in miles. You and your friend drive together from Newtown to Essex. You drive first, for a total of 40 miles. Then your friend drives 1.5 hours, reaching Essex. What is your friend's average rate? **58 miles per hour**

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1-4 Additional Problems (continued)
Solving Equations

Problem 4

Is the equation *sometimes*, *always*, or *never* true?

a. $1 + 5x - 6 = 6x - 5 - x$

b. $-x + 2(5x - 1) = 2(3x + 4) + x$

a. **always true**

b. **sometimes true**

Problem 5

If $1000 is in a bank account earning 5% simple interest, the dollar value of the account A in t years is given by $A = 1000(1 + 0.05t)$. What is t in terms of A?

$t = \frac{1}{50} A - 20$

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1-5 **Additional Problems**
Solving Inequalities

Problem 1

What inequality represents the sentence, "The product of 7 and a number is no more than 50?" **$7n \leq 50$**

Problem 2

What is the solution of $4(x - 7) > -20$? Graph the solution.
$x > 2$

Problem 3

Plumber A charges $75 for a service charge and $40 per hour. Plumber B charges $50 per hour but no service charge. How many hours must a plumbing job last for Plumber A to cost less than Plumber B? **greater than 7.5 hours**

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1-5 **Additional Problems** (continued)
Solving Inequalities

Problem 4

Is the inequality *sometimes*, *always*, or *never* true?

a. $3(x + 3) \geq 3(2 + x)$

b. $9 - x - 5 < -x + 4$

a. **always true**
b. **never true**

Problem 5

What is the solution of $\frac{a}{2} < 3$ and $-3a + 5 < 8$? Graph the solution.

$a < 6$ and $a > -1$

Problem 6

What is the solution of $5 - 2m \geq 21$ or $4m - 1 \geq -21$? Graph the solution.
$m \leq -8$ or $m \geq -5$

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1-6 **Additional Problems**
Absolute Value Equations and Inequalities

Problem 1

What is the solution of $|2x + 5| = 9$? Graph the solution.

$-7, 2$

Problem 2

What is the solution of $\frac{1}{3}|3x - 6| - 2 = 5$? **$-5, 9$**

Problem 3

What is the solution of $|-2x + 9| = 3x + 10$? **$-\frac{1}{5}$**

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1-6 **Additional Problems** (continued)
Absolute Value Equations and Inequalities

Problem 4

What is the solution of $|4x + 3| < 5$? Graph the solution.

Problem 5

What is the solution of $|2x + 6| \geq 10$? Graph the solution.

Problem 6

You are cutting pieces of wood to make a table. Each piece should be 4.75 ft, but you will use a piece if it is greater than 4.7 ft and less than 4.8 ft. What absolute value inequality describes the tolerance of the length of wood?
$|x - 4.75| < 0.05$