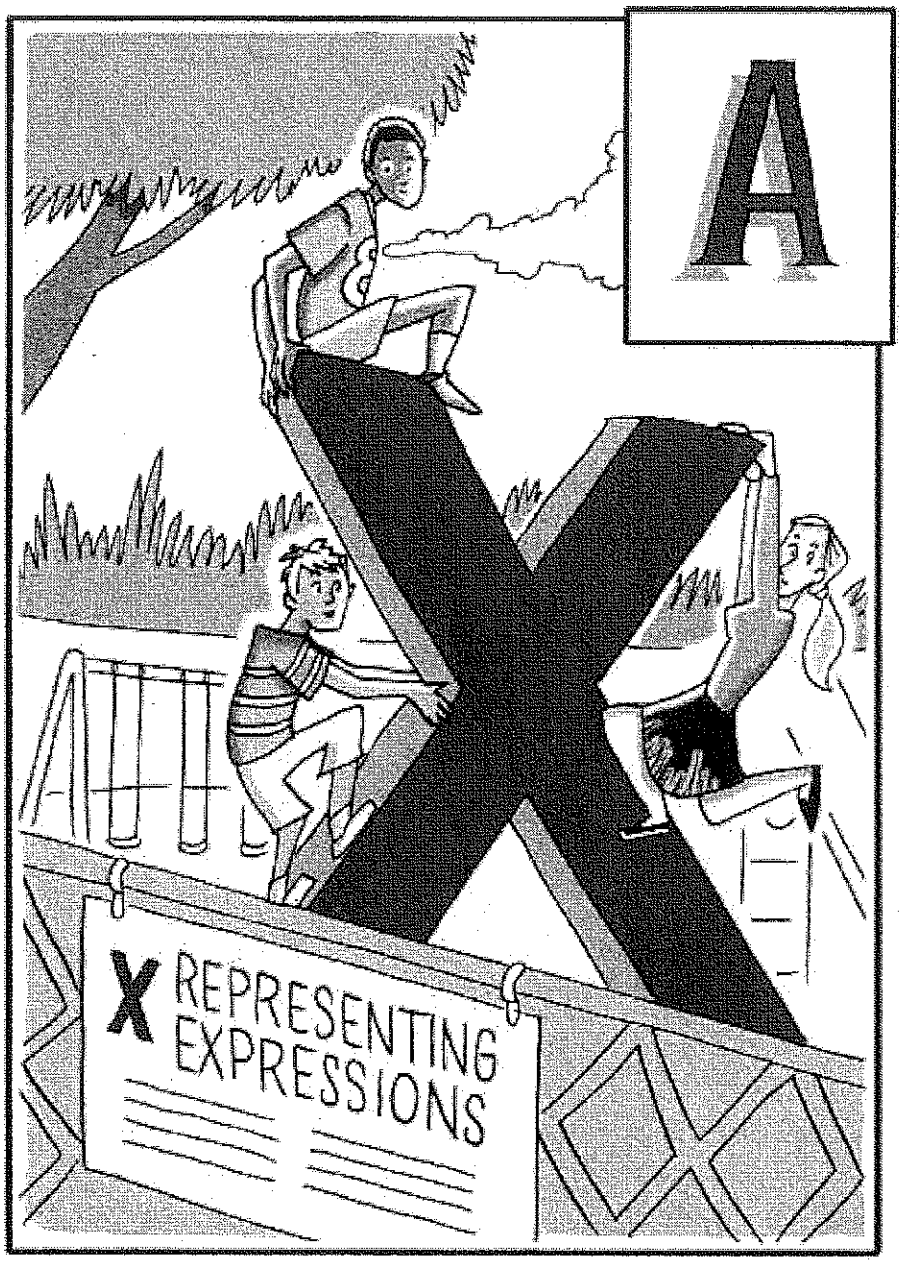

A
X REPRESENTING EXPRESSIONS

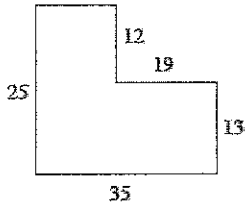
Review & Preview

A-6. Suppose you put one of your x-tiles and two unit tiles with another pile of three x-tiles and five unit tiles. What is in this new pile? Write it as a sum.

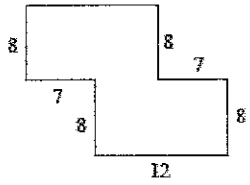
A-7. Suppose one person in your team has two x^2-tiles, three x-tiles, and one unit tile on his desk and another person has one x^2-tile, five x-tiles, and eight unit tiles on her desk. You decide to put all of the tiles together on one desk. What could you call this new group of tiles? Write it as a sum.

A-8. Copy the following figures onto your paper. Then find the area and perimeter of each shape, assuming that all corners are right angles. Be sure to show all of your work.

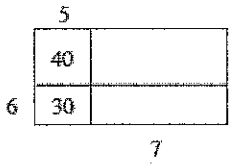
a.



b.



A-9. Consider the rectangle at right.



a. Find the perimeter of the large outer rectangle shown at right.

b. Notice that the areas of two of the parts have been labeled inside the rectangle. Find the total area. Remember to show all work leading to your solution.

A-10. The word "evaluate" has many different meanings. In algebra, when you are asked to **evaluate** an expression for a specified value of the variable(s), you are being asked to find the value of the expression. You do this by replacing a variable with a number and calculating the result. For example, if you are asked to evaluate the expression $4x-2$ when $x=-7$, you would put -7 in place of the variable and then calculate: $4\cdot(-7)-2=-30$.

Evaluate the expressions below for the given values of x and y.

a. $\frac{6}{x}+9$ if $x=3$

b. $8x-3+y$ if $x=2$ and $y=1$

c. $2xy$ if $x=5$ and $y=-3$

d. $2x^2-y$ if $x=3$ and $y=8$

A-11. Simplify each expression.

a. $-\frac{1}{2}+\frac{3}{4}$ b. $-\frac{1}{3}-\frac{1}{6}$ c. $-\frac{2}{3}\cdot 12$ d. $-4\div-\frac{1}{2}$

Review & Preview

A-17. Simplify each algebraic expression below, if possible. If it is not possible to simplify the expression, explain why not.

a. $3y+2y+y^2+5+y$

b. $3y^2+2xy+1+3x+y+2x^2$

c. $3xy+5x+2+3y+x+4$

d. $4m+2mn+m^2+m+3m^2$

A-18. Remember that one meaning of the word "evaluate" is to replace a variable with a number and to calculate the result. For example, evaluating the expression x^2 when $x=-2$ gives the solution $(-2)^2=4$.

Evaluate the expressions below for the given values.

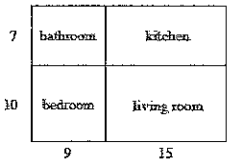
a. $-4d+3$ if $d=-1$

b. $k-m$ if $k=4$ and $m=-10$

c. $\frac{t}{w}$ if $t=6$ and $w=-3$

d. x^2+y^2 if $x=7$ and $y=5$

A-19. The diagram at right is the floor plan of Randy's apartment. Use the diagram to answer the following questions, assuming all measurements are in feet.

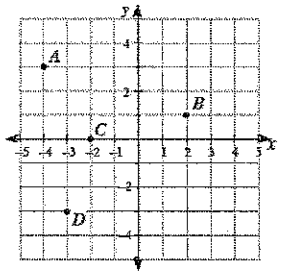


a. What are the dimensions (length and width) of Randy's living room?

b. Randy's friends are coming to visit him soon. He plans to keep them out of his bedroom. Find the area of each of the other three rooms he will have to clean.

c. What is the total area of the rooms he will have to clean?

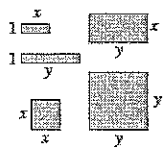
A-20. Examine the graph at right. Then complete parts (a) and (b) below.

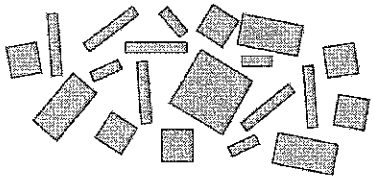


a. In (x, y) form, name the coordinates of points A, B, C, and D.

b. On graph paper, draw a set of axes like the ones shown at right. Then plot points $E(5, 2)$, $F(-3, -1)$, $G(0, -4)$, and $H(2, -3)$.

A-21. If algebra tiles have the dimensions shown at right, what would you call the tile collection below? (What is the total area of all of the pieces?) Write the expression algebraically, using x, x^2, y, y^2, and xy.





A-22. Without using a calculator, compute the value of each expression below.

a. $-14+(-31)$

b. $-(-8)-(-2)$

c. $\frac{-16}{-8}$

d. $-11 \cdot 24$

e. $\frac{1}{2}-\frac{3}{4}$

f. $46 \div (-23)$

Review & Preview

A-30. Copy and simplify the following expressions by combining like terms. Using or drawing sketches of algebra tiles may be helpful.

a. $2x+3x+3+4x^2+10+x$

b. $4x+4y^2+y^2+9+10+x+3x$

c. $2x^2+30+3x^2+4x^2+14+x$

d. $20+5xy+4y^2+10+y^2+xy$

A-31. Plot the points $A(5, 3)$, $B(-4, 3)$, $C(-4, -6)$, and $D(5, -6)$ on a set of axes. Use a ruler to connect them in order, including D back to A, to form a **quadrilateral** (a shape with four sides).

a. What kind of quadrilateral was formed?

b. How long is each side of the quadrilateral?

c. What is the area of the quadrilateral?

d. What is the perimeter of the quadrilateral?

A-32. Write an equation to solve the following problem. Write your answer with a complete sentence.

Susan is buying three different colors of tiles for her kitchen floor. She is buying 107 red tiles, and three times as many navy-blue tiles as beige tiles. If Susan buys 435 tiles altogether, how many tiles of each color does she buy?

Let b = the number of beige tiles. Your equation should start with "435 =" and use b as the only variable.

A-33. Without using a calculator, compute the value of each expression below.

a. $-3+6$

b. $(-2)(-9)$

c. $-4-9-11$

d. $-12-18$

e. $\frac{3}{4}(-8)$

f. $(-2)(-2)(2)$

g. $7+(-19)$

h. $-15\div 15$

A-34. Solve each proportion.

a. $\frac{6}{8}=\frac{30}{m}$

b. $\frac{3}{5}=\frac{x}{9}$

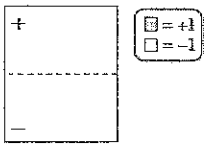
c. $\frac{20}{30}=\frac{y}{9}$

d. $\frac{x}{3}=9$

Review & Preview

A-42. Bob, Kris, Janelle, and Pat are in a study team. Bob, Kris, and Janelle have algebra tiles on their desks. Bob has two x^2-tiles, four x-tiles, and seven unit tiles; Kris has one x^2-tile and five unit tiles; and Janelle has ten x-tiles and three unit tiles. Pat's desk is empty. The team decides to put all of the tiles from the three desks onto Pat's desk. Write an algebraic expression for the new collection of tiles on Pat's desk.

A-43. Can zero be represented by any number of tiles? Using only the unit tiles (only the 1 and –1 tiles), determine if you can represent zero on an Expression Mat with the number of tiles below. If you can, draw an Expression Mat demonstrating that it is possible. If it is not possible, explain why not.



a. 2 tiles b. 6 tiles c. 3 tiles

A-44. Read the Math Notes box for this lesson. Then evaluate each equation below.

a. For $y = 2 + 3x$ when $x = 4$, what does y equal?

b. For $a = 4 - 5c$ when $c = -\frac{1}{2}$, what does a equal?

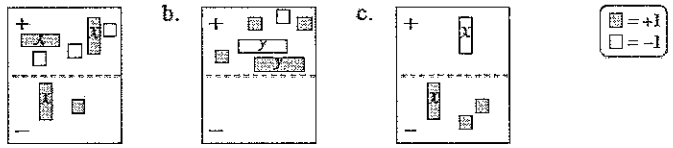
c. For $n = 3d^2 - 1$ when $d = -5$, what does n equal?

d. For $v = -4(r - 2)$ when $r = -1$, what does v equal?

e. For $3 + k = t$ when $t = 14$, what does k equal?

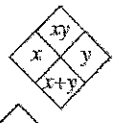
A-45. Write and simplify the algebraic expression shown in each Expression Mat below.

a. b. c.

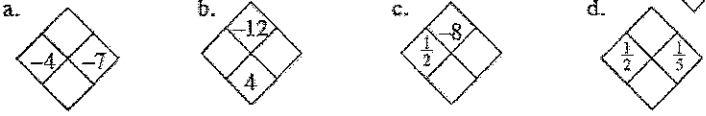


A-46. Write an expression that represents the perimeter of the shape built with algebra tiles at right.

A-47. Copy and complete each of the Diamond Problems below. The pattern used in the Diamond Problems is shown at right.



a. b. c. d.



Review & Preview

A-53. Simplify the following expressions by combining like terms, if possible.

a. $x+x-3+4x^2+2x-x$

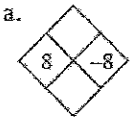
b. $8x^2+3x-13x^2+10x^2-25x-x$

c. $4x+3y$

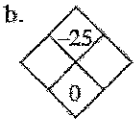
d. $20+3xy-3+4y^2+10-2y^2$

A-54. Copy and complete each of the Diamond Problems below. The pattern used in the Diamond Problems is shown at right.

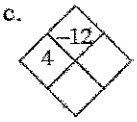
a.



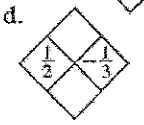
b.



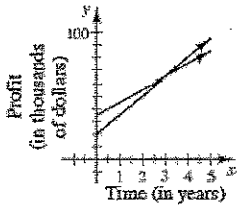
c.



d.



A-55. The two lines at right represent the growing profits of Companies A and B.



a. Sketch this graph on your paper. If Company A started out with more profit than Company B, determine which line represents A and which represents B. Label the lines appropriately.

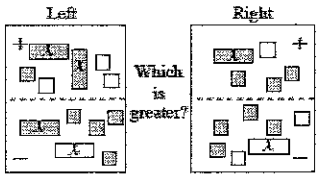
b. In how many years will both companies have the same profit?

c. Approximately what will that profit be?

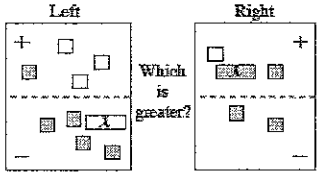
d. Which company's profits are growing more quickly? How can you tell?

A-56. Use legal simplification moves to determine which side of the Expressions Comparison Mat is greater.

a.



b.



A-57. Evaluate each expression to find y.

a. $y=2+4.3x$ when $x=-6$

b. $y=(x-3)^2$ when $x=9$

c. $y=x-2$ when $x=3.5$

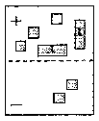
d. $y=5x-4$ when $x=-2$

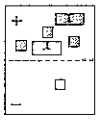
A-58. Sam read 75 pages of a new mystery novel in 2 hours. If the book contains 350 pages and he always reads at the same rate, how long will it take him to the read the entire novel?

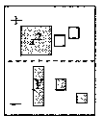
Review & Preview

A-61. Find a simplified algebraic expression for each Expression Mat below.

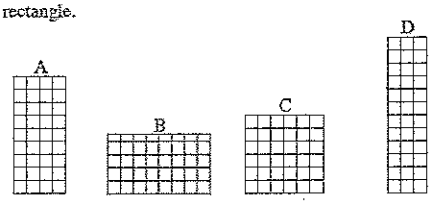
□ = +1
□ = –1

a. 

b. 

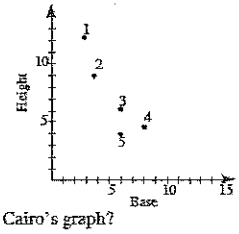
c. 

A-62. Cairo wants to create a graph representing the heights and bases of all rectangles that have an area of 36 square units. He started by drawing the rectangles A, B, C, and D below. Examine the dimensions (length and width) of each rectangle.



a. Copy the graph at right onto graph paper. Then match the letter of each rectangle above with a point on the graph. Which point is not matched?

b. What are the base, height, and area for the unmatched point?



c. Why should the unmatched point not be on Cairo's graph?

d. Find the dimensions of three more rectangles that have areas of 36 square units. At least one of your examples should have dimensions that are not integers. Place a new point on the graph for each new rectangle you find.

e. Connect all of the points representing an area of 36 square units. Describe the resulting graph.

A-63. Without using a calculator, compute the value of each expression below.

a. $7-2\cdot(-5)$

b. $6\div 3(7-3\cdot 2)^2$

c. $5\cdot(-3)^2$

d. $35\div(16-3^2)\cdot 2$

e. $-3\cdot 4+5\cdot(-2)$

f. $7-6(10-4\cdot 2)\div 4$

A-64. One of Teddy's jobs at home is to pump gas for his family's sedan and truck. When he fills the truck up with 12 gallons of gas, he notices that it costs him $39.48.

a. How much does one gallon of gas cost? Explain how you found your answer.

b. How much will it cost him to fill up the sedan if it needs 15 gallons of gas? Show your work.

c. When Teddy filled up the tank on his moped, it cost $13.16. How much gas did his moped need? Explain how you know.

A-65. Draw a circle on your paper and lightly shade in three-fourths of the circle.

a. Divide the entire circle into eight equal parts. How many parts are shaded?

b. Using fractions, write and solve a related division problem.

A-66. If $f(x)=2x+3$, evaluate each expression below.

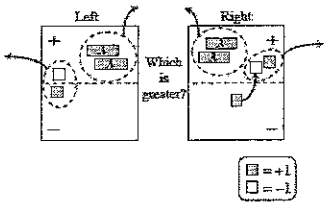
a. $f(-5)$ b. $f(-\frac{1}{2})$ c. $f(4)$ d. $f(-2)$

Review & Preview

A-71. Solve this problem by writing an equation. Write your answer with a complete sentence. Let x = the number of adults. Your equation should start with "1220 =" and use x as the only variable.

The number of students attending the fall play was 150 more than the number of adults attending. A total of 1220 people attended the play. How many students attended the play?

A-72. Sylvia simplified the expressions on the Expression Comparison Mat shown at right. Some of her work is shown. Are all of her moves "legal"? Explain.



A-73. Examine the tile pattern at right.

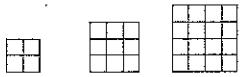


Figure 1 Figure 2 Figure 3

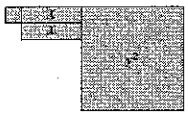
a. On graph paper, draw Figures 4 and 5.

b. What would Figure 10 look like?
How many tiles would it have on each side?
What about Figure 100?

c. Cami has a different tile pattern. She decided to represent the number of tiles of her pattern in a table, as shown below. Can you use the table to predict how many tiles would be in Figure 5 of her tile pattern? How many tiles would Figure 8 have? Explain how you know.

Figure Number	1	2	3	4
Number of Tiles	5	9	13	17

A-74. Examine the shape made with algebra tiles at right.



a. Write an expression that represents the perimeter of the shape. Then evaluate your expression for $x = 6$ and $y = 10$ units.

b. Write an expression that represents the area of the shape. What is the area if $x = 6$ and $y = 10$ units?

A-75. CALCULATOR CHECK

Use your scientific calculator to compute the value of each expression in the left-hand column below. Match each result to an answer in the right-hand column.

a.	$-3+16-(-5)$	1.	−16
b.	$(3-5)(6+2)$	2.	327
c.	$17(-23)+2$	3.	0.5
d.	$5-(3-17)(-2+25)$	4.	18
e.	$(-4)(-2.25)(-10)$	5.	−90
f.	$-1.5-2.25-(-4.5)$	6.	0.75
g.	$\frac{4-5}{-2}$	7.	−389

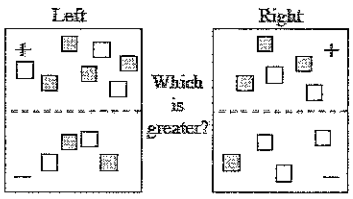
A-76. Alicia used 4 gallons of gasoline to travel 90 miles. At the same rate, how far can she travel on a full tank that holds 18 gallons?

Review & Preview

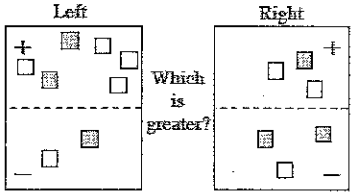
A-82. WHICH IS GREATER?

For each Expression Comparison Mat below, simplify and determine which side is greater.

a.



b.



A-83. Solve this problem by writing an equation using only one variable. Then write your answer with a complete sentence.

Mairé is thinking of two numbers. The first number is 14 less than the second number. When she adds them, she gets 40. Help her younger sister, Enya, figure out the numbers.

A-84. Simplify each expression below as much as possible.

a. $3y - y + 5x + 3 - 7x$

b. $-1 - (-5x) - 2x + 2x^2 + 7$

c. $6x + 2 - 1 - 4x - 3 - 2x + 2$

d. $\frac{2}{3}x - 3y + \frac{1}{3}x + 2y$

A-85. Plot the points (0, 0), (3, 2), and (6, 4) on graph paper. Then draw a line through the points. Name the coordinates of three more points on the same line.

A-86. Mr. Dexter's teams earned the following scores on a quiz: 15, 20, 19, 20, 16, 20, 14, 18, and 17.

a. What is the mean (average score)?

b. What is the median (middle score)?

A-87. Simplify each expression.

a. $-\frac{2}{3} + \frac{4}{5}$

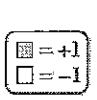
b. $2 - \frac{5}{8}$

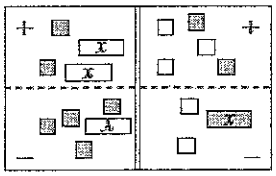
c. $-\frac{3}{5} \cdot 10$

d. $\frac{2}{3} \div -2$

Review & Preview

A-92. Translate the Equation Mat at right into an equation. Remember that the double line represents "equals."





A-93. Ling wants to save $87 for tickets to a rock concert. If she has $23 now and will save $4 per week, how long will it take her to get enough money to buy the tickets?

A-94. On graph paper, plot the points (0, 0), (–2, 1), and (2, –1). Then draw a line through them. Name the coordinates of three more points on the same line that have integer coordinates.

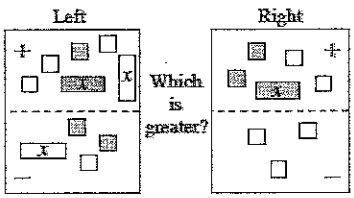
A-95. Solve each equation and then show the check to prove that your answer is correct.

a. $2-4x=8-x$

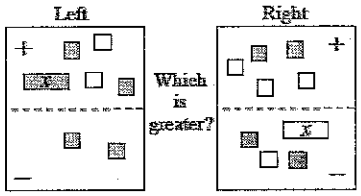
b. $x+4-3x=4-(x-1)$

A-96. Use legal simplification moves to determine which side of the Expression Comparison Mat is greater.

a.



b.



A-97. Evaluate the expressions below for the given values.

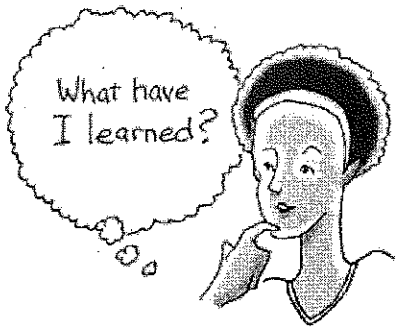
a. $6m+2n^2$ for $m=7$ and $n=3$

b. $\frac{5x}{3}-2$ for $x=-18$

c. $(6x)^2-\frac{x}{5}$ for $x=10$

d. $(k-3)(k+2)$ for $k=1$

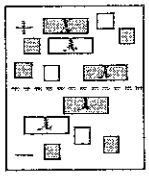
④ WHAT HAVE I LEARNED?



Most of the problems in this section represent typical problems found in this chapter. They serve as a gauge for you. You can use them to determine which types of problems you can do well and which types of problems require further study and practice. Even if your teacher does not assign this section, it is a good idea to try these problems and find out for yourself what you know and what you still need to work on.

Solve each problem as completely as you can. The table at the end of the closure section has answers to these problems. It also tells you where you can find additional help and practice with problems like these.

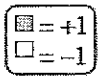
CL A-98. Examine the Expression Mat at right.



a. Copy the Expression Mat onto your paper.

b. Write an expression for the tiles as they appear.

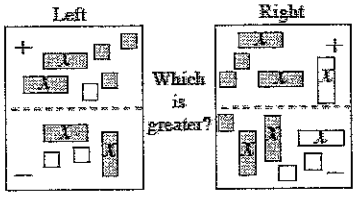
c. On your drawing, circle all of the zeros that you can find to simplify the expression.



d. Write the completely simplified expression.

CL A-99. Zeke ran 4 miles in 45 minutes. If he keeps up the same pace, how long will it take him to run 10 miles? Explain your method or reasoning.

CL A-100. Write expressions for each side of the Expression Comparison Mat. Use "legal" moves to simplify and determine which is greater.



CL A-101. Solve the following problem by writing an equation using only one variable. Write your answer with a complete sentence.

Ralph and Alphonse are shooting marbles. Ralph has five more marbles than Alphonse, and they have a total of 73 marbles. How many marbles does each of them have?

CL A-102. Simplify each expression with or without algebra tiles. Record your steps.

a. $3+7x-(2+9x)$ b. $6-(3x-4)+7x-11$

CL A-103. Copy the pattern below onto graph paper. Draw Figures 1 and 5 on your paper.

a. How many tiles are in each figure?

b. How is the pattern changing?

c. How many tiles would Figure 6 have?

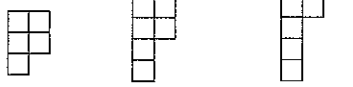
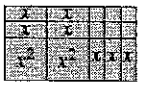


Figure 2 Figure 3 Figure 4

CL A-104. Find the area and perimeter of the figure at right.



CL A-105. Evaluate $6x-(3y+7)-xy$ when $x=5$ and $y=3$.

CL A-106. Simplify the expression below by combining like terms:

$$3x^2+10-y^2+4x-8x^2-5y-8+y^2+3$$

CL A-107. Solve this equation to find x and then show the check:

$$2-(3x-4)=2x-9$$

CL A-108. Check your answers using the table at the end of the closure section. Which problems do you feel confident about? Which problems were hard? Use the table to make a list of topics you need help on and a list of topics you need to practice more.