Chapter 4 Closure  What have I learned?
Reflection and Synthesis

WHAT HAVE I LEARNED?

CL 4-72. Examine the pattern below, and then complete parts (a) through (f) that follow.

A. Sketch Figure 0 and Figure 4 on the grid below.

B. Make a table showing Figure 0 through Figure 4.

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>5</td>
<td>11</td>
<td>17</td>
<td>23</td>
<td>29</td>
</tr>
</tbody>
</table>

C. Write a rule to represent the pattern.

Rule:  \( y = 6x + 5 \)

D. Create a graph of the pattern on the grid to the right.

E. What is the growth for the pattern?

growth is 6

F. Predict how many tiles Figure 100 will have.

\[ y = 6(100) + 5 \]
\[ y = 600 + 5 \]
\[ y = 605 \]

Figure 100 has 605 tiles.
CL 4-73. Are the two expressions below equal? Show how you know.

\[ 4x^2 + (2x - 5) - 3x \quad \text{and} \quad 6x^2 - x + 3 - 2x^2 - 8 \]
\[ 4x^2 - x - 5 \]

They are equal because they are the same after I combine like terms.

CL 4-74. Examine the graph at right.

A. Give two ways you can tell that the rule \( y = 2x - 3 \) does not match the graph.

The growth for the graph is not 2.

The y-intercept (Fig 0) is not at -3 for the graph.

B. Make a graph that matches the rule \( y = 2x - 3 \).

C. Find a rule that represents the graph at right.

\[ y = -2x + 3 \]

CL 4-75. Consider the rule \( y = 5x + 7 \).

A. How many tiles are in Figure 0?

There are 7 tiles in Fig. 0.

B. Which figure has 37 tiles?

\[ 37 = 5x + 7 \quad \rightarrow \quad 30 = 5x \quad \rightarrow \quad \frac{30}{5} = x \]

Figure 6 has 37 tiles.

C. In the equation \( y = mx + b \), what do the letters \( m \) and \( b \) represent?

\( m \) represents growth.

\( b \) represents the # of tiles in Fig. 0.
**CL 4-76.** Molly read 75 pages of the latest thriller mystery novel in 45 minutes. What is her unit rate? At the same rate, how long will it take her to read the entire 425-page novel?

\[
\frac{\text{pages}}{\text{min}} = \frac{75}{45} = 1\frac{1}{3} \text{ pages per min.}
\]

\[
\frac{75x}{45} = \frac{425}{x}
\]

\[
\frac{75x = 19125}{75} \rightarrow x = 255 \text{ min.}
\]

**CL 4-77.** Solve this equation to find \( x \): \( 2 - (3x - 4) = 2x - 9 \).

\[
\begin{align*}
2 - 3x + 4 & = 2x - 9 \\
6 - 3x & = 2x - 9 \\
-2x & = -15 \\
x & = 3
\end{align*}
\]

**CL 4-78.** Simplify the following expressions, if possible.

**A.** \( \frac{3x + 4y - 3 + 3x^2 - 2x}{3x^2 + 3x -3} \)

\[
3x^2 + 3x -3
\]

**B.** \( \frac{2x^2 - 4y^2 - 6y - 9}{x - 3x} \)

\[
-2y^2 + 4x - 9
\]

**C.** \( x^2 + 10y - 2y^2 + 4x -14 \)

\[
\text{is already simplified}
\]

**D.** \( \frac{20 + (3x + x + y + 10) - y^2}{10 - y^2} \)

\[
-xy + 30
\]

Evaluate the expressions in parts (A) and (B) above when \( x = 5 \) and \( y = -2 \).

**A.** \[
\begin{align*}
3(5)^2 + 3(5) - 3 & \\
3(25) + 3(5) - 3 & \\
75 + 3(5) - 3 & \\
75 + 15 - 3 & \\
90 - 3 & \boxed{87}
\end{align*}
\]

**B.** \[
\begin{align*}
-2(-2)^2 + 4(5) - 9 & \\
-2(4) + 4(5) - 9 & \\
-8 + 4(5) - 9 & \\
-8 + 20 - 9 & \\
12 - 9 & \boxed{3}
\end{align*}
\]
CL 4-79. Complete the table for the linear pattern below.

<table>
<thead>
<tr>
<th>IN (x)</th>
<th>-4</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT (y)</td>
<td>-22</td>
<td>-17</td>
<td>-12</td>
<td>-7</td>
<td>-2</td>
<td>3</td>
<td>8</td>
<td>13</td>
<td>18</td>
</tr>
</tbody>
</table>

A. What is the y-intercept (where the line crosses the y-axis, also called Figure 0)? What is the growth factor?

Y-int.: \(-2\)  
Growth: \(5\)

B. Find the rule for this line.

Rule: \(5x - 2\)

C. If the output number \((y)\) is \(-52\), what was the input number \((x)\)?

\[
\begin{align*}
-52 &= 5x - 2 \\
+2 &= +2 \\
-50 &= 5x \\
\frac{-50}{5} &= \frac{5x}{5} \\
-10 &= x
\end{align*}
\]

CL 4-80. For the problem below, define a variable, write an equation, and solve it.

For the school play, the advance tickets cost $3, while tickets at the door cost $5. Thirty more tickets were sold at door than in advance, and $2630 was collected. How many of each kind of ticket were sold? Write your answer in a sentence.

\[
\begin{align*}
\text{Advanced} &= 3x \\
\text{Door} &= 5(x + 30) \\
3x + 5(x + 30) &= 2630 \\
3x + 5x + 150 &= 2630 \\
8x + 150 &= 2630 \\
-150 &= -150 \\
8x &= 2480 \\
\frac{8x}{8} &= \frac{2480}{8} \\
x &= 310
\end{align*}
\]

Advanced = 310 tickets  
Door = 340 tickets.

Additional Closure Problem: Find the area of the shaded region.

The area of the rectangle is \(12 \times 8\)

\[
A_{\text{rec.}} = 12 \times 8 = 96 \text{ ft}^2
\]

Area of circle: \(\pi (r)^2\)

\[
A_{\text{area of cir.}} = \pi (4) = 12.566 \text{ ft}^2
\]

\[
96 - 12.566 = 83.434 \text{ ft}^2
\]

The shaded area is 83.434 ft\(^2\).