

Unit 7 Linear Relations

7.1 Representing Patterns

Ex.



Figure 1

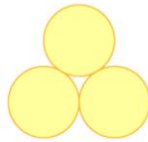


Figure 2

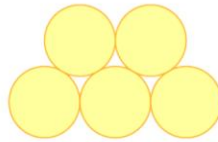


Figure 3

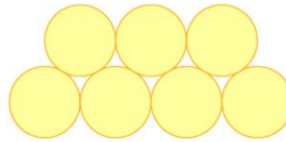


Figure 4

a) Describe the pattern.

Start with 1 circle, then add 2 circles to each consecutive figure

b) Create a table of values to represent the relation between the figure number (n) and the number of circles (c). Is this a linear relation?

Figure # n	# circles c
1	1 ✓
2	3 ✓
3	5 ✓
4	7 ✓

Yes it is linear because each variable is changing by a constant amount

c) Write a linear equation to represent the pattern.

$$C = 2n - 1$$

 $\frac{2}{1}$

d) How many circles are there in figure #15?

$$C = 2(15) - 1$$

$$= 29 \text{ circles}$$

e) Which figure number has 61 circles?

$$61 = 2n - 1$$

$$\frac{62}{2} = \frac{2n}{2}$$

$$31 = n$$

Figure #31

Ex. In a banquet hall a single rectangular table seats six people (two on each side and one at each end). Each time a new table is added on to the end, four more people can be seated.

- a) Create a table of values showing the relation between the number of tables (t) and the number of people (p) for 1 to 4 tables.



# tables t	# people p
1	6
2	10
3	14
4	18

Handwritten notes: A circled '+1' is next to the first column, and a circled '+4' is next to the second column, indicating the constant increase in people per additional table.

- b) Write a linear relation to model the situation.

Handwritten work for the linear relation:

$$P = 4t + 2$$

Additional notes: $\frac{4}{1} = 4$, $P = 4t + \underline{\quad}$, $6 = 4(1) + 2$ (with 2 circled).

- c) How many people can 13 connected tables seat?

$t = 13$

$$\begin{aligned}
 P &= 4(13) + 2 \\
 &= 52 + 2 \\
 &= \boxed{54 \text{ people}}
 \end{aligned}$$

- d) How many tables are connected to allow seating for 114 people?

$p = 114$

$$114 = 4t + 2$$

$$\frac{112}{4} = \frac{4t}{4}$$

$$28 = t$$

$$\boxed{28 \text{ tables}}$$