

## Unit 6 Linear Relations

### 6.1 Representing Patterns

Ex.

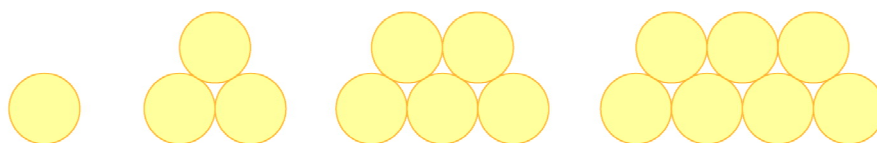


Figure 1

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 #<br>n | # circles<br>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?

$$\hookrightarrow n = 15$$

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

$$= 29 \text{ circles}$$

e) Which figure number has 61 circles?

$$\hookrightarrow C = 61$$

$$61 = 2n - 1$$

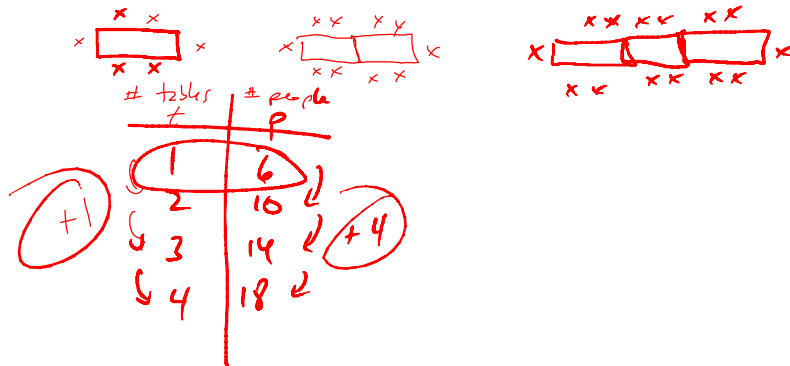
$$\frac{62}{2} = \frac{2n}{2}$$

$$31 = n$$

$$\text{Figure \# 31}$$

**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.



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

Handwritten work for finding the linear relation:

$$\frac{4}{1} = 4$$

$$p = 4t + \underline{\quad}$$

$$6 = 4(1) + 2$$

The final linear relation is boxed:

$$p = 4t + 2$$

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

Handwritten work for finding the number of people:

$$t = 13$$

Handwritten work for finding the number of people:

$$p = 4(13) + 2$$

$$= 52 + 2$$

$$= \boxed{54 \text{ people}}$$

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

Handwritten work for finding the number of tables:

$$p = 114$$

Handwritten work for finding the number of tables:

$$114 = 4t + 2$$

Handwritten work for finding the number of tables:

$$112 = 4t$$

Handwritten work for finding the number of tables:

$$28 = t$$

Handwritten work for finding the number of tables:

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