

1. Consider the following figures (diagrams) made out of sticks:

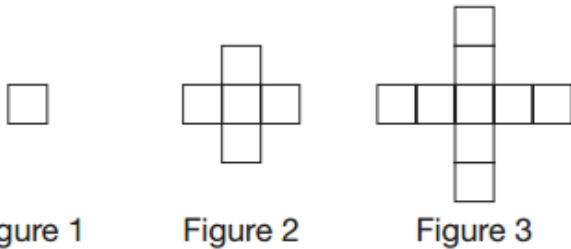


Figure 1

Figure 2

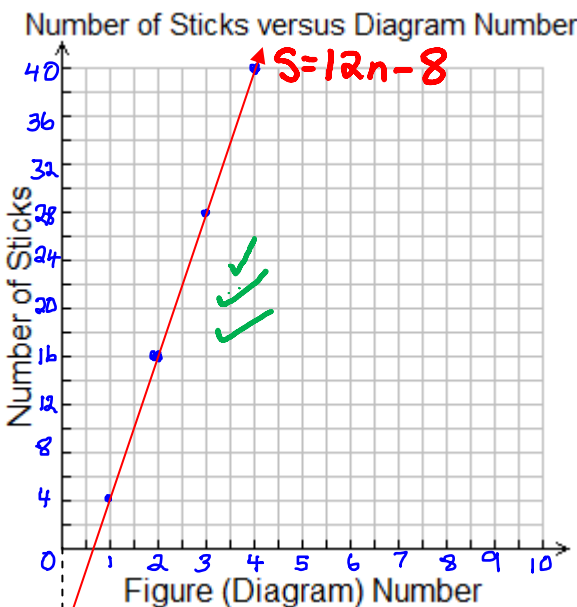
Figure 3

- (a) Let n represent the figure number (i.e. diagram number) and let s represent the number of sticks (not squares) required to make the figure. Complete the following table: (2/2)

n	s
0	-8
1	4
2	16
3	28
4	40
5	52

When $n=0$, $s=-8$. Therefore, initial value = -8

- (b) Graph the relation between s and n . (5/5)



Vertical Intercept
= Initial Value
= -8

- (c) Write an equation that relates s to n . (2/2)

$$s = 12n - 8$$

vertical intercept = -8
slope = 12
When $n=0$, $s=-8$

- (d) For the relation between s and n identify each of the following: (5/5)

Slope = 12

Constant of Variation = 12

Vertical-Intercept = -8

Initial Value = -8

Rate of Change of s with respect to n
= 12 sticks/diagram

- (e) How many sticks are there in figure 357? Show your work! (2/2) $n=357$, $s=?$

$$\begin{aligned} s &= 12n - 8 \\ &= 12(357) - 8 \\ &= 4276 \end{aligned}$$

There are 4276 sticks in diagram 357.

- (f) One of the figures can be made using 11332 sticks. What is the diagram number of the figure? Show your work! (3/3)

$$n=?, s=11332$$

$$11332 = 12n - 8$$

$$\therefore 11332 + 8 = 12n - 8 + 8$$

$$\therefore 11340 = 12n$$

$$\therefore \frac{11340}{12} = \frac{12n}{12}$$

$$\therefore 945 = n$$

The diagram number is 945

- (g) Is the relation between s and n a direct variation or a partial variation? Explain. (2/2)

The relation must be a partial variation because

(a) the graph does not pass through the origin
(b) the initial value is -8
(For a direct variation, the initial value must be zero)

for either answer