

1.4

Relationships in Patterns



Quick Review

- You can describe a number pattern using the term number.

(n) ←

Term number	1	2	3	4	5	6
Term	8	16	24	32	40	48

We can write an algebraic expression for the term when we know the term number.
Each term is 8 times the term number.

Let n represent any term number.

Then the term is represented by $8 \times n$, or $8n$.

When you compare or *relate* a variable to an expression that contains the variable, you have a *relation*.

The variable is n .

The expression is $8n$.

The relation is: $8n$ is related to n

- The table and relation above can represent the total number of beats in a music score when there are 8 beats in each bar.

Number of bars of music	1	2	3	4	5	6
Total number of beats	8	16	24	32	40	48

You can use the relation to find the number of beats in 17 bars of music.

Substitute $n = 17$ in the expression $8n$.

$$8n = 8(17)$$

$$= 136$$

There are 136 beats in 17 bars of music.

Practice

- Complete each chart.

a)

Term number	1	2	3	4	5	6
Term	5	10	15	20	25	30

Del 1 al 5 = $\times 5 \Rightarrow 5n$
3 al 5

b)

Term number	1	2	3	4	5	6
Term	5	6	7	8	9	10

Del 1 al 5 y = $+4 \Rightarrow n+4$
3 al 7

c)

Term number	1	2	3	4	5	6
Term	3	6	9	12	15	18

Del 1 al 3 = $\times 3 = 3n$
3 al 9
5 al 15

2. Every day, Ray rides his bike 12 km around Stanley Park.
Complete the chart to show the total distance Ray travelled.

Number of days	1	2	3	4	5	6
Distance (km)	12	24	36	48	60	72

3. Write a relation for the pattern rule for each pattern.
Use the relation to find the 12th term.

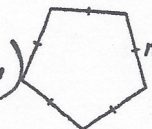
Let n represent any term number.

a) 6, 12, 18, 24, $\rightarrow +6$ 30, 36, 42, 48, 54, 60, 66, 72

b) 10, 11, 12, 13, $\rightarrow +8$ 14, 15, 16, 17, 18, 19, 20, 21

4. a) Write a relation for the perimeter of a regular pentagon

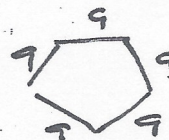
with side length n centimetres. $5n$ (n es "side length")



Tiene 5 lados

- b) What is the perimeter of a regular pentagon with side length 9 cm?

$5 \times 9 = 45$



5. Ally is organizing an end-of-term party.

The cost to rent the hall is \$100. The cost of food is \$8 per person.

- a) Write a relation for the total cost of the party, in dollars, for n people.

$\$ \text{ Party} = \$100 + \$8n$

- b) How much will the party cost if:

i) 20 people attend? $\$ = 100 + 8(20) = 100 + 160 = 260$

ii) 50 people attend? $\$ = 100 + 8(50) = 100 + 400 = 500$

- c) How does the relation in part a change in each case?

- i) The cost of food doubles.

$\$ = 100 + 16n$

- ii) The cost of the food increases by \$2 per person.

$\$ = 100 + 10n$

- d) For each scenario in part c, find the cost when 40 people attend.

i) $100 + 16(40) = 100 + 640 = 740$

ii) $100 + 10(40) = 100 + 400 = 500$