

Section 1.4 Relationships in patterns

Enviro-Challenge Day

Warm up Grade 7

Mr. J's class pledges to pick up 6 pieces of garbage each.

What is the variable to determine how many pieces of garbage gets picked up?

*The number of students is the variable, n .

How many pieces will get picked up when the number of students is 5? 10? 15?

You can use a chart to help figure this out.

Number of Students	5	10	15	20	25	30	n
Pieces of Garbage	30	60	90	120	150	180	

 n 5×6 10×6 15×6 $n \times 6$ or $6n$

What pattern do you see in the number of pieces of garbage.

* It is increasing by 30

Write a rule to find how many pieces of garbage will be picked up, when you know the number of students.

* multiply the number of students by 6Write an algebraic expression for the number of pieces of garbage picked up by n students.* $6 \times n$ or $6n$ $6n$ $6 \times n$ $n \times 6$
 ~~$n \times 6$~~

for each
for every
per
/

} key words
for
multiply
by
variable

→ \$ 5 per hour
5^{*}h

→ 6 candy each 6^{*}c

Mrs. W's class pledges to pick up a total of 10 more pieces of garbage than Mrs. J's class.

Number of Students	2	4	6	8	10	n
Number of pieces of garbage by Mrs. J's class	6x2 12	6x4 24	6x6 36	6x8 48	6x10 60	6n
Number of pieces of garbage by Mrs. W's class	22	34	46	58	70	6n + 10

n represents the number of students

The number of pieces of garbage is related to the number of students.

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

Study
per each
key word

Example

Mr. Prasad plans to hold a party for a group of his friends. The cost of renting a room is \$35. The cost of food is \$4 per person.

goes with letter

remember
cost of food + cost of rent

(a) Write a relation for the cost of the party in dollars for n people.

Use a chart to help you find the answer.

let n = # of people

Number of People	0	5	10	15	20	n
Cost of Party	35	55	75	95	115	

Relation

*

4020
5x4+35
20+35
food+Room
10x4+35
40+35
Food+Room

(b) How much will a party cost for 10 people? For 30 people? For 50 people?

10 people
Food + Room
4 x 10 + 35
40 + 35
75

30 people
food + Room
4 x 30 + 35
120 + 35
155

50 people
Room
4 x 50 + 35
200 + 35
235

Homework pg. 23 # 1(a,b,c,d)
2 (a,b,c,d)
3(a,b)
4 (a,b)

For #2 students MUST draw charts similar to #1 to find the relations)

food
Room
4 x n + 35

4n + 35

Homework pg. 23 # 1(a,b,c,d)
 # 2 (a,b,c,d)
 # 3(a,b)
 # 4 (a,b)

for each for every per } # goes with letter

(For #2 students MUST draw charts similar to #1 to find the relations)

2a) $n \equiv \# \text{ students}$ 2b)
 each student has 3 pencils

# student	1	2	3	4	
Total pencils	3	6	9	12	2d)

$3n$

3)

2b)

# students n	1	2	3	4	5	
Total desk	3	4	5	6	7	

up 1

$n=1$ out 3
 in (1) add 2
 $n+2$

2f)

# students n	1	2	3	4	5
Totals Stickers	14	18	22	26	30

up 4

$4n$

Check it
 $n=1$ out=14
 $4(1)$
 4 add 10

$4n+10$

3) key word for each for every per } # goes in front of letter

a) $10n$
 $n \equiv \# \text{ of hours}$

b) 30 hours
 $n=30$
 $10 \times n$
 10×30
 \downarrow 300

a) pg 23

Term number(n)	1	2	3	4	5	6
Term	2	4	6	8	10	12

↑ ↑ ↑
up 1

↑ ↑
up 2

↓ this # goes with letter

$2n$

Now check

$n=1$ $out=2$

$2n$

$2(1)$

2

← Same ✓
Done

b)

Term number ⁿ	1	2	3	4	5
Term	3	4	5	6	7

↑ ↑
up 1

↑ ↑ ↑
up 1

Start ↓ in

Check

$n=1$ $out=3$

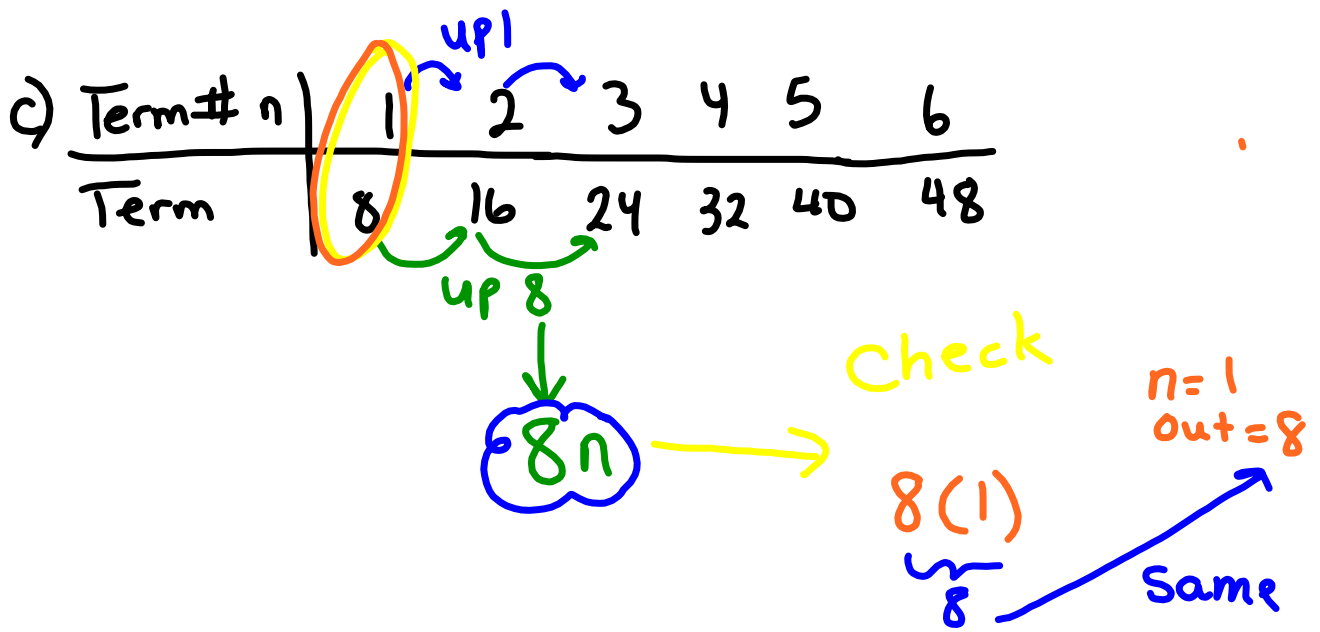
n

(1)

1

↗ Not Same
Need add 2

$in+2$



d)

Term#	n	1	2	3	4	5	6
Term		6	7	8	9	10	11

ln

ln + 5

Check $n=1$ out = 6
 $ln(1)$
 Not Same add 5