Patterns, Relations, and Algebra – Answer Key

Page 1

B	**C**
x = -5	**C**
A	**x ≥ 4**

Page 2

C	**B**
D	

Page 3

D	**D**
D	**B**

Page 4

D	**D**
	***S* – 109**
	x = 7

Page 5

A	**A**
	B

Page 6

D	**D**
C	

Sample 1

Total Cost of Silver Chain And Beads	
Number of Beads	Total Cost
0	$10
5	$ 20
10	$30
15	$40
⋮	⋮
25	$60
⋮	⋮
40	$90

A) ← Substitute the things you know into the equation: $x = 10$ then solve: $y = 2(10) + 10$

$y = 20 + 10$

$y = \$30$

when $x = 15$ the total cost is: $y = 2(15) + 10$

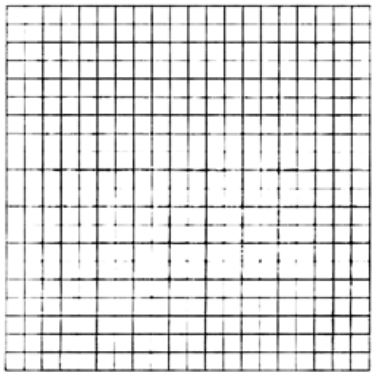
$y = 30 + 10$ $y = \$40$

when $x = 25$ the total cost is: $y = 2(25) + 10$ $y = 50 + 10$ $y = \$60$

when $x = 40$ the total cost is. $y = 2(40) + 10$ $y = 80 + 10$ $y = \$90$

B) the 2 in the equation represents the price of each glass bead, because $x =$ the number of beads

C) The 10 represents the cost of the silver chain, because when finding the total cost you need to account for everything.



Sample 2

a)

# of beads (x)	Total Cost (y)
0	$10
5	$20
10	$30
15	$40
20	$50
25	$60
30	$70
35	$80
40	$90

$y = 2x + 10$

After I filled in each row of "# of beads", I plugged that # in for x, and solved for y. For example:

$y = 2(10) + 10$

$y = 20 + 10$

$y = 30$

$y = 2(15) + 10$

$y = 30 + 10$

$y = 40$

b.) The 2 in the equation represents the slope, because I know the slope equ. is $y = mx + b$, and "m" is the slope, so the 2 in "$y = 2x + 10$" is the slope.

c.) The 10 in the equation represents the y-intercept, because in the slope equation "$y = mx + b$", the "b" = the y-intercept. In "$y = 2x + 10$" the 10 represents the "b," or the y intercept.

Sample 1

a. To find the y-intercept, I set x to 0. $y = 12(0) + 120$; $y = 120$. Therefore, the line will intersect the y axis at the point $(0, 120)$.

b. The y intercept tells us that when she eats 0 vanilla cookies, her snack has 120 calories. In other words, her cup of milk has 120 calories.

c. To find the slope, I needed two points. I already knew one point was $(0, 120)$, so I solved for the x-intercept: $0 = 12x + 120$, $-120 \quad -120$, $\frac{-120}{12} = \frac{12x}{12}$, $x = -10$, $(-10, 0)$

Slope = $\frac{\text{change in } y}{\text{change in } x}$, so I took both my points $[(0, 120), (-10, 0)]$ and plugged them into this equation. Slope = $\frac{120 - 0}{0 - (-10)}$

$= \frac{120}{10}$

$= 12$

d. The slope tells us that each one of Marisa's vanilla cookies has 12 calories in it.

e. To find the total number of calories, I substituted 9 into the equation for x and solved. $y = 12(9) + 120$

$y = 108 + 120$

$y = 228$

If Marisa eats 9 small vanilla cookies, her snack will have 228 calories in it.

Sample 2

a) 120 is the y-intercept

b) The y-intercept, 120, is the amount of calories in Marisa's glass of milk.

c) The slope is 12.

d) The slope, 12, is the amount of calories per small vanilla cookie that Marisa ate.

e) The total amount of calories in Marisa's snack, if she eats 9 small vanilla cookies, is 228 calories. I got this by multiplying 12, the number of calories each cookie contains, by the number of cookies Marisa ate, which is 9. The answer to this is 108. I then added 120, the amount of calories in Marisa's glass of milk, to 108, the amount of calories of her cookies. 108 + 120 = 228 calories.

Page 9

B	D
C	B

Page 10

C	B
A	B
D	A

Page 11

C	B
D	A
B	D

Page 12

B
A

Sample 1

a.) $6t+40$ is the total number of people that can be seated at both booths and tables.

b.) $6t+40 \geq 125$

c.) $6t+40 \geq 125$

$-40 \quad -40$

$\frac{6t}{6} \geq \frac{85}{6}$

$t \geq 14.2$

This would be rounded to 15 because you can't have .2 of a table.
This means in order to seat at least 125 people, Ms. Gleason needs to order at least 15 tables.

Sample 2

a.) p=people expression!

$40+6t=p$

b.) $40+6t \geq 125$

c.) $15 \leq t$ That means Ms. Gleason needs to buy at least 15 tables to seat at least 125 people

$125 \leq 40+6t$ — $125-40=85$

$85 \leq 6t$ $-85 \div 6 = 14\frac{1}{6}$

$14\frac{1}{6} \leq t$ But Ms. Gleason cannot buy $\frac{1}{6}$ of a table so I rounded up to at least 15 tables.

a)

Week (w)	Number of Minutes (n)
0	135
1	150
2	165
3	180
4	195
5	210
6	225

b) $n = 15w + 135$

c) Week 20

$n = 15w + 135$

$n = 15 \cdot 20 + 135$

$n = 435$

The total number of minutes Irina will exercise in week 20 if she continues her exercise program beyond 6 weeks is 435 minutes.