Name _____

Exploring Patterns

For each pattern, follow these instructions:

1. Study the pattern your teacher has provided.
2. Build step 4.
3. Make a sketch of step 4 and step 5. How many units make up each step?
4. Use the pattern you discover to sketch step 10. How many units make up step 10?
5. Describe any number patterns you notice.
6. Suggest other ways to describe how this pattern grows.

Function _____

step 4	step 5	step 10
units: _____	units: _____	units: _____

What patterns do you notice? _____

Can you suggest other ways this pattern might grow? _____

_____

Function _____

step 4	step 5	step 10
units: _____	units: _____	units: _____

What patterns do you notice? _____

Can you suggest other ways this pattern might grow? _____

_____

Function _____

step 4	step 5	step 10
units: _____	units: _____	units: _____

What patterns do you notice? _____

Can you suggest other ways this pattern might grow? _____

_____

Function _____

step 4	step 5	step 10
units: _____	units: _____	units: _____

What patterns do you notice? _____

Can you suggest other ways this pattern might grow? _____

_____

Function _____

step 4	step 5	step 10
units: _____	units: _____	units: _____

What patterns do you notice? _____

Can you suggest other ways this pattern might grow? _____

_____

Name _____

Exploring Patterns

For each pattern, sketch steps 4 and 5. Then predict how many units would be in step 10. Describe the pattern.

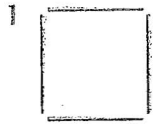**Function 1.** Count the toothpicks.

1   2   3

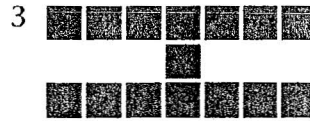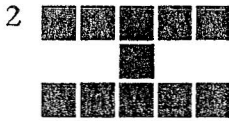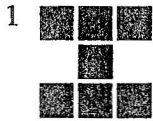| 4	5

How many would be in step 10? _____
How is the pattern changing or growing? _____

Function 2. Count the toothpicks.

1   2   3

4	5

How many would be in step 10? _____
How is the pattern changing or growing? _____

Function 3. Count the toothpicks.

1   2   3

4	5

How many would be in step 10? _____
How is the pattern changing or growing? _____

Function 4. Count the toothpicks.

1   2   3

4	5

How many would be in step 10? _____
How is the pattern changing or growing? _____

Function 5. Count the tiles.

1   2   3

4	5

How many would be in step 10? _____
How is the pattern changing or growing? _____

Function 6. Count the tiles.
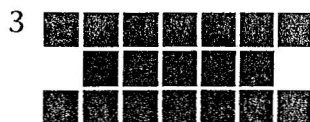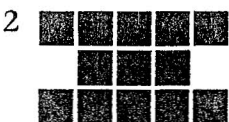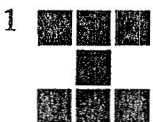
1   2   3

4	5

How many would be in step 10? _____
How is the pattern changing or growing? _____

Find the next three numbers in each pattern. Then find step 10.
Describe in words how the pattern is changing.

Function 7.

step	1	2	3	4	5	6	. . .	10
result	8	12	16	___	___	___		___

Describe the pattern. _____

Function 8.

step	1	2	3	4	5	6	. . .	10
result	7	11	15	___	___	___		___

Describe the pattern. _____

Function 9.

step	1	2	3	4	5	6	. . .	10
result	8	13	18	___	___	___		___

Describe the pattern. _____

Function 10.

step	1	2	3	4	5	6	. . .	10
result	15	23	31	___	___	___		___

Describe the pattern. _____

Function 11.

step	1	2	3	4	5	6	. . .	10
result	25	29	33	___	___	___		___

Describe the pattern. _____

Function 12.

step	1	2	3	4	5	6	. . .	10
result	57	63	69	___	___	___		___

Describe the pattern. _____

Function 13.

step	1	2	3	4	5	6	. . .	10
result	101	115	129	___	___	___		___

Describe the pattern. _____

Function 14.

step	1	2	3	4	5	6	. . .	10
result	68	64	60	___	___	___		___

Describe the pattern. _____

Function 15.

step	1	2	3	4	5	6	. . .	10
result	8	10.5	13	___	___	___		___

Describe the pattern. _____

Function 16.

step	1	2	3	4	5	6	. . .	10
result	2	4	8	___	___	___		___

Describe the pattern. _____

(;..

Name _____

Graphing Functions

Function _____

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
17	
n	

Function _____

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
17	
n	

Function _____

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
17	
n	

$f(n)$

n

Function _____

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
17	
n	

Function _____

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
17	
n	

Function _____

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
17	
n	

$f(n)$

n

Name _____
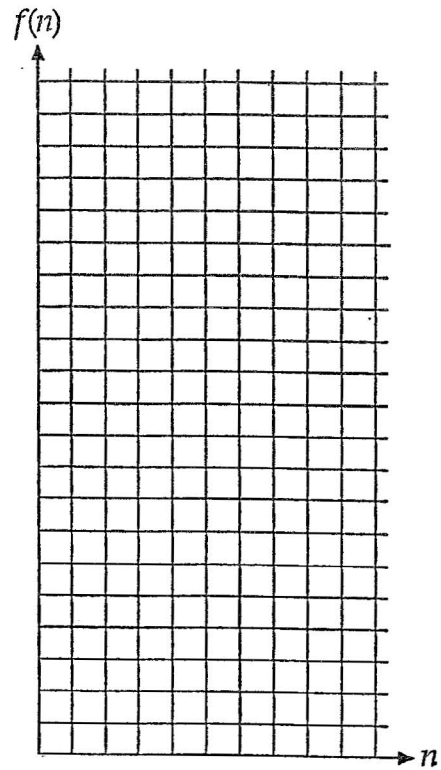
Graphing Functions

Construct a T-table for each of these functions from Homework 1:
Exploring Patterns. Then graph each function on the grid. Determine
the value of the function at step 0 and put this in the table too.

Function 1

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
10	
⋮	
17	
n	

Function 2

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
10	
⋮	
17	
n	

Function 3

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
10	
⋮	
17	
n	

Function 4

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
10	
⋮	
17	
n	

Function 5

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
10	
⋮	
17	
n	

Function 6

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
10	
⋮	
17	
n	
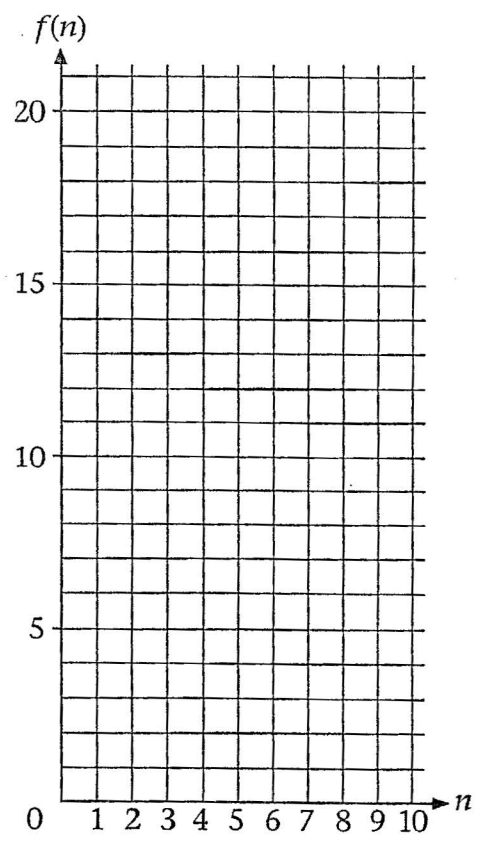
Construct a T-table for each of these functions from Homework 1:
Exploring Patterns. Then graph each function on the grid. Determine
the value of the function at step 0 and put this in the table too.

Function 11

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
10	
⋮	
17	
n	

Function 12

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
10	
⋮	
17	
n	

Function 13

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
10	
⋮	
17	
n	

Function 14

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
10	
⋮	
17	
n	

Function 15

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
10	
⋮	
17	
n	

Function 16

n	$f(n)$
1	
2	
3	
4	
5	
⋮	
10	
⋮	
17	
n	

$f(n)$

n
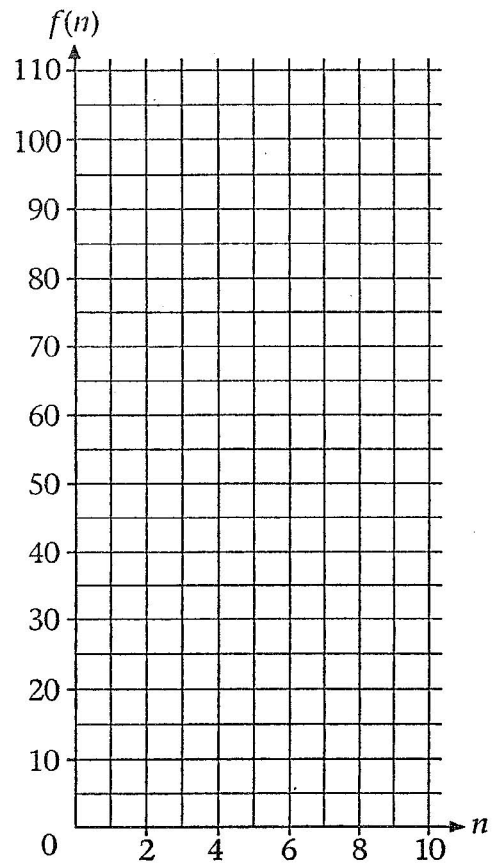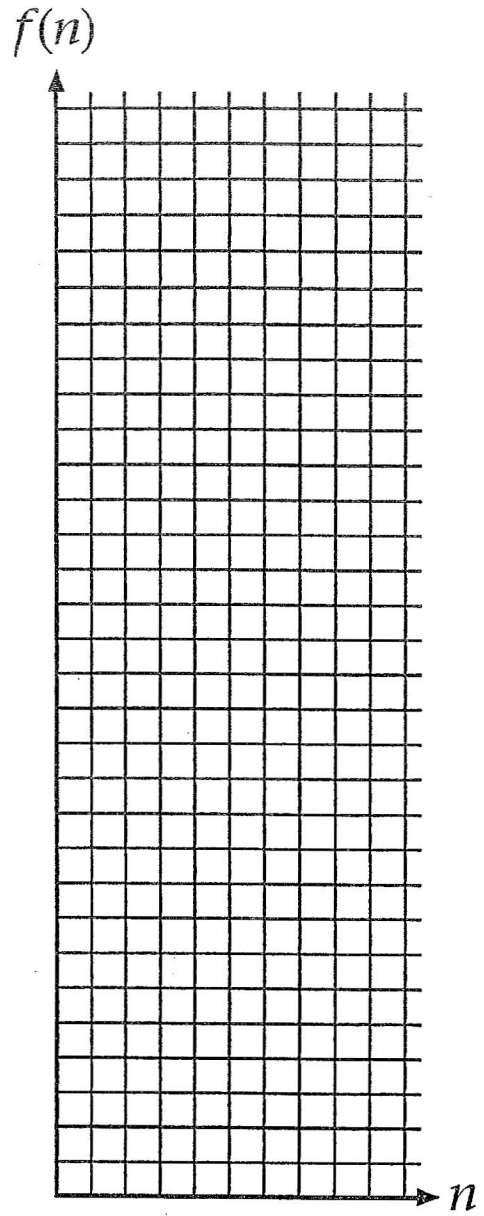
n	$f(n)$
0	
1	
2	
3	
$\vdots$	
17	
n	

Working Backward

Below are ten functions and six pictures. Below each pictorial representation, write the letter of the matching function. On the back of this sheet, design a pictorial representation for the four functions that are not pictured. Label them with their functions.

a. $f(n) = 4n - 3$ e. $f(n) = 2n + 3$ h. $f(n) = 6n - 5$

b. $f(n) = 3n + 2$ f. $f(n) = 4n + 4$ i. $f(n) = 6n - 1$

c. $f(n) = 2n + 2$ g. $f(n) = 3n + 6$ j. $f(n) = 6n + 2$

d. $f(n) = 4n + 1$

1. count squares

1

2

3

Function _____

2. count circles

1

2

3

Function _____

3. count toothpicks

1

2

3
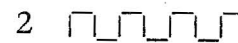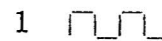
Function _____

4. count squares

1

2

3
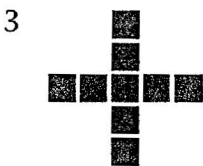
Function _____

5. count hexagons

1

2

3
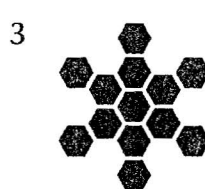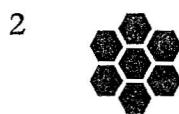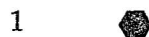
Function _____

6. count squares

1

2

3
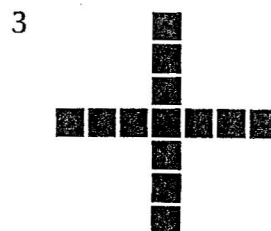
Function _____

Working Backward

Below are nine functions. For each one, design a pictorial representation and show three steps. Use polygons, lines, toothpicks, dots, or other shapes. Be creative.

1. $f(n) = 2n + 1$	**2.** $f(n) = 2n$	**3.** $f(n) = 4n + 2$
4. $f(n) = 4n$	**5.** $f(n) = 4n + 4$	**6.** $f(n) = 5n + 3$
7. $f(n) = 2n + 3$	**8.** $f(n) = 3n + 2$	**9.** $f(n) = 2n - 1$

$f(n)$

n

n	$f(n)$
0	
1	
2	
3	
⋮	
23	
n	

Name _____
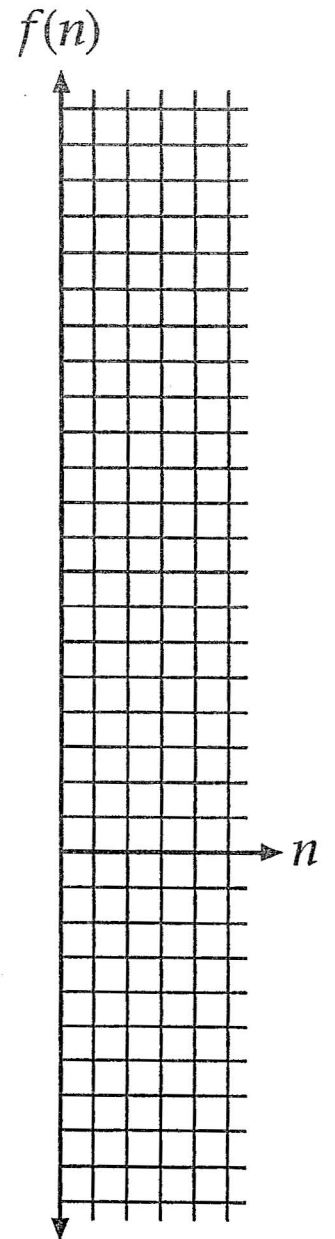
Advanced Functions

Function _____

n	$f(n)$
0	
1	
2	
3	
⋮	
23	
n	

Function _____

n	$f(n)$
0	
1	
2	
3	
⋮	
23	
n	

Function _____

n	$f(n)$
0	
1	
2	
3	
⋮	
23	
n	

Function _____

n	$f(n)$
0	
1	
2	
3	
⋮	
23	
n	

Function _____

n	$f(n)$
0	
1	
2	
3	
⋮	
23	
n	

Function _____

n	$f(n)$
0	
1	
2	
3	
⋮	
23	
n	

$f(n)$

n

Name _____

Advanced Functions

Fill in a T-table for each function below. Then graph the function.
Write the function's expression in the bottom of the table.

Function 1
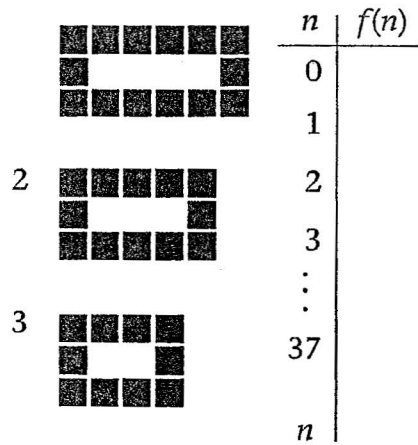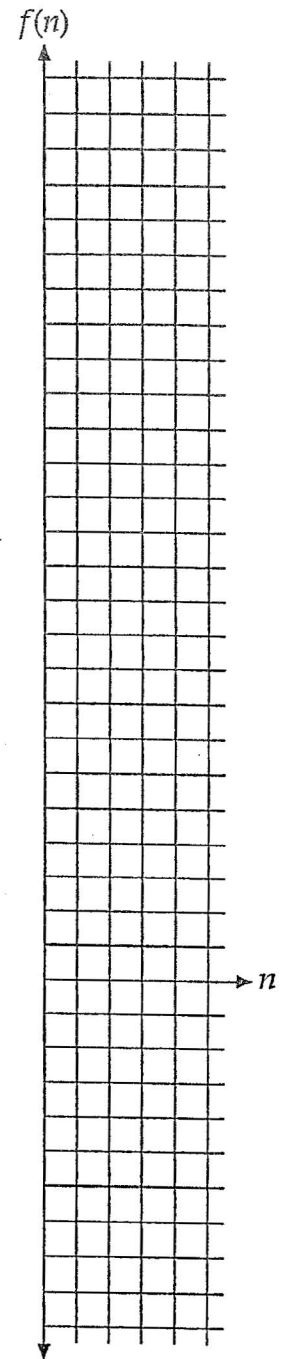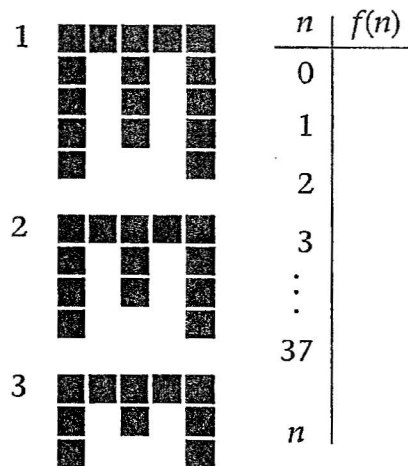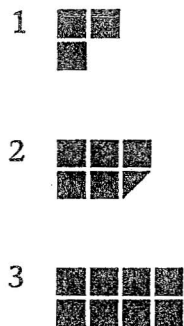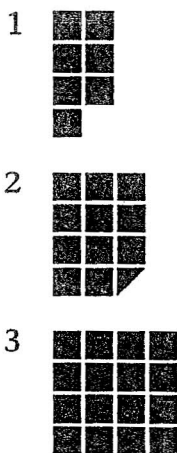
1

2

3

n	$f(n)$
0	
1	
2	
3	
⋮	
37	
n	

Function 2

1

2

3

n	$f(n)$
0	
1	
2	
3	
⋮	
37	
n	

Function 3

1

2

3

n	$f(n)$
0	
1	
2	
3	
⋮	
37	
n	

Function 4

1

2

3

n	$f(n)$
0	
1	
2	
3	
⋮	
37	
n	

$f(n)$

n

Fill in a T-table for each function below. Then graph the function. Write the function's expression in the bottom of the table.

$f(n)$

Function 5

n	$f(n)$
0	
1	
2	
3	
$\vdots$	
37	
n	

1

2

3

Function 6

n	$f(n)$
0	
1	
2	
3	
$\vdots$	
37	
n	

1

2

3

Function 7

n	$f(n)$
0	
1	
2	
3	
$\vdots$	
37	
n	

2

3

Function 8

n	$f(n)$
0	
1	
2	
3	
$\vdots$	
37	
n	

1

2

3

n

Fill in a T-table for each function below. Then graph the function. Write the function's expression in the bottom of the table.

$f(n)$

Function 9

1

2

3

n	$f(n)$
0	
1	
2	
3	
⋮	
37	
n	

Function 10

1

2

3

n	$f(n)$
0	
1	
2	
3	
⋮	
37	
n	

Function 11

1 5.7
2 8
3 10.3

n	$f(n)$
0	
1	
2	
3	
⋮	
37	
n	

Function 12

1
2 6.35
3
4 7.25
5 7.7

n	$f(n)$
0	
1	
2	
3	
⋮	
37	
n	

n
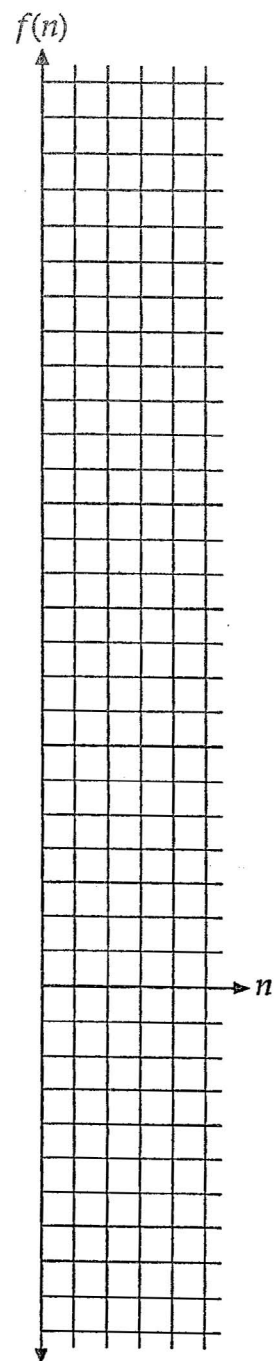
1. Randy already has $70 in his savings account. He will add $40 per month. How much money will he have?

    A) How much money will he have after the first five months?

    B) How much money will he have after the tenth month?

    c) How much money will he have after the eighteenth month?

2. Angela already has $310 in her savings account. She will add $35 per month. How many months will it take before she and Randy have the same amount of money in their accounts? How much will each of them have?

3. Randy wants to know when he will have at least $1,000. Find a way to determine this for him.

4. Angela finds she has exactly $1,220. How many months has she been saving?

Name _____

Banking on Algebra

1. Derek has $75 in his savings account. He will add $25 every month. Use this T-table to show how Derek's account will grow. Write an expression or formula and make a graph below.

Derek's Account

month	principal
0	
1	
2	
3	
4	
5	
m	

2. Rosa has $306 in her savings account. She will add $14 every month. Use this T-table to show how Rosa's account will grow. Write an expression or formula and make a graph below.

Rosa's Account

month	principal
0	
1	
2	
3	
4	
5	
m	

3. When will Derek have $ 700? _____
4. When will Rosa and Derek have the same amount of money? _____
5. How much money will they each have then? _____
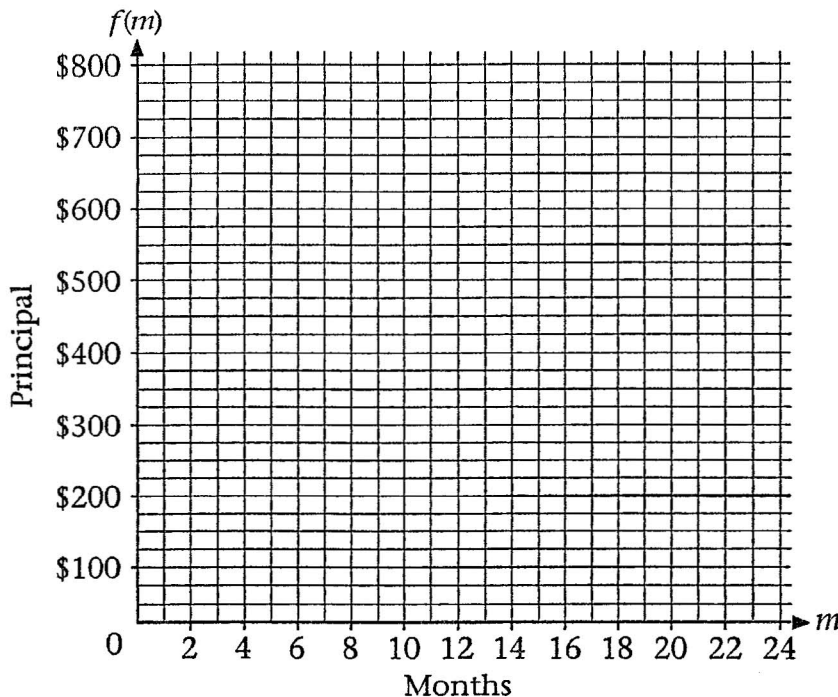
What scale has been used for the horizontal axis?
One unit = _____.

What scale has been used for the vertical axis?
One unit = _____.

6. San wants to buy a bicycle for $295. He currently has $72 in his account. If he adds $27 each month, when will he have enough money for the bike? _____

San's Account

month	principal
0	
1	
2	
3	
4	
5	
m	

7. Keisha wants the same bike that San wants. If she already has $115 in her account, and she adds $16 per month, can she buy her bike before San can buy his? _____

Keisha's Account

month	principal
0	
1	
2	
3	
4	
5	
m	

Graph the function for problems 6 and 7 on this grid. Choose a scale that allows the data to fit. Label each function on the graph with its formula.

$f(m)$

Principal

m
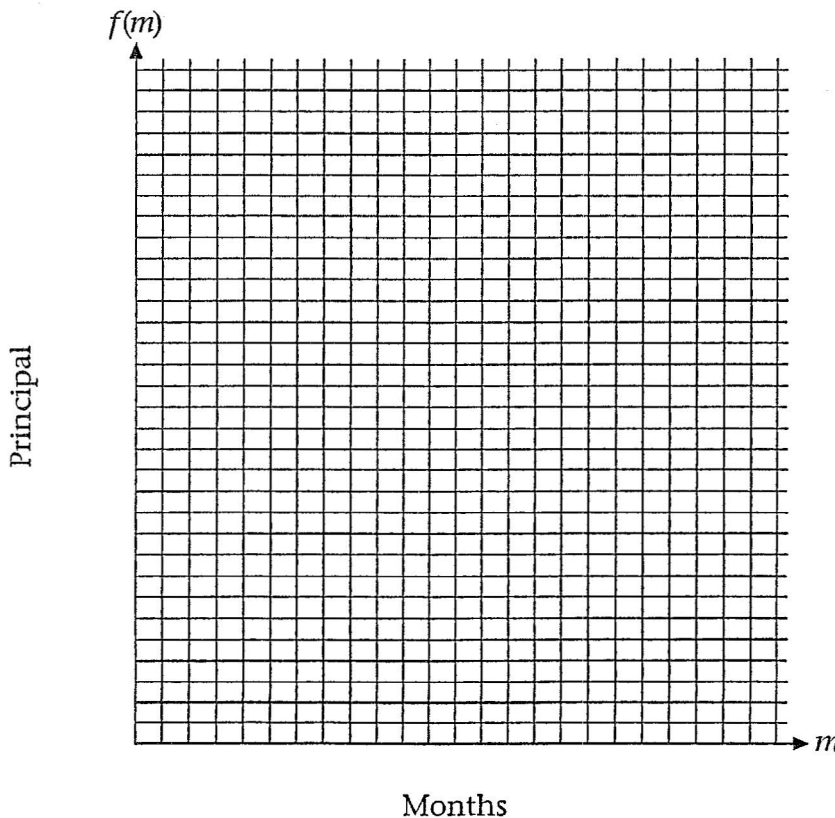
Months

What scale did you use for the horizontal axis?
One unit = _____.

What scale did you use for the vertical axis?
One unit = _____.

8. Chris has $39 in the bank. He adds $32 to it each month. He wants to buy a bike that costs $435. Every month the bike's price is reduced by $10. How many months will it take for Chris to afford the bike? _____

Chris's Account			Bike Sale	
month	principal		month	bike price
0			0	$435
1			1	$425
2			2	
3			3	
4			4	
5			5	
m			m	

Graph the function for problem 8 on this grid. Choose a scale that allows the data to fit. Label each function on the graph with its formula.

$f(m)$

Principal

Months

m
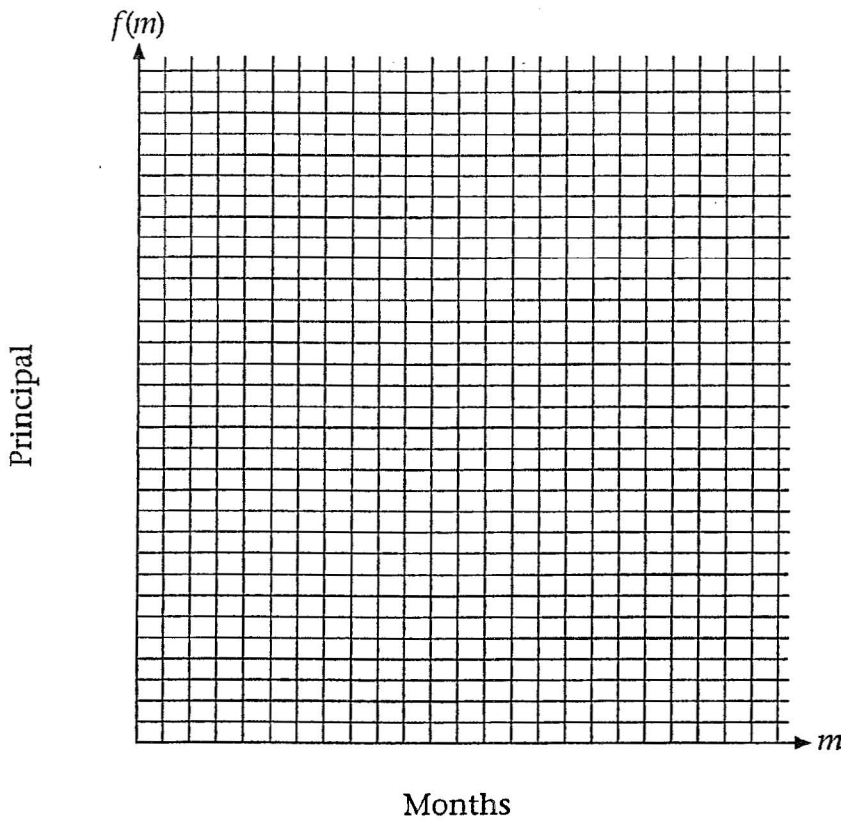
What scale did you use for the horizontal axis?
One unit = _____.

What scale did you use for the vertical axis?
One unit = _____.

Schedule of Rates

|	M	Tu	W	Th	F	Sa	Su
8 AM–5 PM	■	■	■	■	■	☐	☐
5 PM–11 PM	▦	▦	▦	▦	▦	☐	☐
11 PM–8 AM	☐	☐	☐	☐	☐	☐	☐

	■ Day		▦ Evening		☐ Night	
From: Redding	1st min.	add'l. min.	1st min.	add'l. min.	1st min.	add'l. min.
To:						
Alturas	$0.11	$0.07	$0.09	$0.06	$0.07	$0.04
Challenge	0.12	0.10	0.10	0.07	0.08	0.05
Millville	0.13	0.11	0.11	0.09	0.08	0.06
Oroville	0.14	0.12	0.13	0.10	0.09	0.07
Red Bluff	0.15	0.13	0.13	0.11	0.10	0.07

Name _____

The Long-Distance Connection

Schedule of Rates

	M	Tu	W	Th	F	Sa	Su
8 AM–5 PM	■	■	■	■	■	☐	☐
5 PM–11 PM	▨	▨	▨	▨	▨	☐	☐
11 PM–8 AM	☐	☐	☐	☐	☐	☐	☐

	■ Day		▨ Evening		☐ Night	
From: Redding **To:**	1st min.	add'l. min.	1st min.	add'l. min.	1st min.	add'l. min.
Alturas	$0.11	$0.07	$0.09	$0.06	$0.07	$0.04
Challenge	0.12	0.10	0.10	0.07	0.08	0.05
Millville	0.13	0.11	0.11	0.09	0.08	0.06
Oroville	0.14	0.12	0.13	0.10	0.09	0.07
Red Bluff	0.15	0.13	0.13	0.11	0.10	0.07

1. Fill in the T-tables to compare the phone rates of calls from Redding to Oroville.

Day			Evening			Night	
min.	price		min.	price		min.	price
0			0			0	
1			1			1	
2			2			2	
3			3			3	
⋮			⋮			⋮	
13			13			13	
m			m			m	

2. Fill in the T-tables to compare the phone rates of calls from Redding to Red Bluff.

Day			Evening			Night		
min.	price		min.	price		min.	price	
0			0			0		
1			1			1		
2			2			2		
3			3			3		
⋮			⋮			⋮		
13			13			13		
m			m			m		

3. Fill in the T-tables to compare the phone rates of calls from Redding to Challenge.

Day			Evening			Night		
min.	price		min.	price		min.	price	
0			0			0		
1			1			1		
2			2			2		
3			3			3		
⋮			⋮			⋮		
13			13			13		
m			m			m		