TOPIC 1
Domain and Range

"DoLoR   the   RoBoT"

Domain Left to Right   Range Bottom to Top
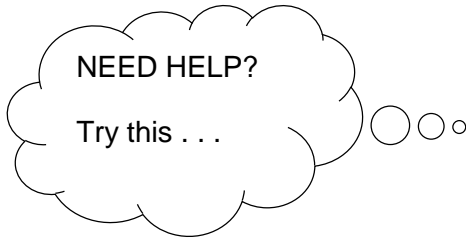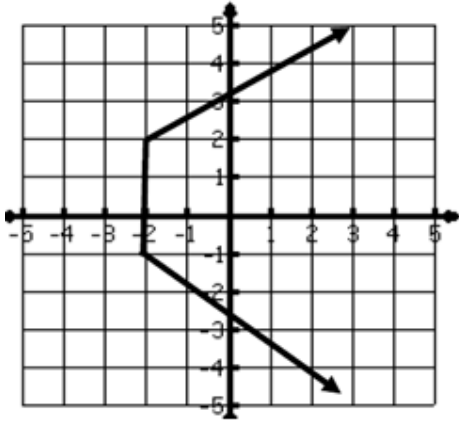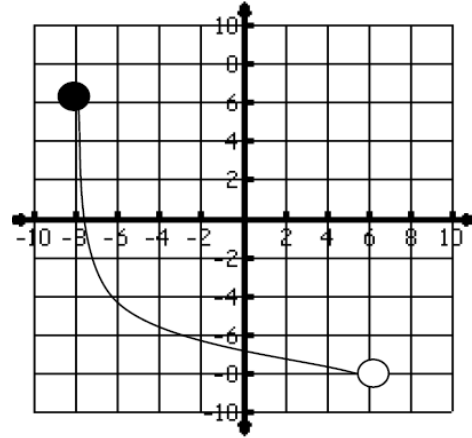
Determine the Domain and Range for each of the following:

1. {(3, 4), (-5, -2), (7, 6), (6, 5), (-8, 6)}

2.

3.

4. The DeWind family lives in a rectangular shaped home with a length of 45 feet and a width of 35 feet. Mr. DeWind plans to install carpet in every room of the house with the exception of the square kitchen. The kitchen has a side length of x feet and the function $y = 1575 - x^2$ describes the area of the home, without the kitchen, in square feet. Identify the domain and range of this function, graphed below.
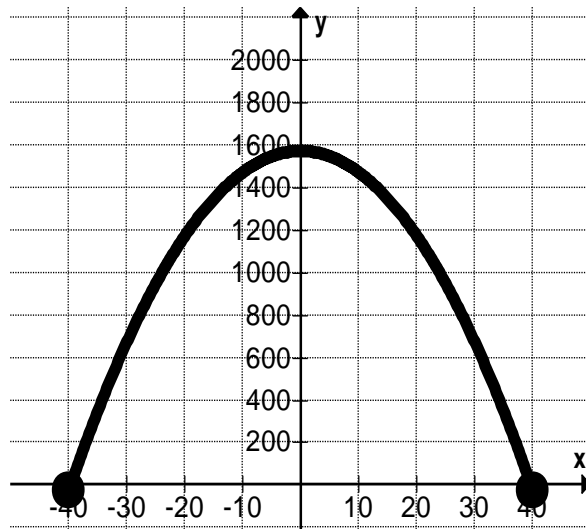
5. Laura is selling cookies to raise funds for a school club. Each cookie costs $0.50. The function rule $m = 0.5c$ gives the money made m based on the number of cookies sold c. What is a reasonable range in this situation if Laura makes 13 dozen cookies?

6. Determine the Domain and Range of the data in the table below.

x	y
3	-4
-1	7
-6	-8
1	11
4	13

7. A plumber charges $96 an hour for making house calls to do plumbing work. The equation $c = 96h$ give the total cost c based on the number of hours worked h. Determine the reasonable range of this situation if Paul the plumber determines that the job will take $3\frac{1}{2}$ hours.
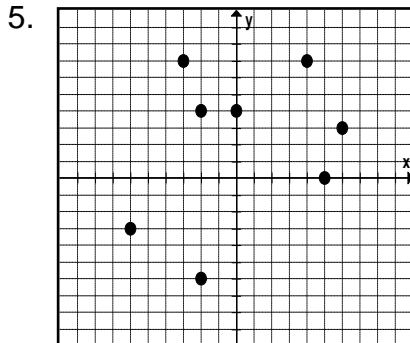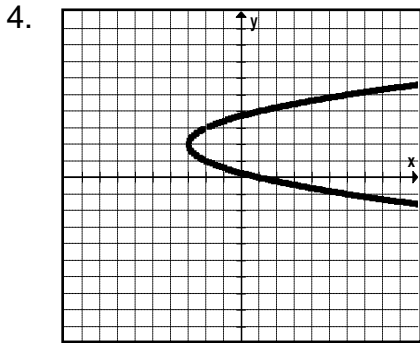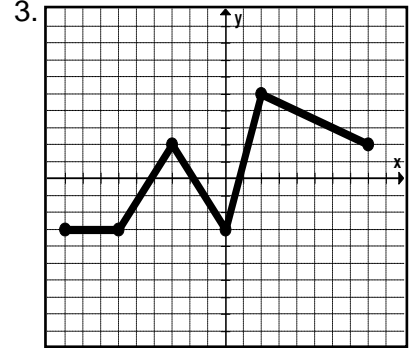
TOPIC 2
Identifying Functions

if you can draw a vertical line anywhere on a graph so that it hits the graph in more than one spot, then the graph is NOT a function.

This is a function.
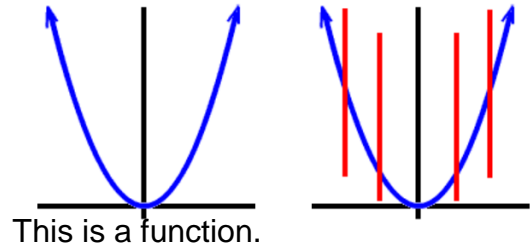
Determine if the following are examples of functions.

1.

2,

3.

4.

5.
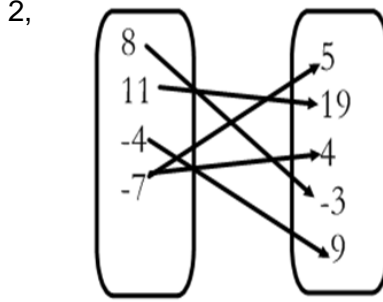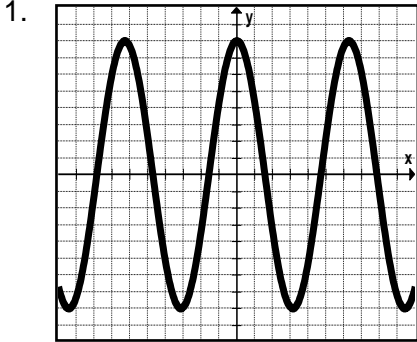
6.

x	f(x)
3	2
-1	4
6	5

7. Which of the following represents *y* as a function of *x*?

A.

B.

C.
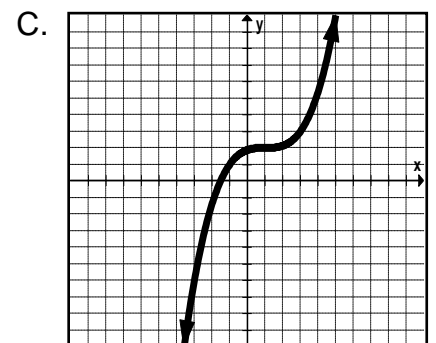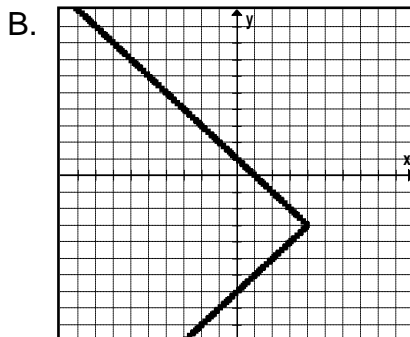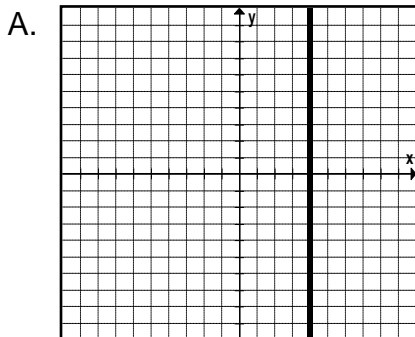
D.

x	-7	-3	-1	-3	-9
y	9	11	-8	19	-10

8. Which of the following does not represent a function?

I.

Input	Output
red	rose
blue	sky
yellow	sun
blue	ocean

II.
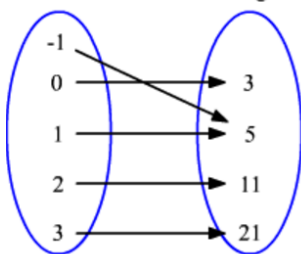
III.
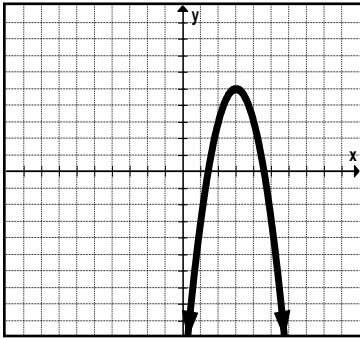
IV.   {(2, -4), (4, 5), (-6, -3), (8, 2), (2, 9)}

A. I and III

B. II and IV

C. I Only

D. I and IV

TOPIC 3
Evaluating Functions

$g(a) = -a^2 + 3a;$ find $g(-2)$.

$g(-2) = -(-2)^2 + 3(-2)$

$g(-2) = -(4) + (-6)$

$g(-2) = -10$

Helpful Hint

1. Given the function $f(x) = 13 - 2x^2 + 4x$, find the value of $f(-3)$.

2. Given the function $f(m) = \dfrac{4 - 3m^2}{2m}$, find the value of $f(4)$.

3. Use the graph below to find $f(x) = 6$
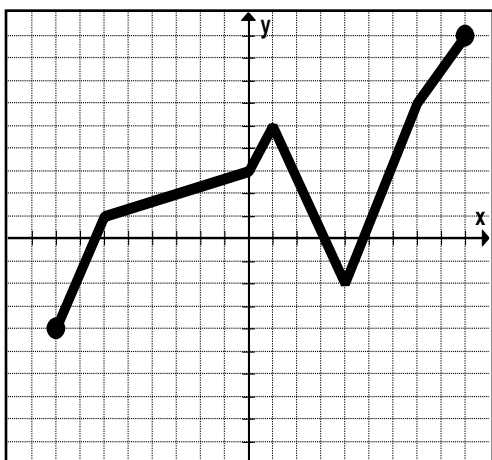
4. Use the graph below to find $f(-1)$.
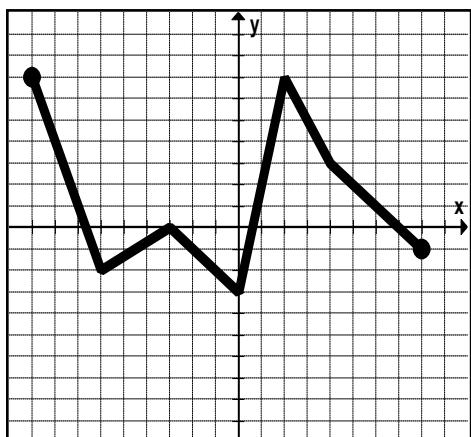
5. Lucy is tracking the process of her plant's growth. Today the plant is 5 cm high. The plant grows 1.5 cm per day. If the equation $h = 5 + 1.5d$ represents this situation, what will the height of the plant be after 23 days?

6. An airplane 30,000 feet above the ground begins descending at the rate of 2000 feet per minute. Assume the plane continues at the same rate of descent. If the equation $a = 30,000 - 2000m$ represents this situation, what would be the altitude of the plane after 5 minutes?

7. You are visiting Baltimore, MD and a taxi company charges a flat fee of $3.00 for using the taxi and $0.75 per mile. The equation $c = 3 + 0.75m$ represents this situation.

   A. How much would a taxi ride for 8 miles cost?

   B. If a taxi ride cost $15, how many miles did the taxi travel?

TOPIC 4
Writing and Solving Equations from Real World Situations

1. Jack paid to have his motorcycle fixed at an auto-repair shop. The parts needed to do the repair cost $72, and the service fee was $12 per hour. If **c** represents the amount that Jack paid, **write an equation** to represent this situation for **h** hours of work.

2. Yesterday was your mom's birthday. You sent her a bunch of daisies and a box of chocolates as a gift totaling $43. If the box of chocolates cost $13 and the price of a daisy was $3, how many daisies did you buy?

3. Five less than twice a number is the same as the number increased by eight. Find the number.

4. The sum of three consecutive odd numbers is 141. What is the smallest of the three numbers?

5. Mr. Ross is purchasing a table and chairs for $1350, including tax and interest. He will pay for the furniture with monthly payments of $75. If Mr. Ross has made m payments, which equation best describes r, the amount of the remaining balance?

   A. $r = (1350 - 75)m$

   B. $r = 75m + 1350$

   C. $r = 1350 - 75m$

   D. $r = 75m - 1350$

6. Ms. Adams bought a refrigerator that cost $1200, including tax. The cost of electricity to run this refrigerator is estimated at $78 per year. Which equation best represents c, the total cost of the refrigerator including electricity over n years of operation?

   A. $c = 1200(78n)$

   B. $c = 1200(n + 78)$

   C. $c = 1200 - 78n$

   D. $c = 1200 + 78n$

7. The perimeter of a rectangular garden is 54 feet. If the length of the garden is 3 more than twice the width, what is the length of the garden?

8. At the beginning of the school year, teachers had 240,000 sheets of copier paper to use. If about 2000 sheets of paper are used each day during a school year, which equation best describes s, the number of sheets that are left after d days of school?

   A. $s = 240,000 - 2000d$
   B. $s = 240,000 + 2000d$
   C. $s = 240,000d - 2000d$
   D. $s = 240,000d + 2000d$

Writing and Solving Equations from Real World Situations
Answers

1. $c = 72 + 12h$
2. Equation: $3d + 13 = 43$ Answer: 10 daisies
3. Equation: $2n - 5 = n + 8$ Answer: $n = 13$
4. Equation: $n + (n + 2) + (n + 4) = 141$ Answer: smallest number: 45
5. C
6. D
7. Equation: $2(2w + 3) + 2w = 54$ Answer: Length = 15 feet
8. A

TOPIC 5
Arithmetic Sequences

$$a_n = a_1 + d(n-1)$$

a_n any term in the sequence

a_1 **first** term of the sequence

d common difference

n Term Number

1. Find the next three terms in the sequence below.

   6, 12, 18, 24

2. The table below shows the number of country club members for four years after it began.

Time (yrs)	0	1	2	3	4
Members	100	200	300	400	500

   A. Does this data represent an arithmetic sequence?

   B. Write the formula that could be used to determine the value of a_n.

3. Identify the 4th term given the formula $a_n = -10 + 6(n-1)$.

4. Given $a_6 = 31$ and $d = 6$, find the value of a_1 in the arithmetic sequence.

5. Given the sequence: 36, 31, 26, 21
   A. Find a_1.
   B. What is the common difference?
   C. Write the formula that could be used to determine the value of a_n.

6. Determine if the sequences below are examples of arithmetic sequences.

    A. 6, 11, 17, . . .

    B. -40, -25, -10, 5, . . .

    C. 2, 14, 98, 686, . . .

    D. 10, 14, 18, 22, . . .

7. An arithmetic sequence has a common difference of 1.5 and $a_6 = 5$.
    A. Find a_1.

    B. Write the formula that can be used to determine the nth term of the sequence.

$$a_n = a_1 (r)^{n-1}$$

a_n any term in the sequence $\qquad$ a_1 **first** term of the sequence

r common ratio $\qquad$ n Term Number

1. Give the next three terms in the geometric sequence -1, 3, -9, 27, …

2. The first term of a geometric sequence is 8 and the common ratio is 2. Find the 10th term.

3. What is the 11th term of the geometric sequence: 2, 6, 18, 54, . . .

4. Write the formula that can be used to represent the nth term of the geometric sequence below.
$$2, \ \frac{1}{2}, \ \frac{1}{8}, \ \frac{1}{32}, \ ...$$

5. Given the sequence $9, \ -3, \ 1, \ -\frac{1}{3}, \ ...$

   A. Find a_1.
   B. Find the common ratio.
   C. Write the formula that can be used to find the nth term of the sequence.

6. Determine if the sequences below are examples of geometric sequences.

   A. 6, 11, 17, . . .

   B. 160, 80, 40, 20, . . .

   C. 2, 14, 98, 686, . . .

   D. 7, -21, 63, -189, . . .

7. Identify the 3rd term given the formula $a_n = 5\left(-\frac{1}{2}\right)^{n-1}$.

Geometric Sequences
Answers

1. -81, 243, -729
2. 4096
3. 118,098
4. $a_n = 2\left(\frac{1}{4}\right)^{n-1}$
5. A. 9

   B. $-\frac{1}{3}$

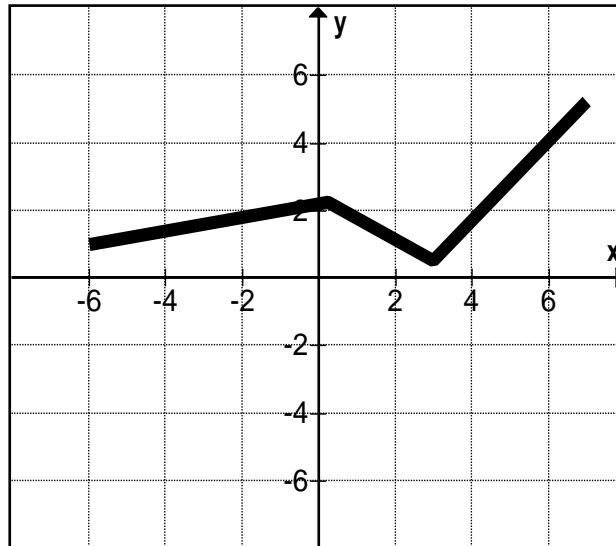   C. $a_n = 9\left(-\frac{1}{3}\right)^{n-1}$
6. A. No

   B. Yes

   C. Yes

   D. Yes
7. $\frac{5}{4}$ or 1.25

TOPIC 7
Challenge

1. The figure below shows the graph of the function h. Which of the following is closet to $h(5)$?

   A. 1

   B. 2

   C. 3

   D. 4

   E. 5

2. A hotel charges a service fee of $1.00 per day to use its copy machine. In addition, there is a charge of $0.10 per copy made. Which of the following represents the total charge, in dollars, to use the copy machine to make n copies in one day?

   A. $0.90n$
   B. $1.10n$
   C. $1.00 + 10n$
   D. $1.00 + 0.10n$
   E. $1.00 + 0.10 + n$

3. If $3x = 0$, what is the value of $1 + x + x^2$?

   A. $\dfrac{7}{9}$
   B. 1
   C. $\dfrac{13}{9}$
   D. 7
   E. 13

4. All positive integers appear in the sequence above, and each positive integer k appears in the sequence k times. In the sequence, each term after the first is greater than or equal to each of the terms before it. If the integer 12 first appears in the sequence as the nth term, what is the value of n?

   $$1, 2, 2, 3, 3, 3, 4, 4, 4, 4, \ldots$$

5. The following figure shows the graph of $f(x)$ from $x = -6$ to $x = 6$. If $f(3) = a$, what is $f(a)$?
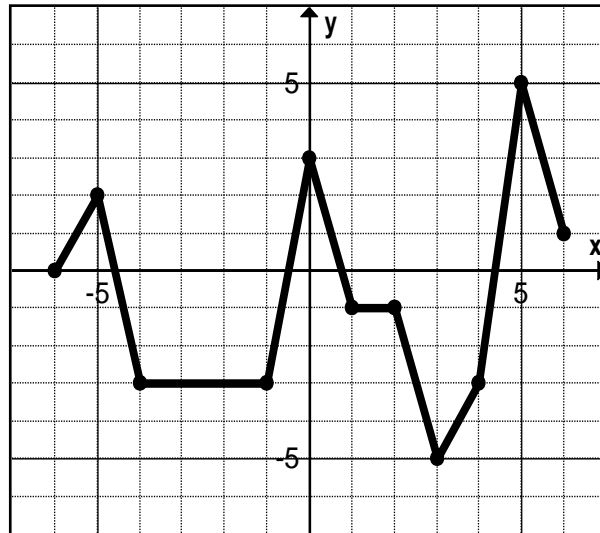
A. -6
B. -5
C. 0
D. 2

6. A salesperson's commission is k percent of the selling price of a car. Which of the following represents the commission, in dollars, on 2 cars that sold for $14,000 each?

A. $280k$
B. $7,000k$
C. $28,000k$
D. $\dfrac{14,000}{100 + 2k}$
E. $\dfrac{28,000 + k}{100}$

7. When the number w is multiplied by 4, the result is the same as when 4 is added to w. What is the value of $3w$?

A. $\dfrac{3}{4}$
B. 1
C. $\dfrac{4}{3}$
D. 3
E. 4

8. The first term of a sequence of numbers is 1. If each term after the first is the product of -2 and the preceding term, what is the sixth term of the sequence?

A. 64
B. 32
C. 16
D. -16
E. -32

Answers:
1. C   2. D   3. B   4. 67   5. D   6. A   7. E   8. E