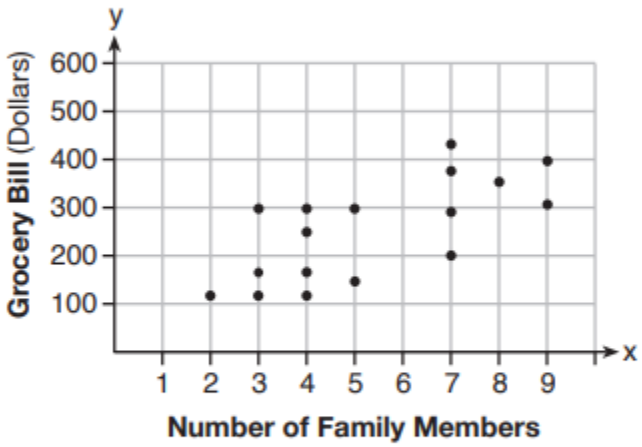
Name……..Period…….March 15, 2024

Classwork

1.

The scatter plot below shows the relationship between the number of members in a family and the amount of the family's weekly grocery bill.



The most appropriate prediction of the grocery bill for a family that consists of six members is

(1) \$100
(2) \$300
(3) \$400
(4) \$500

2

The function $g(x)$ is defined as $g(x) = -2x^2 + 3x$. The value of $g(-3)$ is

(1) -27
(2) -9
(3) 27
(4) 45

3.

Which expression results in a rational number?

(1) $\sqrt{121} - \sqrt{21}$
(2) $\sqrt{25} \cdot \sqrt{50}$
(3) $\sqrt{36} \div \sqrt{225}$
(4) $3\sqrt{5} + 2\sqrt{5}$

4.

The math department needs to buy new textbooks and laptops for the computer science classroom. The textbooks cost \$116.00 each, and the laptops cost \$439.00 each. If the math department has \$6500 to spend and purchases 30 textbooks, how many laptops can they buy?

(1) 6
(2) 7
(3) 11
(4) 12

5

What is the solution to the equation $\frac{3}{5}\left(x + \frac{4}{3}\right) = 1.04$?

(1) $3.0\overline{6}$
(2) 0.4
(3) $-0.4\overline{8}$
(4) $-0.709\overline{3}$

6

The area of a rectangle is represented by $3x^2 - 10x - 8$. Which expression can also be used to represent the area of the same rectangle?

(1) $(3x + 2)(x - 4)$
(2) $(3x + 2)(x + 4)$
(3) $(3x + 4)(x - 2)$
(4) $(3x - 4)(x + 2)$

7.

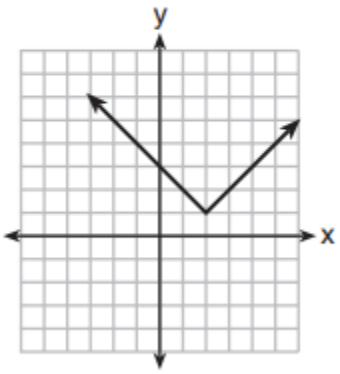
Which relation does *not* represent a function?

x	1	2	3	4	5	6
y	3.2	4	5.1	6	7.4	8.8

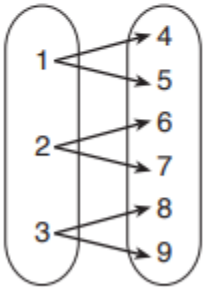
(1)

$y = 3\sqrt{x+1} - 2$

(3)



(2)



(4)

8.

Britney is solving a quadratic equation. Her first step is shown below.

Problem: $3x^2 - 8 - 10x = 3(2x + 3)$
Step 1: $3x^2 - 10x - 8 = 6x + 9$

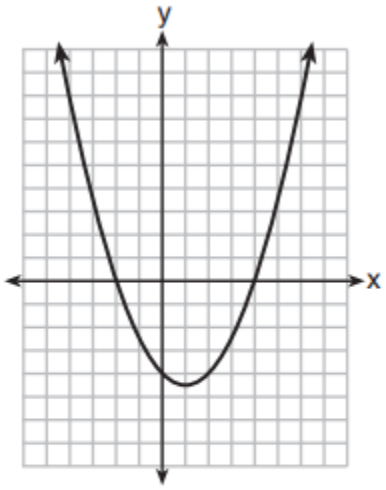
Which two properties did Britney use to get to step 1?

I. addition property of equality
II. commutative property of addition
III. multiplication property of equality
IV. distributive property of multiplication over addition

(1) I and III
(2) I and IV
(3) II and III
(4) II and IV

9

The graph of $y = \frac{1}{2}x^2 - x - 4$ is shown below. The points $A(-2,0)$, $B(0,-4)$, and $C(4,0)$ lie on this graph.



Which of these points can determine the zeros of the equation $y = \frac{1}{2}x^2 - x - 4$?

(1) A, only
(2) B, only
(3) A and C, only
(4) A, B, and C

10.

Given the parent function $f(x) = x^3$, the function $g(x) = (x - 1)^3 - 2$ is the result of a shift of $f(x)$

(1) 1 unit left and 2 units down
(2) 1 unit left and 2 units up
(3) 1 unit right and 2 units down
(4) 1 unit right and 2 units up

11.

If $C = 2a^2 - 5$ and $D = 3 - a$, then $C - 2D$ equals

(1) $2a^2 + a - 8$

(2) $2a^2 - a - 8$

(3) $2a^2 + 2a - 11$

(4) $2a^2 - a - 11$

12.

Marc bought a new laptop for $1250. He kept track of the value of the laptop over the next three years, as shown in the table below.

Years After Purchase	Value in Dollars
1	1000
2	800
3	640

Which function can be used to determine the value of the laptop for x years after the purchase?

(1) $f(x) = 1000(1.2)^x$

(2) $f(x) = 1000(0.8)^x$

(3) $f(x) = 1250(1.2)^x$

(4) $f(x) = 1250(0.8)^x$

13.

The height of a ball Doreen tossed into the air can be modeled by the function $h(x) = -4.9x^2 + 6x + 5$, where x is the time elapsed in seconds, and $h(x)$ is the height in meters. The number 5 in the function represents

(1) the initial height of the ball

(2) the time at which the ball reaches the ground

(3) the time at which the ball was at its highest point

(4) the maximum height the ball attained when thrown in the air

14.

The function $f(x) = 2x^2 + 6x - 12$ has a domain consisting of the integers from -2 to 1, inclusive. Which set represents the corresponding range values for $f(x)$?

(1) $\{-32, -20, -12, -4\}$

(2) $\{-16, -12, -4\}$

(3) $\{-32, -4\}$

(4) $\{-16, -4\}$

15.

Which equation has the same solution as $x^2 + 8x - 33 = 0$?

(1) $(x + 4)^2 = 49$

(2) $(x - 4)^2 = 49$

(3) $(x + 4)^2 = 17$

(4) $(x - 4)^2 = 17$

16.

The table below shows the weights of Liam's pumpkin, $l(w)$, and Patricia's pumpkin, $p(w)$, over a four-week period where w represents the number of weeks. Liam's pumpkin grows at a constant rate. Patricia's pumpkin grows at a weekly rate of approximately 52%.

Weeks w	Weight in Pounds l(w)	Weight in Pounds p(w)
6	2.4	2.5
7	5.5	3.8
8	8.6	5.8
9	11.7	8.8

Assume the pumpkins continue to grow at these rates through week 13. When comparing the weights of both Liam's and Patricia's pumpkins in week 10 and week 13, which statement is true?

(1) Liam's pumpkin will weigh more in week 10 and week 13.

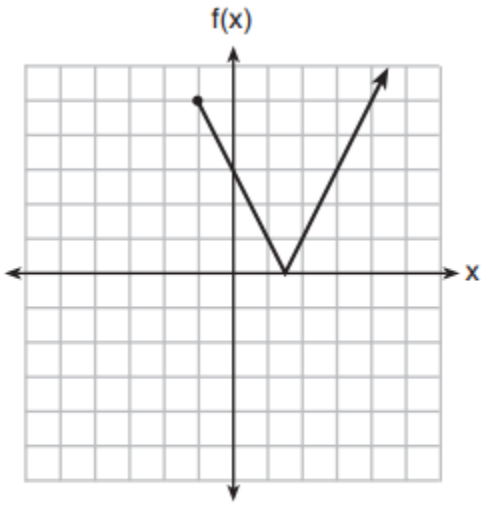
(2) Patricia's pumpkin will weigh more in week 10 and week 13.

(3) Liam's pumpkin will weigh more in week 10, and Patricia's pumpkin will weigh more in week 13.

(4) Patricia's pumpkin will weigh more in week 10, and Liam's pumpkin will weigh more in week 13.

17.

The function $f(x)$ is graphed below.



The domain of this function is

(1) all positive real numbers

(2) all positive integers

(3) $x \geq 0$

(4) $x \geq -1$

18.

Which pair of equations would have (–1,2) as a solution?

(1) $y = x + 3$ and $y = 2^x$

(2) $y = x - 1$ and $y = 2x$

(3) $y = x^2 - 3x - 2$ and $y = 4x + 6$

(4) $2x + 3y = -4$ and $y = -\frac{1}{2}x - \frac{3}{2}$

19

Which function could be used to represent the sequence 8, 20, 50, 125, 312.5,..., given that $a_1 = 8$?

(1) $a_n = a_{n-1} + a_1$

(2) $a_n = 2.5(a_{n-1})$

(3) $a_n = a_1 + 1.5(a_{n-1})$

(4) $a_n = (a_1)(a_{n-1})$

20.

The formula for electrical power, P, is $P = I^2R$, where I is current and R is resistance. The formula for I in terms of P and R is

(1) $I = \left(\frac{P}{R}\right)^2$

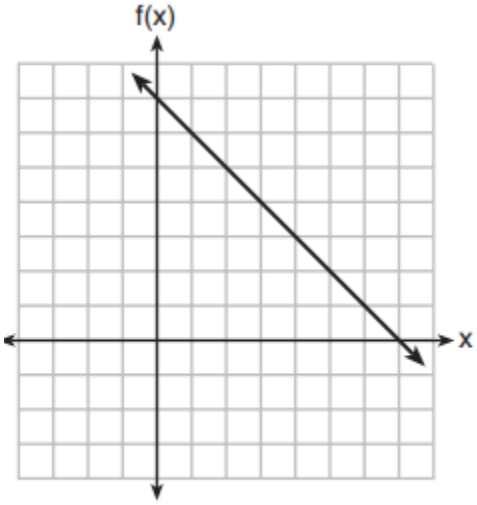
(2) $I = \sqrt{\frac{P}{R}}$

(3) $I = (P - R)^2$

(4) $I = \sqrt{P - R}$

21.

The functions $f(x)$, $q(x)$, and $p(x)$ are shown below.



$q(x) = (x - 1)^2 - 6$

x	p(x)
2	5
3	4
4	3
5	4
6	5

When the input is 4, which functions have the same output value?

(1) $f(x)$ and $q(x)$, only

(2) $f(x)$ and $p(x)$, only

(3) $q(x)$ and $p(x)$, only

(4) $f(x)$, $q(x)$, and $p(x)$

22

Using the substitution method, Vito is solving the following system of equations algebraically:

$$y + 3x = -4$$
$$2x - 3y = -21$$

Which equivalent equation could Vito use?

(1) $2(-3x - 4) + 3x = -21$

(2) $2(3x - 4) + 3x = -21$

(3) $2x - 3(-3x - 4) = -21$

(4) $2x - 3(3x - 4) = -21$

23

Materials A and B decay over time. The function for the amount of material A is $A(t) = 1000(0.5)^{2t}$ and for the amount of material B is $B(t) = 1000(0.25)^t$, where t represents time in days. On which day will the amounts of material be equal?

(1) initial day, only

(2) day 2, only

(3) day 5, only

(4) every day

24

The following conversion was done correctly:

$$\frac{3 \text{ miles}}{1 \text{ hour}} \cdot \frac{1 \text{ hour}}{60 \text{ minutes}} \cdot \frac{5280 \text{ feet}}{1 \text{ mile}} \cdot \frac{12 \text{ inches}}{1 \text{ foot}}$$

What were the final units for this conversion?

(1) minutes per foot

(2) minutes per inch

(3) feet per minute

(4) inches per minute

25

Adam ran for 30 minutes. He kept a record of his running speed, in miles per hour (mph), for each 5-minute interval. The table shows the changes in the running speed for different time intervals.

Interval of Time	Running Speed
First 5 minutes	Went from 0 mph to 7 mph
5 minutes to 15 minutes	Remained at 7 mph
15 minutes to 20 minutes	Went from 7 mph to 4 mph
20 minutes to 25 minutes	Went from 4 mph to 6 mph
25 minutes to 30 minutes	Went from 6 mph to 0 mph

Consider a graph in the *xy*-coordinate plane of Adam's running speeds as a function of time, in minutes. Assume that the increases and decreases in the running speed were constant.

Part A

In which time interval is the graph of the function increasing?

Select **all** that apply.

- A. 0 to 5 minutes
- B. 5 to 10 minutes
- C. 10 to 15 minutes
- D. 15 to 20 minutes
- E. 20 to 25 minutes
- F. 25 to 30 minutes

14. (continued from previous page)

Part B

In which time interval is the graph of the function decreasing?

Select **all** that apply.

- [ ] A. 0 to 5 minutes
- [ ] B. 5 to 10 minutes
- [ ] C. 10 to 15 minutes
- [ ] D. 15 to 20 minutes
- [ ] E. 20 to 25 minutes
- [ ] F. 25 to 30 minutes

26

The number of bacteria initially present in a culture was 1,000. Each hour, the number of bacteria in the culture was eight times the number that was present at the start of the preceding hour, as shown in the table.

Time (hours)	Number of Bacteria in the Culture
0	1,000
1	8,000
2	64,000
3	512,000

Which equation could be used to determine n, the number of bacteria in the culture at hour t?

- A. $n = 1,000(8,000)^t$
- B. $n = 1,000(2)^t$
- C. $n = 1,000(8)^t$
- D. $n = 1,000(2t)$

27

Solve algebraically for x: $3600 + 1.02x < 2000 + 1.04x$

28.

The number of people who attended a school's last six basketball games increased as the team neared the state sectional games. The table below shows the data.

Game	13	14	15	16	17	18
Attendance	348	435	522	609	696	783

State the type of function that best fits the given data. Justify your choice of a function type.