Classwork

1.

The cost of airing a commercial on television is modeled by the function $C(n) = 110n + 900$, where n is the number of times the commercial is aired. Based on this model, which statement is true?

(1) The commercial costs $0 to produce and $110 per airing up to $900.

(2) The commercial costs $110 to produce and $900 each time it is aired.

(3) The commercial costs $900 to produce and $110 each time it is aired.

(4) The commercial costs $1010 to produce and can air an unlimited number of times.

2

The graph below represents a jogger's speed during her 20-minute jog around her neighborhood.
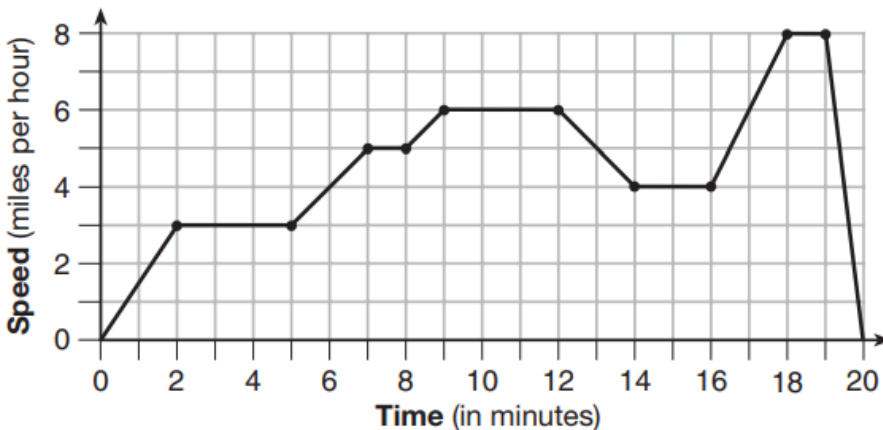
Which statement best describes what the jogger was doing during the 9–12 minute interval of her jog?

(1) She was standing still.

(2) She was increasing her speed.

(3) She was decreasing her speed.

(4) She was jogging at a constant rate.

3.

If the area of a rectangle is expressed as $x^4 - 9y^2$, then the product of the length and the width of the rectangle could be expressed as

(1) $(x - 3y)(x + 3y)$

(3) $(x^2 - 3y)(x^2 - 3y)$

(2) $(x^2 - 3y)(x^2 + 3y)$

(4) $(x^4 + y)(x - 9y)$

4.

Which table represents a function?

x	2	4	2	4
f(x)	3	5	7	9

(1)

x	3	5	7	9
f(x)	2	4	2	4

(3)

x	0	−1	0	1
f(x)	0	1	−1	0

(2)

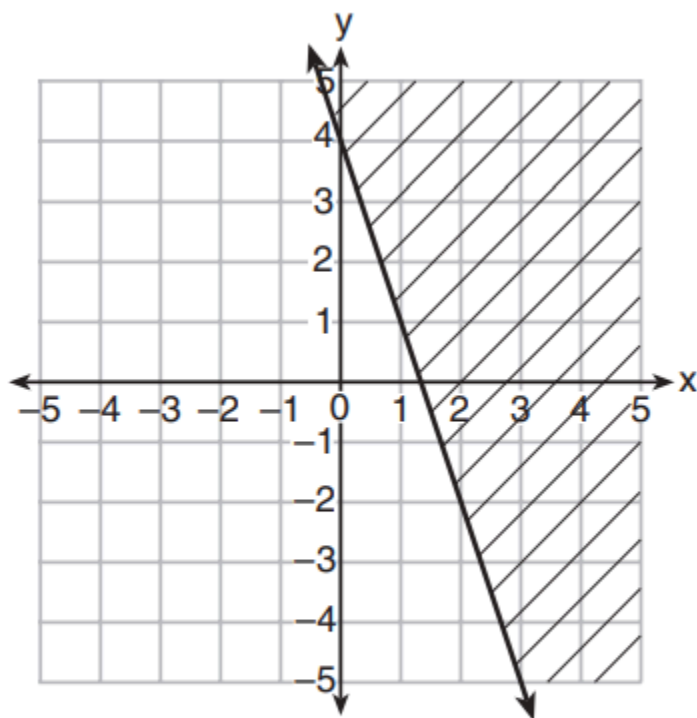| x	0	1	−1	0
f(x)	0	−1	0	1

(4)

5

Which inequality is represented in the graph below?

(1) $y \geq -3x + 4$

(2) $y \leq -3x + 4$

(3) $y \geq -4x - 3$

(4) $y \leq -4x - 3$

6

Mo's farm stand sold a total of 165 pounds of apples and peaches. She sold apples for $1.75 per pound and peaches for $2.50 per pound. If she made $337.50, how many pounds of peaches did she sell?
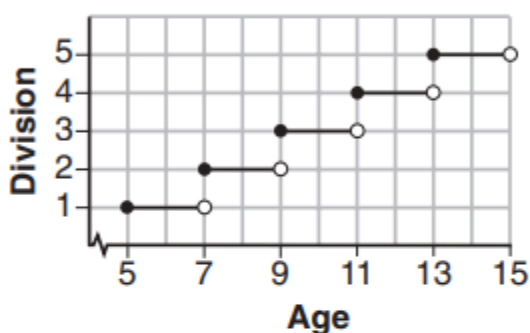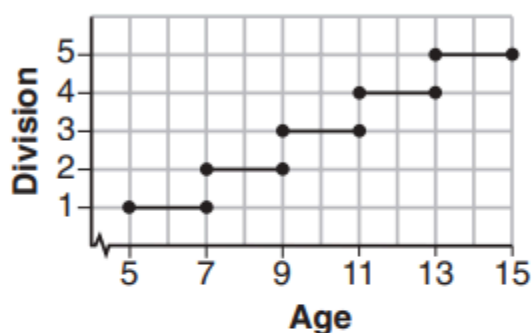
(1) 11

(2) 18

(3) 65

(4) 100

7.

Morgan can start wrestling at age 5 in Division 1. He remains in that division until his next odd birthday when he is required to move up to the next division level. Which graph correctly represents this information?

(1)

(3)
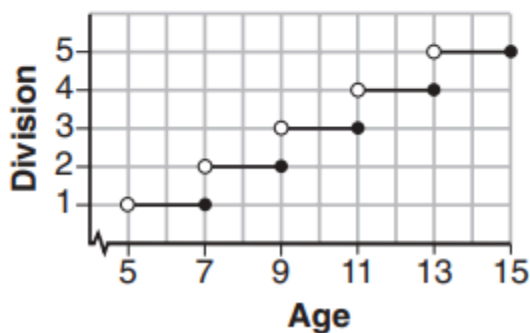
(2)
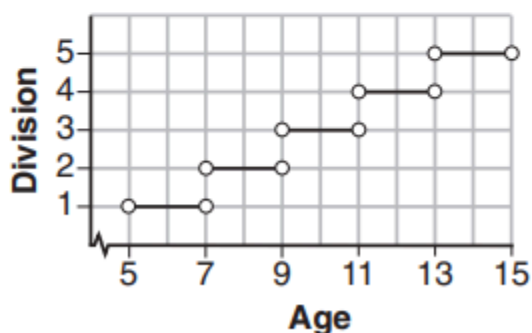
(4)

8.

Which statement is *not* always true?

(1) The sum of two rational numbers is rational.

(2) The product of two irrational numbers is rational.

(3) The sum of a rational number and an irrational number is irrational.

(4) The product of a nonzero rational number and an irrational number is irrational.

9

The graph of the function $f(x) = \sqrt{x} + 4$ is shown below.

f(x)

The domain of the function is

(1) $\{x|x > 0\}$ (3) $\{x|x > -4\}$

(2) $\{x|x \geq 0\}$ (4) $\{x|x \geq -4\}$

10.

What are the zeros of the function $f(x) = x^2 - 13x - 30$?

(1) -10 and 3   (3) -15 and 2

(2) 10 and -3 (4) 15 and -2

11.

Joey enlarged a 3-inch by 5-inch photograph on a copy machine.
He enlarged it four times. The table below shows the area of the
photograph after each enlargement.

Enlargement	0	1	2	3	4
Area (square inches)	15	18.8	23.4	29.3	36.6

What is the average rate of change of the area from the original
photograph to the fourth enlargement, to the *nearest tenth*?

(1) 4.3   (3) 5.4

(2) 4.5   (4) 6.0

12.

Which equation(s) represent the graph below?

I $y = (x + 2)(x^2 - 4x - 12)$

II $y = (x - 3)(x^2 + x - 2)$

III $y = (x - 1)(x^2 - 5x - 6)$
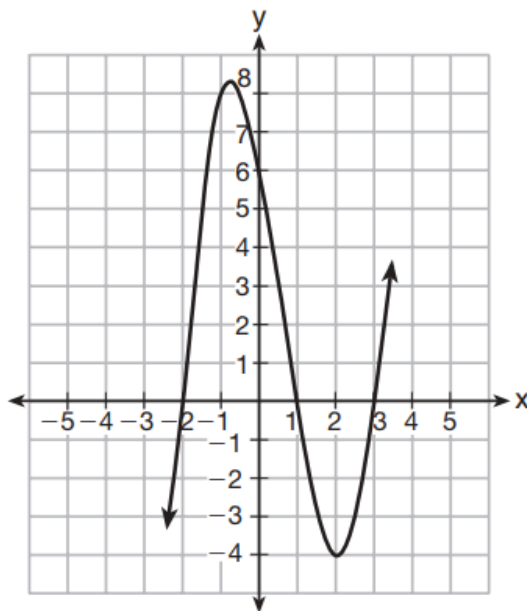
(1) I, only   (3) I and II

(2) II, only   (4) II and III

13.

A laboratory technician studied the population growth of a colony of bacteria. He recorded the number of bacteria every other day, as shown in the partial table below.

t (time, in days)	0	2	4
f(t) (bacteria)	25	15,625	9,765,625

Which function would accurately model the technician's data?

(1) $f(t) = 25^t$ (3) $f(t) = 25t$

(2) $f(t) = 25^{t+1}$ (4) $f(t) = 25(t + 1)$

14.

Which quadratic function has the largest maximum?

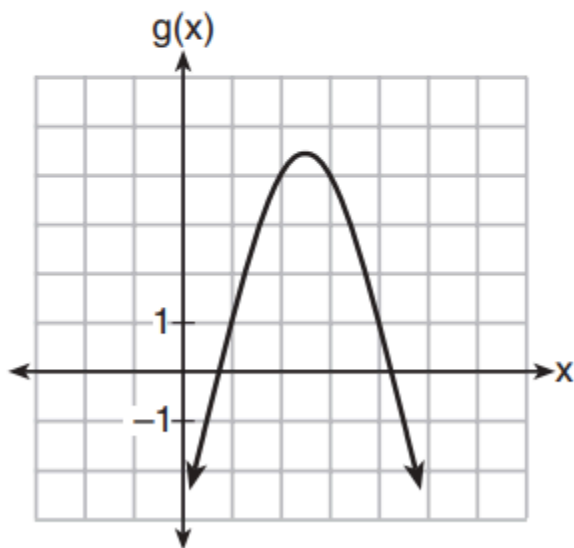$h(x) = (3 - x)(2 + x)$ $k(x) = -5x^2 - 12x + 4$

(1)   (3)

g(x)

x	f(x)
−1	−3
0	5
1	9
2	9
3	5
4	−3

(2)   (4)

15.

If $f(x) = 3^x$ and $g(x) = 2x + 5$, at which value of x is $f(x) < g(x)$?

(1) -1 (3) -3

(2) 2 (4) 4

16.

Beverly did a study this past spring using data she collected from a cafeteria. She recorded data weekly for ice cream sales and soda sales. Beverly found the line of best fit and the correlation coefficient, as shown in the diagram below.

Beverly's Cafeteria Study

$r = .96$

Cans of Soda Sold

Ice Cream Bars Sold
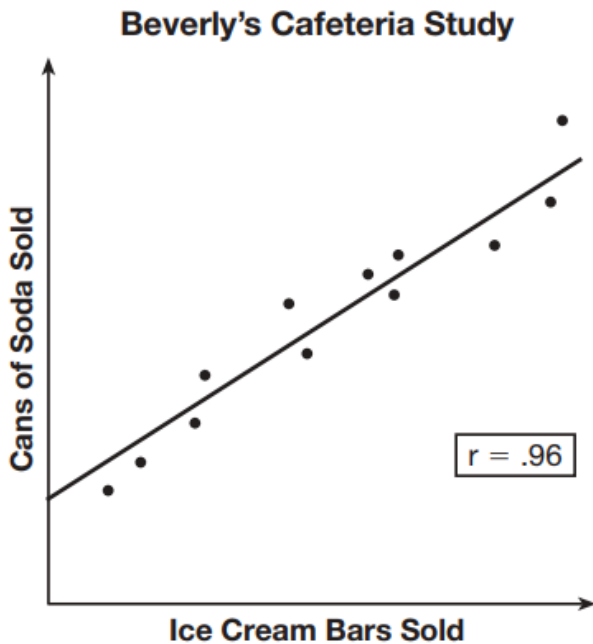
Given this information, which statement(s) can correctly be concluded?

I. Eating more ice cream causes a person to become thirsty.

II. Drinking more soda causes a person to become hungry.

III. There is a strong correlation between ice cream sales and soda sales.

(1) I, only   (3) I and III

(2) III, only   (4) II and III

17.

The function $V(t) = 1350(1.017)^t$ represents the value $V(t)$, in dollars, of a comic book t years after its purchase. The yearly rate of appreciation of the comic book is

(1) 17% (3) 1.017%

(2) 1.7% (4) 0.017%

18.

When directed to solve a quadratic equation by completing the square, Sam arrived at the equation $\left(x - \frac{5}{2}\right)^2 = \frac{13}{4}$. Which equation could have been the original equation given to Sam?

(1) $x^2 + 5x + 7 = 0$ (3) $x^2 - 5x + 7 = 0$

(2) $x^2 + 5x + 3 = 0$ (4) $x^2 - 5x + 3 = 0$

19

The distance a free falling object has traveled can be modeled by the equation $d = \frac{1}{2}at^2$, where a is acceleration due to gravity and t is the amount of time the object has fallen. What is t in terms of a and d?

(1) $t = \sqrt{\frac{da}{2}}$ (3) $t = \left(\frac{da}{d}\right)^2$

(2) $t = \sqrt{\frac{2d}{a}}$ (4) $t = \left(\frac{2d}{a}\right)^2$

20.

The table below shows the annual salaries for the 24 members of a professional sports team in terms of millions of dollars.

0.5	0.5	0.6	0.7	0.75	0.8
1.0	1.0	1.1	1.25	1.3	1.4
1.4	1.8	2.5	3.7	3.8	4
4.2	4.6	5.1	6	6.3	7.2

The team signs an additional player to a contract worth 10 million dollars per year. Which statement about the median and mean is true?

(1) Both will increase.

(2) Only the median will increase.

(3) Only the mean will increase.

(4) Neither will change.

21.

A student is asked to solve the equation $4(3x - 1)^2 - 17 = 83$. The student's solution to the problem starts as

$$4(3x - 1)^2 = 100$$
$$(3x - 1)^2 = 25$$

A correct next step in the solution of the problem is

(1) $3x - 1 = \pm 5$ (3) $9x^2 - 1 = 25$

(2) $3x - 1 = \pm 25$ (4) $9x^2 - 6x + 1 = 5$

22

A pattern of blocks is shown below.

Term 1   Term 2   Term 3   Term 4

If the pattern of blocks continues, which formula(s) could be used to determine the number of blocks in the nth term?

I	II	III
$a_n = n + 4$	$a_1 = 2$ $a_n = a_{n-1} + 4$	$a_n = 4n - 2$

(1) I and II

(2) I and III

(3) II and III

(4) III, only

23

What are the solutions to the equation $x^2 - 8x = 24$?

(1) $x = 4 \pm 2\sqrt{10}$

(2) $x = -4 \pm 2\sqrt{10}$

(3) $x = 4 \pm 2\sqrt{2}$

(4) $x = -4 \pm 2\sqrt{2}$

24

Natasha is planning a school celebration and wants to have live music and food for everyone who attends. She has found a band that will charge her $750 and a caterer who will provide snacks and drinks for $2.25 per person. If her goal is to keep the average cost per person between $2.75 and $3.25, how many people, p, must attend?

(1) $225 < p < 325$ (3) $500 < p < 1000$

(2) $325 < p < 750$ (4) $750 < p < 1500$

25

Consider a quadratic equation with integer coefficients and two distinct zeros. If one zero is irrational, which statement is true about the other zero?

A. The other zero must be rational.

B. The other zero must be irrational.

C. The other zero can be either rational or irrational.

D. The other zero must be non-real.

26

Let *a* represent a non-zero rational number and let *b* represent an irrational number.

2. **Part A**

Which expression could represent a rational number?

A. $-b$

B. $a + b$

C. ab

D. b^2

27

Ms. Fox asked her class "Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?" Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

28.

The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

	1 Club	2 Clubs	3 or More Clubs
9th	90	33	12
10th	125	12	15
11th	87	22	18
12th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?