Name……..Period…….March 01, 2024

Classwork

1.

Which statement is *not* always true?

(1) The product of two irrational numbers is irrational.

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

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

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

2.

A satellite television company charges a one-time installation fee and a monthly service charge. The total cost is modeled by the function $y = 40 + 90x$. Which statement represents the meaning of each part of the function?

(1) y is the total cost, x is the number of months of service, \$90 is the installation fee, and \$40 is the service charge per month.

(2) y is the total cost, x is the number of months of service, \$40 is the installation fee, and \$90 is the service charge per month.

(3) x is the total cost, y is the number of months of service, \$40 is the installation fee, and \$90 is the service charge per month.

(4) x is the total cost, y is the number of months of service, \$90 is the installation fee, and \$40 is the service charge per month.

3.

If $4x^2 - 100 = 0$, the roots of the equation are

(1) -25 and 25

(2) -25, only

(3) -5 and 5

(4) -5, only

4.

Isaiah collects data from two different companies, each with four employees. The results of the study, based on each worker's age and salary, are listed in the tables below.

Company 1

Worker's Age in Years	Salary in Dollars
25	30,000
27	32,000
28	35,000
33	38,000

Company 2

Worker's Age in Years	Salary in Dollars
25	29,000
28	35,500
29	37,000
31	65,000

Which statement is true about these data?

(1) The median salaries in both companies are greater than $37,000.

(2) The mean salary in company 1 is greater than the mean salary in company 2.

(3) The salary range in company 2 is greater than the salary range in company 1.

(4) The mean age of workers at company 1 is greater than the mean age of workers at company 2.

5

Which point is *not* on the graph represented by $y = x^2 + 3x - 6$?

(1) $(-6,12)$

(2) $(-4,-2)$

(3) $(2,4)$

(4) $(3,-6)$

6

A company produces x units of a product per month, where $C(x)$ represents the total cost and $R(x)$ represents the total revenue for the month. The functions are modeled by $C(x) = 300x + 250$ and $R(x) = -0.5x^2 + 800x - 100$. The profit is the difference between revenue and cost where $P(x) = R(x) - C(x)$. What is the total profit, $P(x)$, for the month?

(1) $P(x) = -0.5x^2 + 500x - 150$

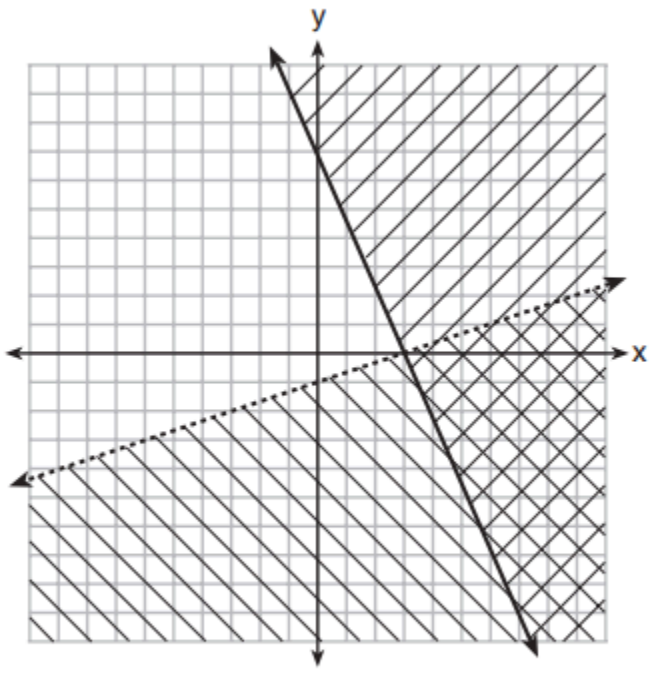
(2) $P(x) = -0.5x^2 + 500x - 350$

(3) $P(x) = -0.5x^2 - 500x + 350$

(4) $P(x) = -0.5x^2 + 500x + 350$

7.

What is one point that lies in the solution set of the system of inequalities graphed below?



(1) (7,0)

(2) (3,0)

(3) (0,7)

(4) (−3,5)

8.

The value of the x-intercept for the graph of $4x - 5y = 40$ is

(1) 10

(2) $\frac{4}{5}$

(3) $-\frac{4}{5}$

(4) -8

9

Sam and Jeremy have ages that are consecutive odd integers. The product of their ages is 783. Which equation could be used to find Jeremy's age, j, if he is the younger man?

(1) $j^2 + 2 = 783$

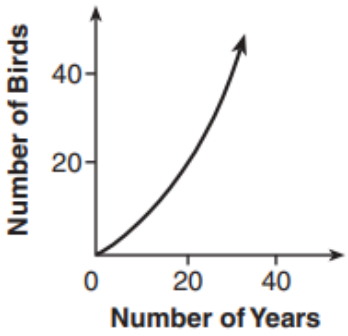
(2) $j^2 - 2 = 783$

(3) $j^2 + 2j = 783$

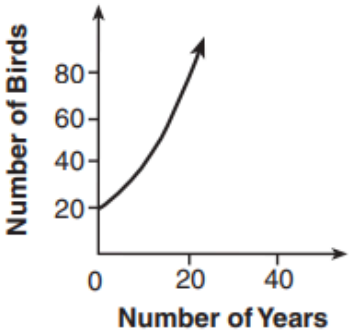
(4) $j^2 - 2j = 783$

10.

A population that initially has 20 birds approximately doubles every 10 years. Which graph represents this population growth?



(1)



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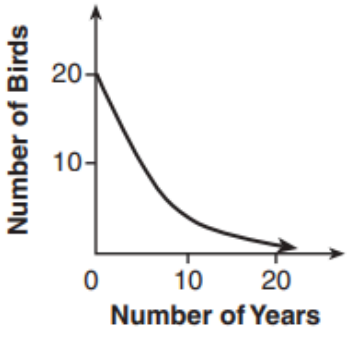

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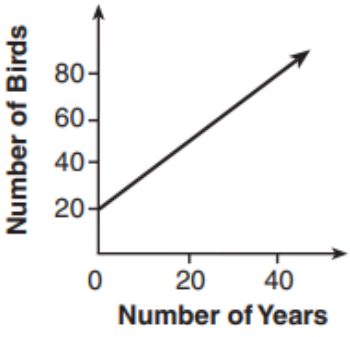


(4)

11.

Let f be a function such that $f(x) = 2x - 4$ is defined on the domain $2 \leq x \leq 6$. The range of this function is

(1) $0 \leq y \leq 8$

(2) $0 \leq y < \infty$

(3) $2 \leq y \leq 6$

(4) $-\infty < y < \infty$

12.

Which situation could be modeled by using a linear function?

(1) a bank account balance that grows at a rate of 5% per year, compounded annually

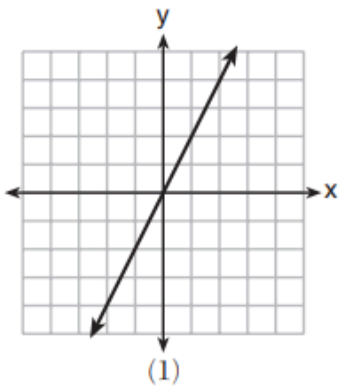
(2) a population of bacteria that doubles every 4.5 hours

(3) the cost of cell phone service that charges a base amount plus 20 cents per minute

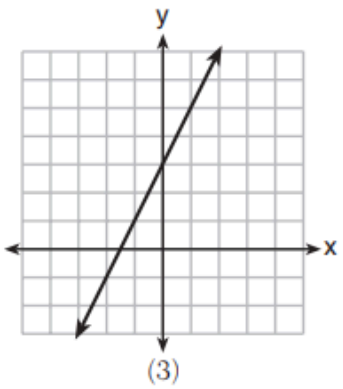
(4) the concentration of medicine in a person's body that decays by a factor of one-third every hour

13.

Which graph shows a line where each value of y is three more than half of x?



(1)



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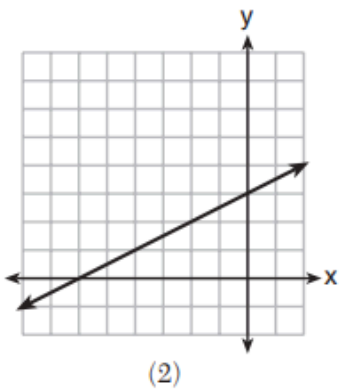

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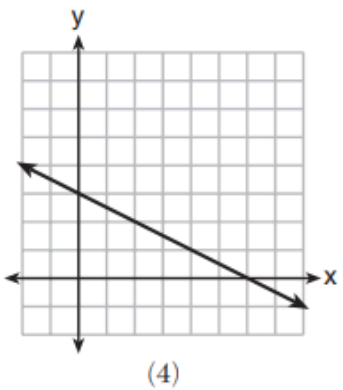


(4)

14.

The table below shows the average diameter of a pupil in a person's eye as he or she grows older.

Age (years)	**Average Pupil Diameter** (mm)
20	4.7
30	4.3
40	3.9
50	3.5
60	3.1
70	2.7
80	2.3

What is the average rate of change, in millimeters per year, of a person's pupil diameter from age 20 to age 80?

(1) 2.4
(2) 0.04
(3) -2.4
(4) -0.04

15.

Which expression is equivalent to $x^4 - 12x^2 + 36$?

(1) $(x^2 - 6)(x^2 - 6)$
(2) $(x^2 + 6)(x^2 + 6)$
(3) $(6 - x^2)(6 + x^2)$
(4) $(x^2 + 6)(x^2 - 6)$

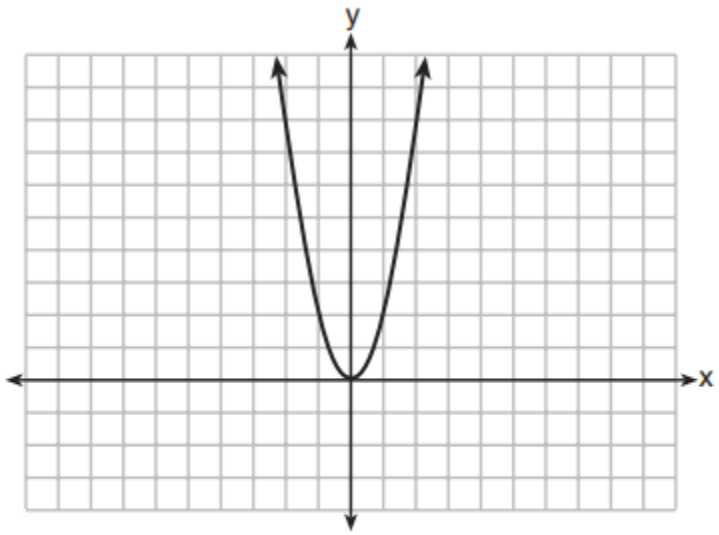
16.

The third term in an arithmetic sequence is 10 and the fifth term is 26. If the first term is a_1, which is an equation for the nth term of this sequence?

(1) $a_n = 8n + 10$
(2) $a_n = 8n - 14$
(3) $a_n = 16n + 10$
(4) $a_n = 16n - 38$

17.

The graph of the equation $y = ax^2$ is shown below.



If a is multiplied by $-\frac{1}{2}$, the graph of the new equation is

(1) wider and opens downward
(2) wider and opens upward
(3) narrower and opens downward
(4) narrower and opens upward

18.

The zeros of the function $f(x) = (x + 2)^2 - 25$ are

(1) -2 and 5
(2) -3 and 7
(3) -5 and 2
(4) -7 and 3

19

During the 2010 season, football player McGee's earnings, m, were 0.005 million dollars more than those of his teammate Fitzpatrick's earnings, f. The two players earned a total of 3.95 million dollars. Which system of equations could be used to determine the amount each player earned, in millions of dollars?

(1) $m + f = 3.95$
$m + 0.005 = f$

(2) $m - 3.95 = f$
$f + 0.005 = m$

(3) $f - 3.95 = m$
$m + 0.005 = f$

(4) $m + f = 3.95$
$f + 0.005 = m$

20.

What is the value of x in the equation $\frac{x-2}{3} + \frac{1}{6} = \frac{5}{6}$?

(1) 4

(2) 6

(3) 8

(4) 11

21.

The table below shows the number of grams of carbohydrates, x, and the number of Calories, y, of six different foods.

Carbohydrates (x)	**Calories** (y)
8	120
9.5	138
10	147
6	88
7	108
4	62

Which equation best represents the line of best fit for this set of data?

(1) $y = 15x$

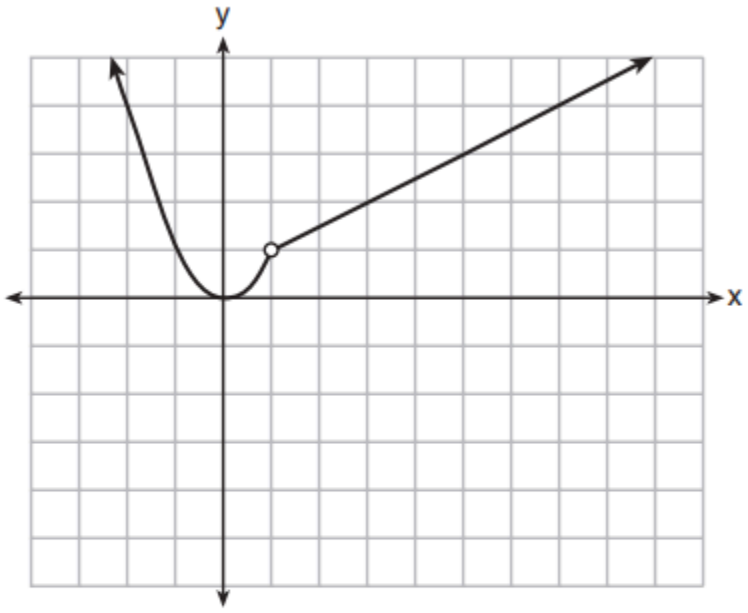
(2) $y = 0.07x$

(3) $y = 0.1x - 0.4$

(4) $y = 14.1x + 5.8$

22

A function is graphed on the set of axes below.



Which function is related to the graph?

(1) $f(x) = \begin{cases} x^2, & x < 1 \\ x - 2, & x > 1 \end{cases}$

(2) $f(x) = \begin{cases} x^2, & x < 1 \\ \frac{1}{2}x + \frac{1}{2}, & x > 1 \end{cases}$

(3) $f(x) = \begin{cases} x^2, & x < 1 \\ 2x - 7, & x > 1 \end{cases}$

(4) $f(x) = \begin{cases} x^2, & x < 1 \\ \frac{3}{2}x - \frac{9}{2}, & x > 1 \end{cases}$

23

The function $h(t) = -16t^2 + 144$ represents the height, $h(t)$, in feet, of an object from the ground at t seconds after it is dropped. A realistic domain for this function is

(1) $-3 \leq t \leq 3$

(2) $0 \leq t \leq 3$

(3) $0 \leq h(t) \leq 144$

(4) all real numbers

24

If $f(1) = 3$ and $f(n) = -2f(n-1) + 1$, then $f(5) =$

(1) -5

(2) 11

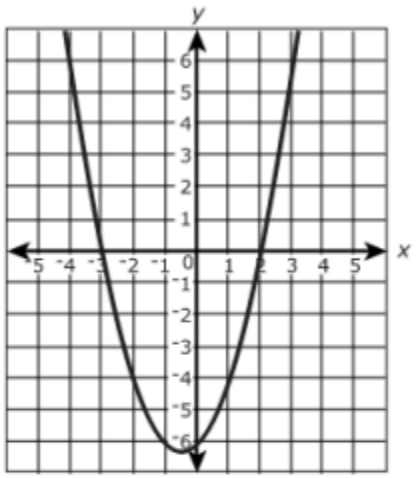
(3) 21

(4) 43

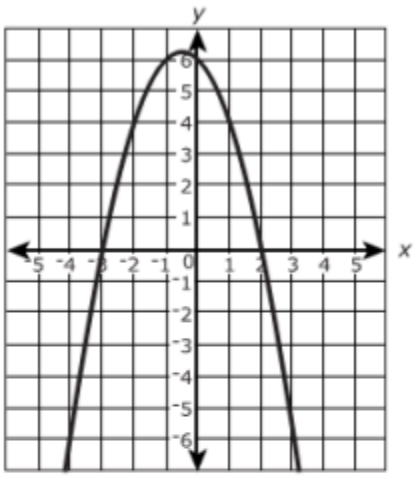
25

What is the graph of the equation $y = x^2 - x - 6$ in the *xy*-coordinate plane?

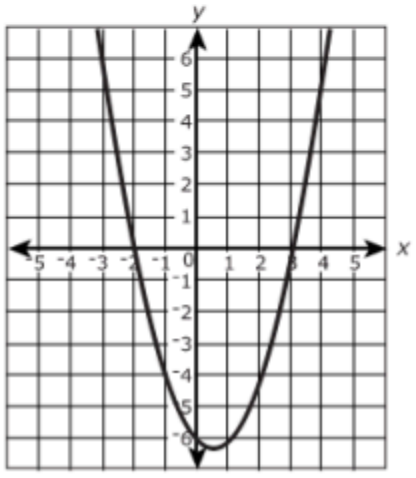
A.



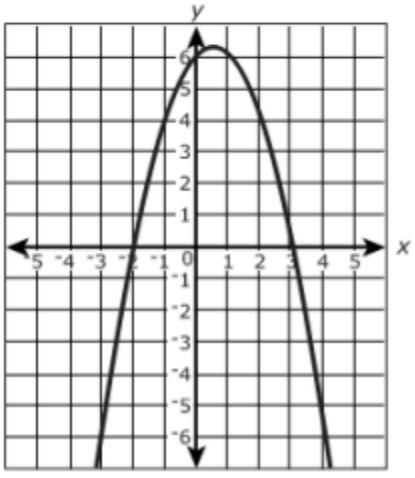
C.



B.



D.



26

Subtract $(4x^2 - x + 6)$ from $(3x^2 + 5x - 8)$.

- A. $7x^2 + 6x - 14$
- B. $-x^2 + 4x + 2$
- C. $7x^2 + 4x - 2$
- D. $-x^2 + 6x - 14$

27

In the equation $x^2 + 10x + 24 = (x + a)(x + b)$, b is an integer. Find algebraically *all* possible values of b.

28.

Rhonda deposited $3000 in an account in the Merrick National Bank, earning 4.2% interest, compounded annually. She made no deposits or withdrawals. Write an equation that can be used to find B, her account balance after t years.