Advanced Geometry Summer Work

Dear Future Advanced Geometry Students,

In order to best prepare you for the exciting Advanced Geometry class this fall it is helpful for me to know what Algebra skills you are bringing with you to high school. The purpose of the summer work is to review Algebra concepts that you would have seen this year. If there are topics that you are having difficulty with, please try to find a resource online that may be able to help you. If you are still struggling, you can send me an email and I can provide you with some support. Do your best to complete this packet by the beginning of school in September. If you are able to purchase a TI-84 graphing calculator before the start of the school year, that would be very helpful for you with the summer work and this course next year.

I am looking forward to meeting all of you in September. Have a wonderful summer and I will see you all in the fall.

<div align="right">

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Name: _____

Date: _____ Per: _____

SHOW ALL WORK NEEDED TO ANSWER EACH QUESTION! Good Luck! ☺

1. What value of x will make the equation below true?

$$\frac{1}{4}(8x - 20) - 16 = 10x + 51$$

A. -4

B. 5

C. 9

D. -9

2. Which equation has no solution?

F. $x - 5(x - 4) = 2(2x + 7) + 6$

G. $5(x + 1) - 3x = 5 - 2(5 - x)$

H. $1 - 3(x + 3) = 2(3x - 4) - 9x$

J. $3(x - 4) + x = 4(3 - x)$

3. Identify the property that justifies the work between Step 1 and Step 2.

Step 1: $30 \geq 4x + 2$

Step 2: $30 + (-2) \geq 4x + 2 + (-2)$

Step 3: $28 \geq 4x$

Step 4: $\left(\frac{1}{4}\right) 28 \geq \left(\frac{1}{4}\right) 4x$

Step 5: $7 \geq x$

A. Addition Property of Inequality

B. Subtraction Property of Inequality

C. Associative Property of Addition

D. Identity Property of Addition

4. What value of x makes the inequality true?

$$3(2x - 1) - 11x \leq -3x + 5$$

F. $\{x:\ x \geq -4\}$

G. $\{x:\ x \leq -4\}$

H. $\{x:\ x \geq -1\}$

J. $\{x:\ x \leq -1\}$

5. Find the value of the expression below when $x = \frac{3}{4}$.

$$4x^2 + 8x - 5$$

A. 10

B. 4

C. $\frac{13}{4}$

D. $\frac{53}{4}$

6. Which statement is justified by the transitive property of equality?

   F. $(x + y) + z = x + (y + z)$

   G. If $7x = 14$, then $14 = 7x$

   H. If $-3x = y$, and $y = 8z$, then $-3x = 8z$

   J. $x(y - z) = xy - xz$

7. Evaluate the expression below if $a = 64$, $b = 9$, and $c = 5$

$$\frac{12b - 2^c}{\sqrt[3]{a}}$$

   A. 19   **C.** $\dfrac{49}{4}$

   B. $\dfrac{19}{2}$ **D.** $\dfrac{49}{2}$

8. The formula below gives the sum of the degrees, S, of the interior angles of a polygon. If n represents the number of sides, which equation solves for n?
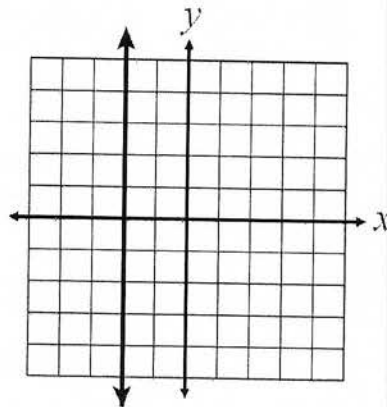
$$S = (n - 2) \cdot 180$$

   F. $n = \dfrac{S}{180} + 2$ **H.** $n = \dfrac{S + 2}{180}$

   G. $n = 180S + 2$ **J.** $n = (S + 2) \cdot 180$

9. What is most likely the slope of the line graphed?

   A. -2

   B. 0

   C. 2

   D. undefined

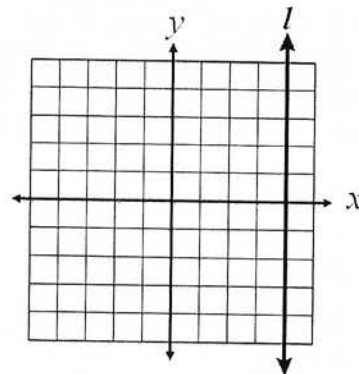**10.** Find the slope of the line between the coordinates (-6, -13) and (3, -1).

   F. $\dfrac{3}{4}$ **H.** $-\dfrac{3}{4}$

   G. $\dfrac{4}{3}$ **J.** $-\dfrac{4}{3}$

11. Which line best models line l?
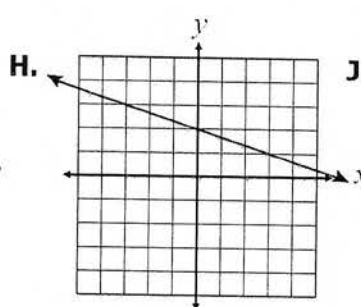

   A. $x = 4$

   B. $y = 4$

   C. $x = 4y$

   D. $y = x + 4$

12. Which best represents the line $y = -\dfrac{1}{3}x + 2$?

F.   **G.**   **H.**   **J.**
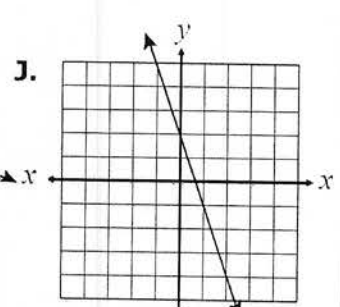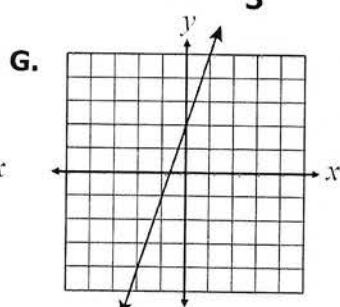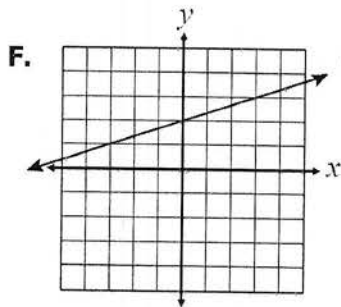
13. Which best represents the equation of the line below?

$$5x - y = 2$$

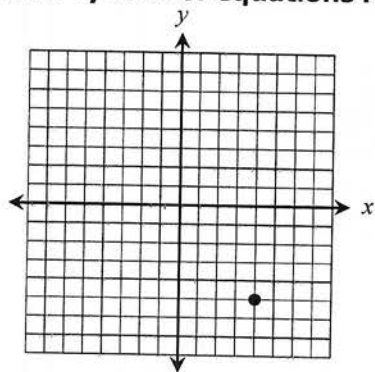**A.**

B.

C.

D.
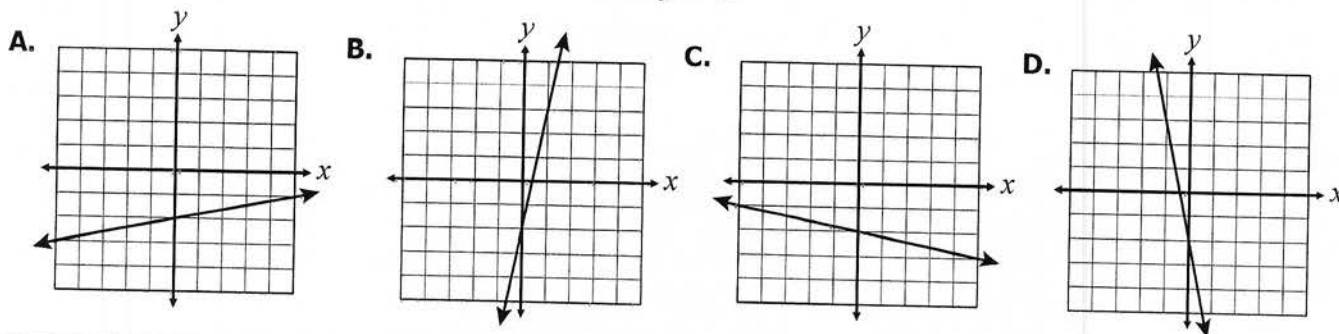
14. Which is an equation of the line that passes through the points (5, 2) and (10, -3)?

F. $y = x - 3$

G. $y = x - 8$

H. $y = -x + 7$

J. $y = -x + 12$

15. A line passes through the point (3, -1) and has a slope of $-\dfrac{2}{3}$. Which of the following points also lies on this line?

A. (9, 5)

B. (-3, 1)

C. (6, 3)

D. (-9, 7)

16. Which system of equations results in the solution plotted on the grid?

F. $\begin{cases} x = -5 \\ x - 4y = 24 \end{cases}$

G. $\begin{cases} 3x - y = -7 \\ 4x = 5y \end{cases}$

H. $\begin{cases} 3x + 2y = 2 \\ x - y = 1 \end{cases}$

J. $\begin{cases} x + y = -1 \\ x - 2y = 14 \end{cases}$

17. Which ordered pair represents the solution to the system of equations?

$$\begin{cases} 2x - 7y = 0 \\ x - 6y = -5 \end{cases}$$

A. (7, 2)

B. (2, 7)

C. (1, 1)

D. (-11, -1)

18. Describe the type of solution for the linear system of equations given below.

$$\begin{cases} x + 4y = 7 \\ 8y = 14 - 2x \end{cases}$$

F. no solution

G. infinite solutions

H. one solution

J. two solutions

19. Jack paid $13.75 to buy 3 slices of pizza and 4 hot dogs at a concession stand. Sarah paid $9.75 to buy 2 slices of pizza and 3 hot dogs from the same concession stand. What was the price of a slice of pizza?
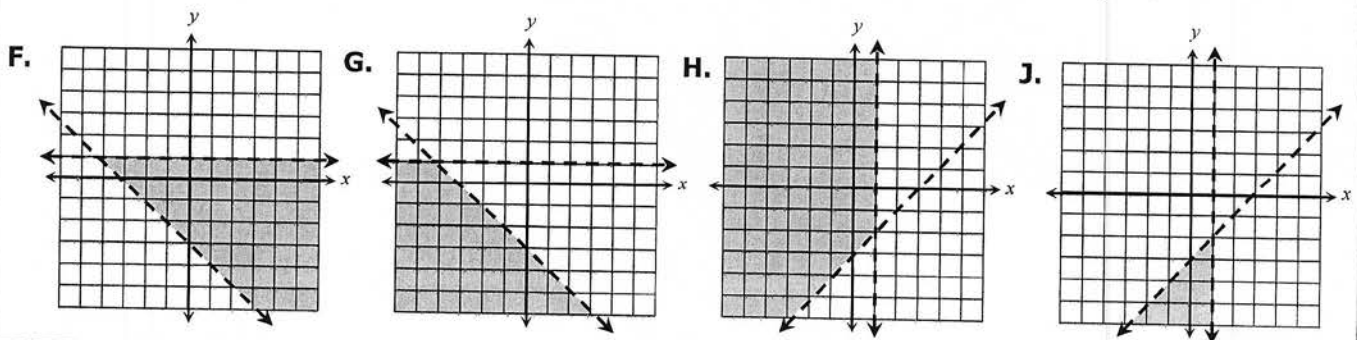
- **A.** $1.50
- **B.** $1.75
- **C.** $2.00
- **D.** $2.25

20. Which inequality is equivalent to $4x - 2y \le 8$?

- **F.** $y \le 2x - 4$
- **G.** $y \ge 2x - 4$
- **H.** $y \le -2x - 4$
- **J.** $y \ge -2x - 4$

21. For which system of inequalities is $(-7, -2)$ a solution?

- **A.** $\begin{cases} x + y > -9 \\ 2x - 5y > -4 \end{cases}$
- **C.** $\begin{cases} x + y \ge -8 \\ 2x - 5y \ge -5 \end{cases}$
- **B.** $\begin{cases} x + y < -8 \\ 2x - 5y > -4 \end{cases}$
- **D.** $\begin{cases} x + y \ge -9 \\ 2x - 5y > -5 \end{cases}$

22. Which graph shows the solution to the following system of inequalities: $\begin{cases} x < 1 \\ x - y < 3 \end{cases}$

F.

G.

H.

J.

23. What is the simplified form of the expression below?

$$\frac{(3m^4 n)^3 (2m^2 n^5 p)}{6m^4 n^9 p^8}$$

- **A.** $9m^5 n p^7$
- **C.** $\dfrac{m^5 n^6}{p^7}$
- **B.** $\dfrac{m^{10}}{np^7}$
- **D.** $\dfrac{9m^{10}}{np^7}$

24. What is the simplified form of $(-5x^{-3}y^4)^2$?

- **F.** $\dfrac{10y^8}{x^6}$
- **H.** $\dfrac{-10y^8}{x^6}$
- **G.** $\dfrac{25y^8}{x^6}$
- **J.** $\dfrac{-25y^8}{x^6}$
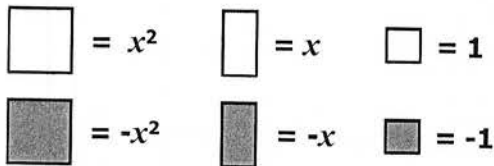
25. What missing exponent makes the statement true?

$$\frac{w^{\boxed{?}}}{w^{-2}} = \frac{1}{w^{6}}$$

A. -8
B. -12
C. 8
D. 12

26. If the dimensions of a rectangular garden can be represented by $(2x + 11)$ and $(3x + 5)$, then what is the area of the garden?

F. $5x + 16$
G. $5x^2 + 43x + 55$
H. $6x^2 + 43x + 55$
J. $6x^2 + 43x + 16$

Use the models below for questions 27.

$\square = x^2$ $\square = x$ $\square = 1$

$\blacksquare = -x^2$ $\blacksquare = -x$ $\blacksquare = -1$

27. Which polynomial is represented by the following diagram?

A. $(x^2 - 2x - 4) + (x^2 + 2x - 1)$

B. $(3x^2 - 7x + 1) - (x^2 - 3x + 4)$

C. $(2x + 1)(x - 3)$

D. $\dfrac{8x^{12} - 16x^7 - 12x^6}{4x^6}$

28. When completely factored, $2x^3 - 200x$ equals –

F. $2x(x^2 - 100)$
G. $2x(x - 10)(x - 10)$
H. $2x(x + 10)(x - 10)$
J. $2x(x + 50)(x - 50)$

29. For which value of b would $x^2 + bx - 24$ be prime?

A. 3
B. 5
C. 10
D. 23

30. Which of the following binomials is a factor of the expression $8y^2 - 10y - 3$?

F. $(4y - 1)$
G. $(4y + 1)$
H. $(2y + 3)$
J. $(y - 3)$

31. Which of the polynomials below have a binomial factor of $(x - 4)$?

I.	$x^2 - 4x - 32$
II.	$2x^2 + x - 36$
III.	$x^2 - 10x + 24$
IV.	$x^2 - 16x$

A. I and III
B. II, III, and IV
C. III only
D. II and III

32. In simplest form, $\sqrt{845}$ is equal to —

    F. 13

    G. $13\sqrt{2}$

    H. $13\sqrt{3}$

    J. $13\sqrt{5}$

33. What is $\sqrt[3]{2187}$ in simplest form?

    A. $3\sqrt[3]{9}$

    B. $3\sqrt[3]{81}$

    C. $9\sqrt[3]{3}$

    D. $27\sqrt[3]{3}$

34. Written in simplest radical form, $\sqrt{192a^{36}b^{9}}$ is equal to —

    F. $4a^{6}b^{3}\sqrt{12}$

    G. $4a^{18}b^{4}\sqrt{12b}$

    H. $8a^{6}b^{3}\sqrt{3}$

    J. $8a^{18}b^{4}\sqrt{3b}$

35. Which of the following values for x will make relation A shown below a function?

$$A = \{(3, 5), (4, 9), (7, 2), (x, 6)\},$$
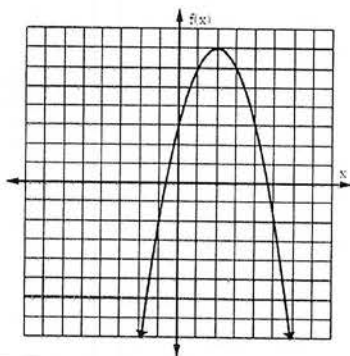
    A. 3

    B. 4

    C. 5

    D. 7

36. What is $h(-8)$ for $h(x) = \frac{1}{4}x^{2}+7x$?

    F. -40

    G. -72

    H. -52

    J. -60

37. If $f(-2) = 16$, which could be the equation for $f(x)$?

    A. $f(x) = x - 18$

    B. $f(x) = 20 - 2x$

    C. $f(x) = 3x + 24$

    D. $f(x) = 8 - 4x$

38. The graph of function $f(x)$ is shown below. What is $f(1) - f(5)$?

    F. -6

    G. -4

    H. 4

    J. 8

39. What are the range values of the function $f(x) = -3x^{2} + 5$ for the domain values $\{-2, 0, 1\}$?
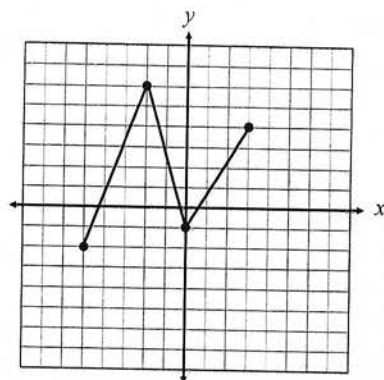
    A. $\{-31, -4, 5\}$

    B. $\{-7, 2, 5\}$

    C. $\{5, 8, 17\}$

    D. $\{5, 14, 41\}$

40. What is the domain of the relation shown in the table below?

x	-5	-2	0	3	6
y	-23	-14	-8	1	10

- **F.** {-5, -2, 0, 3, 6}
- **G.** {-23, -14, -8, 1, 10}
- **H.** {-23, -14, -8, -5, -2, 0, 1, 3, 6, 10}
- **J.** {(-5, -23), (-2, -14), (0, -8), (3, 1), (6, 10)}

41. What is the range of the function shown?

- **A.** $\{x: -2 \leq x \leq 6\}$
- **B.** $\{x: -5 \leq x \leq 3\}$
- **C.** $\{y: -2 \leq y \leq 6\}$
- **D.** $\{y: -5 \leq y \leq 3\}$

42. A function g is described below:

- $g(x) = 2(x - 3)^2 - 5$

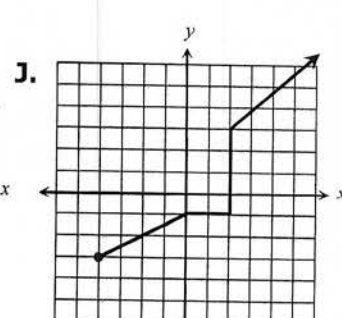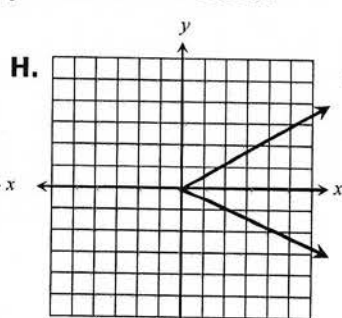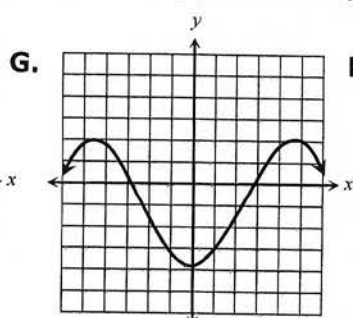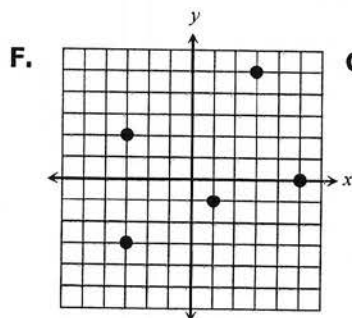- The domain of g is all real numbers greater than 0.

The range of g is all real numbers greater than or equal to –

- **F.** 5
- **G.** -5
- **H.** 3
- **J.** -3

43. Which function has an x-intercept at (-1, 0) and a y-intercept at (0, 4)?
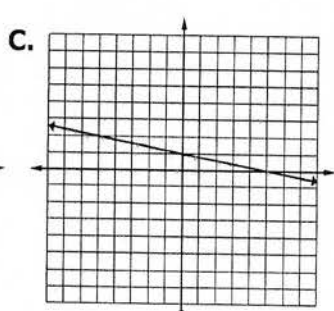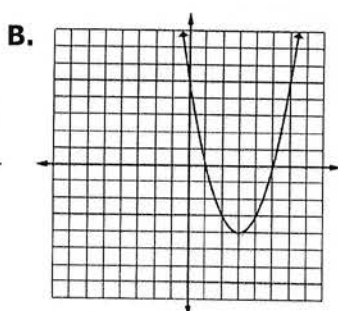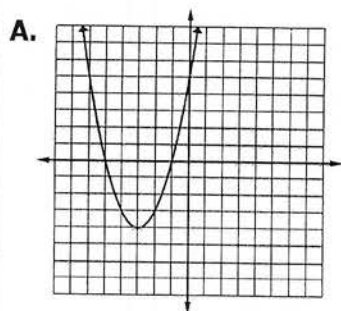
- **A.** $y = -x + 4$
- **B.** $x - 4y = 4$
- **C.** $y = (x - 1)^2 + 4$
- **D.** $y = -x^2 + 3x + 4$

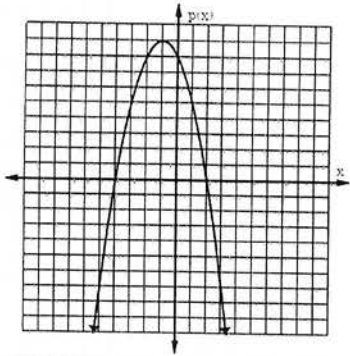**44.** Which of the following graphs appears to represent a function?

F.

G.

H.

J.

45. Which graph represents the function below?

$$f(x) = (x + 1)(x + 5)$$

A.

B.

C.

D.
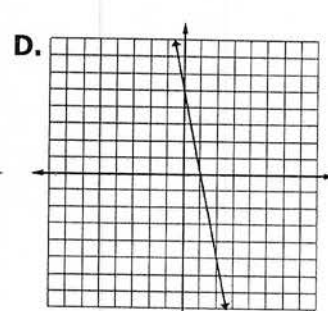
46. The graph of $p(x) = -x^2 - 2x + 8$ is shown. Identify each solution to $p(x) = 0$.

F. $\{-4, 2, 8\}$

G. $\{-4, 2\}$

H. $\{-4, 8\}$

J. $\{-2, 4\}$

47. Which quadratic equation has roots of 5 and 7?

A. $y = x^2 + 2x - 35$

B. $y = x^2 - 2x - 35$

C. $y = x^2 + 12x + 35$

D. $y = x^2 - 12x + 35$

48. Which of the following is a solution to $4x^2 + 8x - 12 = 0$?

F. -1

G. -3

H. 3

J. 0

49. What are the solutions of the equation $10x^2 + x = 2$?

A. $\left\{-\dfrac{1}{2}, \dfrac{2}{5}\right\}$

C. $\left\{-5, \dfrac{1}{2}\right\}$

B. $\left\{-\dfrac{2}{5}, \dfrac{1}{2}\right\}$

D. $\left\{-\dfrac{1}{2}, 5\right\}$

50. What are the solutions to the equation $2 - 4x^2 = -110$?

F. $x = \left\{\pm 3\sqrt{3}\right\}$

G. $x = \left\{\pm 9\sqrt{3}\right\}$

H. $x = \left\{\pm 2\sqrt{7}\right\}$

J. $x = \left\{\pm 4\sqrt{7}\right\}$

51. What are the solutions to the equation $-x^2 - 2x + 47 = 0$?

A. $x = \left\{1 \pm 7\sqrt{3}\right\}$

B. $x = \left\{-1 \pm 3\sqrt{7}\right\}$

C. $x = \left\{1 \pm 16\sqrt{3}\right\}$

D. $x = \left\{-1 \pm 4\sqrt{3}\right\}$

52. Which functions below have a zero of -5?

I.	$p(x) = x^2 + 7x + 10$
II.	$h(x) = 2(x + 5)(x - 5)$
III.	$g(x) = 6(x - 5)$
IV.	$f(x) = 3x^2 - 15x$
V.	$k(x) = 4x^2 + 17x - 15$

F. II and III

G. II, III, and IV

H. I, II, and V

J. I, II, IV, and V

53. The path of a firecracker is modeled by the equation $h(t) = -t^2 + 19t + 14$, where $h(t)$ is the height, in feet, of the firecracker at any given time, t. What is the height of the firecracker after 4 seconds from launch?

    A. 63 feet

    B. 68 feet

    C. 70 feet

    D. 74 feet

54. Which is most likely the equation of the line of best fit for the set of data points?
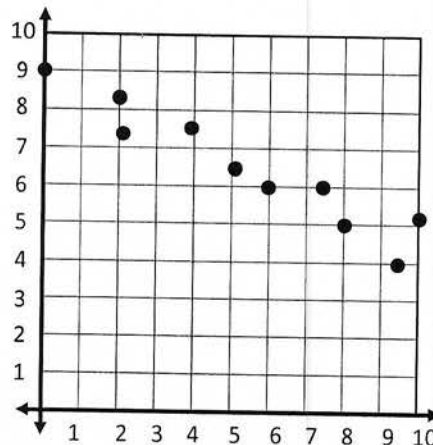
    F. $y = 2x + 9$ **H.** $y = \dfrac{1}{2}x + 9$

    G. $y = -2x + 9$ **J.** $y = -\dfrac{1}{2}x + 9$

55. The data below represents the number of yearly customers, in millions, at a fast food restaurant since 1984. Which is closest to the number of customers that can be expected in 2016?

Year	Customers
1984	30.4
1987	44.2
1992	48.1
1998	55.3
2003	62.8
2010	77.5

    A. 82 million

    B. 86 million

    C. 90 million

    D. 94 million

56. The table shows the number of customers who visited a store each hour since it opened this morning. Which of the following equations for the curve of best fit most closely describes the data?

Hour, x	Customers, y
1	15
2	26
3	33
4	36
5	35
6	30
7	21

    F. $y = 2x^2 - 17x$

    G. $y = -2x^2 + 17x$

    H. $y = x + 24$

    J. $y = -2x + 17$

57. The amount of pay, p, that Susan earns varies directly with the number of hours, h, that she works. If k is the constant of variation, which equation represents this situation?

A. $p = \dfrac{k}{h}$

B. $p = \dfrac{h}{k}$

C. $p = kh$

D. $p = k + h$

58. Which of the following relations represents an inverse variation?

F.

x	20	12	8	4
y	5	3	2	1

G.

x	2	3	4	6
y	-24	-16	-12	-8

H.

x	1	2	3	4
y	4	3	2	1

J.

x	-6	-7	-8	-9
y	-18	-21	-24	-27

59. Which graph best represents a direct variation?

A.

B.

C.

D.
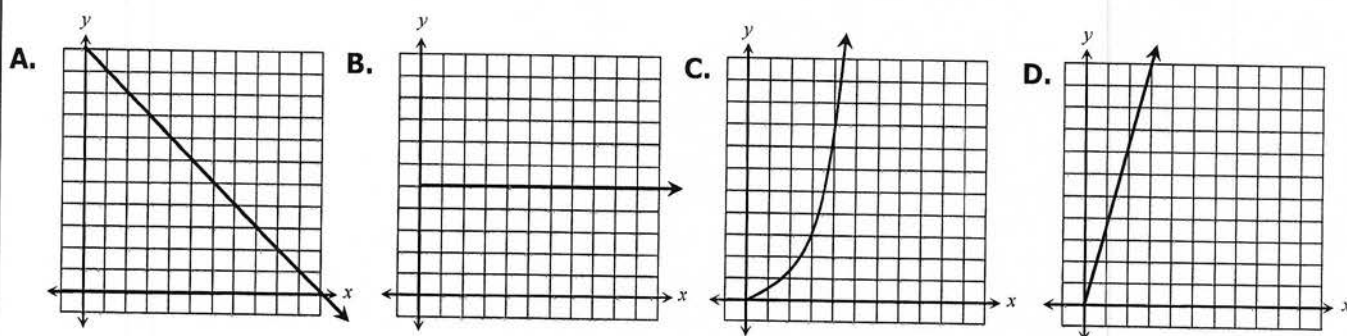
60. A contractor determined the average amount of time needed to build a house.

- When 5 workers are used, it takes 52 days to build the house.
- When 20 workers are used, it takes 13 days to build the house.

If w represents the number of workers and d represent the number of days required to build the house, which statement is true about this relationship?

F. The time required to build a house varies directly with the number of workers because $d = 260w$.

G. The time required to build a house varies directly with the number of workers because $wd = 260$.

H. The time required to build a house varies inversely with the number of workers because $d = 260w$.

J. The time required to build a house varies inversely with the number of workers because $wd = 260$.