Question #1
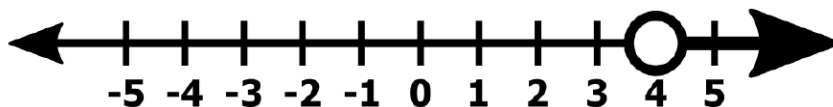
Carmen earns $7.50 an hour, plus tips, as a waitress. Suppose she works 24 hours in one week. How much money in tips (x) must Carmen receive to earn more than $250 that week?

A.   x > $20

B.   x > $60
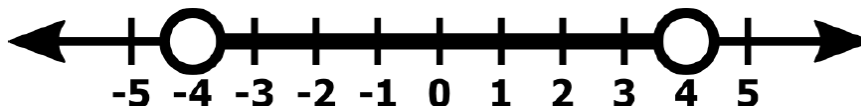
C.   x > $70

D.   x > $120

Question #2

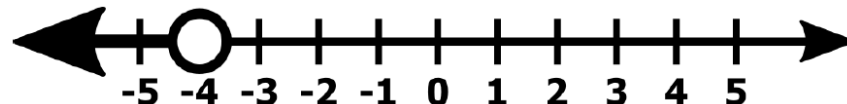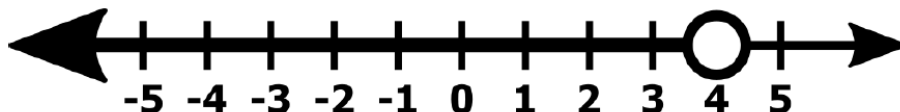Which number line best represents the solution of the inequality shown? $\frac{7x}{2} - 5 < 9$

A

B

C

D

Question #3

Emma solved an inequality using the steps shown.

Given   3x-4(x+8)-6>30

Step 1 3x-4(x+8)-6>30

Step 2 -1x-38>30

Step 3 -1x>68

Step 4 x>-68

Which step contains Emma's first mistake?

A. Step 1

B. Step 2

C. Step 3

D. Step 4

Question #4
Olivia is considering two phone plans. Plan A charges $20 per month plus $0.05 per minute.
Plan B charges $15 per month plus $0.10 per minute.
How many minutes can Olivia talk so that both plans will cost the same amount?

A. 33.33 minutes
B. 70 minutes
C. 100 minutes
D. 233.33 minutes

Question #5
What is the solution to the system represented by the equations given?
$y = 3x + 3$
$y = -x - 3$

A. (1.5, 1.5)
B. (-1.5, -1.5)
C. (-1.5, 1.5)
D. (1.5, -1.5)

Question #6
Which expression is equivalent to $x^2 + x(x-5)^2$?
A. $x^3 - 9x^2 + 25x$
B. $x^3 - 9x^2 - 25x$
C. $x^3 - 11x^2 - 25x$
D. $x^3 - 11x^2 + 25x$

Question #7
Christine's parents gave her $70 to spend at the Topsfield Fair. She spent $10 on flowers and
needs to buy vases. Each antique flower vase at the fair costs $3.
Which represents the number of antique flower vases Christine can buy?

A. at least 20 vases
B. at the most 20 vases
C. exactly 20 vases
D. at the most 1 vase

Question #8
A piece of Plexiglas has a width which is 5 centimeters shorter than its length. What represents the area of the Plexiglas, in terms of its length (L)?

A.   L (L + 5)
B.   L (L − 5)
C.   L (5 - L)
D. $L^2 - 5$

Question #9
Shanta's cell phone company charges her $45 a month plus $0.25 for each text she uses over 250. How can Shanta represent the cost of her cell phone bill for any month assuming that she uses over 250 texts?
A. $C = 45 + 0.25t$
B. $C = 45 + 0.25(t + 250)$
C. $C = 45 + 0.25(t - 250)$
D. $C = 45t + 0.25$

Question #10
Tim's exam grade in history varies directly with the number of hours that he studies. He studied 4 hours for the first exam and his grade was 60.
What grade will he get if he studies 5 hours for the next exam?

A. 48
B. 50
C. 75
D. 80

Question #11
The formula for the volume of a rectangular prism is $V = lwh$. What is the formula when solved for w?

A. $w = \dfrac{V}{lh}$
B. $w = \dfrac{lh}{V}$
C. $w = \dfrac{Vl}{h}$
D. $w = \dfrac{Vw}{l}$

Question #12
What is the value of x in the equation $x^2 + 3x = 4$?

A. $x = -4$ and $x = -1$
B. $x = -4$ and $x = 1$
C. $x = -1$ and $x = 4$
D. $x = 1$ and $x = 4$

Question #13

If $f(x) = (x + 5)(x - 7)$, which are the x-intercepts for the graph of $f(x)$?

A. $x = -7, x = -5$
B. $x = -7, x = 5$
C. $x = 7, x = -5$
D. $x = 7, x = 5$

Question #14

Two equations are given.

y = -8x + 56

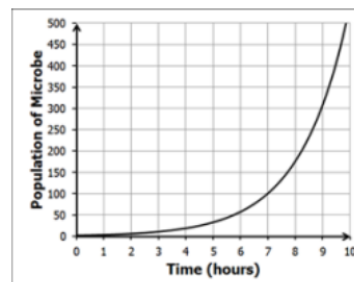2x + 2y = 56

Which ordered pair will satisfy both equations?

A. (-4, -24)
B. (-2, -12)
C. (2, 12)
D. (4, 24)

Question #15

A microbiologist is studying a microbe population and finds that the population growth follows the exponential model shown in the graph.

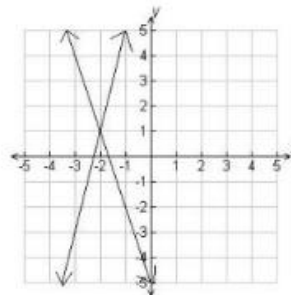What is the approximate population after 9 hours?

A. 50
B. 100
C. 300
D. 500

Question #16

Below is a graph of a system of linear equations.

What is the solution of the system?

A. (-3, 4)
B. (-2, 1)
C. (-1, 5)
D. (1, -2)

Question #17
Consider the system of equations shown.
$y = 9x - 15$
$3x + 2y = 12$
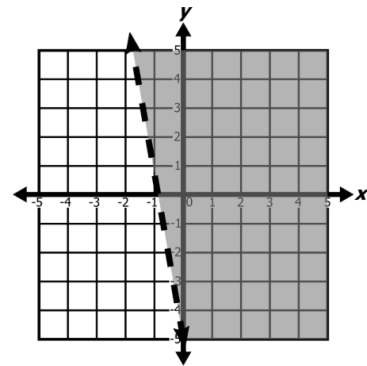Which point represents the solution to the system of equations?

A. (-13, -2)
B. (-2, 13)
C. (2, 3)
D. (3, 2)

Question #18
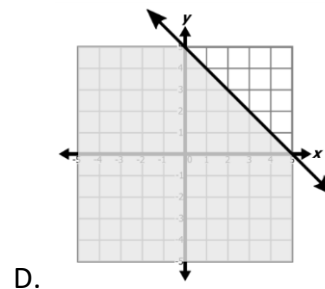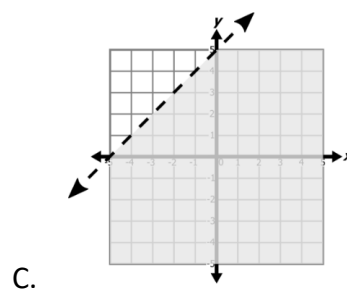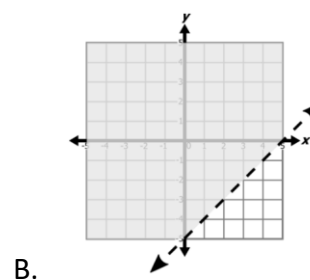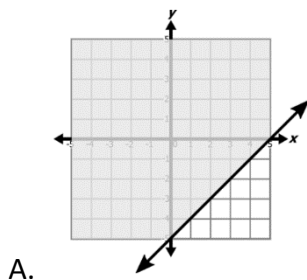Which choice represents the correct inequality for this graph?
A. $y > -3x - 5$
B. $y < -3x - 5$
C. $y \leq 3x - 5$
D. $y \geq 3x - 5$

Question #19
Which graph represents the solution set of the inequality $x + y \leq 5$?

A.

B.

C.

D.

Question #20
What is the degree of the monomial $3x^2y^6$?
A. 3
B. 6
C. 8
D. 11

Question #21
Consider the quadratic equation shown. $y = x^2 + 5x + 6$
What is (are) the coefficient(s) of the equation?

A. 1 only
B. 1 and 5
C. 1, 5, and 6
D. 5 only

Question #22
If $64x^3 - y^3$ is factored completely, what will one of the factors be?

A. $4x + y$
B. $4x - y$
C. $16x^2 + 4xy - y^2$
D. $16x^2 - 4xy - y^2$

Question #23
Which expression is equivalent to $m^2 - 4m - 32$?

A. $(m + 2)(m + 16)$
B. $(m - 4)(m + 8)$
C. $(m + 4)(m - 8)$
D. $(m - 2)(m - 8)$

Question #24
Both expressions can be factored.
$x^2 - 4x - 12$
$x^2 - 11x + 30$
Which expression below is a factor of both expressions?

A. $x + 6$
B. $x - 6$
C. $x + 2$
D. $x - 2$

Question #25
A quadratic function is given. $y=x^2+6x+5$
What are the zeros of the function?

A. -5 and -1
B. 5 and 1
C. 2 and 3
D. -2 and -3

Question #26
Given the function $g(x)=3^x$, what happens when you graph the function $g(x + 4)$?

A. There is a horizontal shift of 4 units to the right.
B. There is a horizontal shift of 4 units to the left.
C. There is a vertical shift of 4 units up.
D. There is a vertical shift of 4 units down.

Question #27
A function includes ordered pairs (-2, 3), (0, -1), (1, 0), (3, 8), and (5, 24). Which point could not be the part of this function?

A. (-1, 0)
B. (1, 3)
C. (4, 15)
D. (6, 35)

Question #28
What is f(2) for the function f (x) = $2x^2$ + 6x - 5?
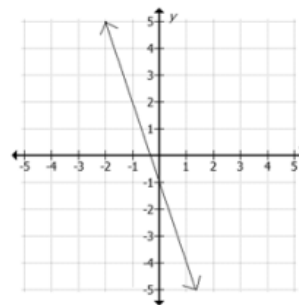
A. 9
B. 11
C. 15
D. 25

Question #29
A function is graphed in the coordinate grid.
What is the value of x when the value of the function is f (x) = -4?

A. -3
B. 0
C. 1
D. 5

Question #30
Which function when graphed would include the point (4, 81)?

A. f(x) = 3x
B. f(x) = 3x²
C. f(x) = 3ˣ
D. f(x) = x³

Question #31
The cost to build *x* laptop computers is represented by the function C(x).The money earned from selling those laptops is represented by the function E(x). If C(6) = 300 and E(6) = 2,100, which statement(s) is (are) true?

A. Three hundred laptops cost $6 each to make.
B. Six laptops cost $300 to make.
C. Six laptops cost $2,100 to make.
D. The sale of 2,100 laptops earns $6 each.

Question #32
Which statement *best* describes the meaning of f(x − 1) = 2x − 2?
A. The input is double the output.
B. The output is double the input.
C. The output is half the input.
D. The relationship between input and output cannot be determined.

Question #33
If the graph of y = ax² + bx + c does not intersect the x -axis, then what is true about the roots?

A. Both are real roots.
B. Both are imaginary roots.
C. One is a real root, and one is irrational.
D. One is a real root, and one is rational.

Question #34
A textile company found that its monthly profit, *P*, is given by this equation. P = -6x² + 36x- 84
In the equation, x is the selling price for each unit of the fabric. What is the best estimate of the maximum price per unit that the company can charge without losing money?
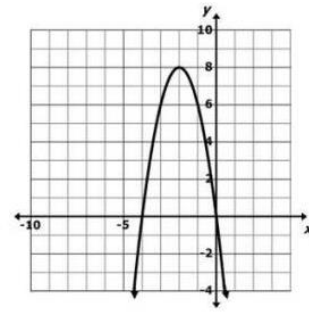
A. $5
B. $9
C. $120
D. $250

Question #35
Use the graph of $f(x) = -8x - 2x$ to answer the question.
Is $f(x)$ greater than zero, less than zero, or equal to zero for $x < -4$?

A. $f(x) > 0$
B. $f(x) < 0$
C. $f(x) = 0$

D. Cannot be determined

Question #36
Diego is interested in buying a particular piece of property which has been on the market for several years. He is keeping track of the advertised price, as shown in the table. Diego plots the data on a coordinate grid where the x -axis represents the year, and the y -axis represents the advertised price. What does the average decrease, in price per year, correspond to on Diego's graph?

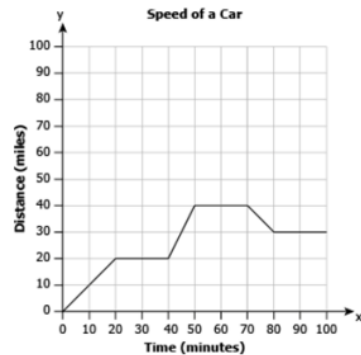| Year	Price
2006	$185,000
2008	$160,000
2010	$135,000

A. the y -intercept of the graph
B. the x -intercept of the graph
C. the beginning value of the graph
D. the slope of the graph

Question #37
The graph below shows the speed of a car at different intervals of time.
At what interval of time is the function increasing?

A. (0, 20) and (40, 50)
B. (0, 20) and (70, 80)
C. (20, 40) and (50, 70)
D. (20, 40) and (80, 100)

Question #38
Henry's cell phone plan gives him 60 minutes of free talk time every month, and he is charged
$0.20 per minute for calls beyond that. The base rate Henry pays on this plan is $20 per month.
Let t be the time, in minutes, he spends on calls in a month.
Which inequality represents the time Henry can spend on calls in a month if he wants to
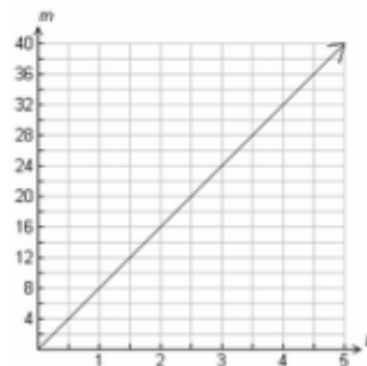maintain a monthly bill of $40?
A. $0 < t \le 60$
B. $0 < t \le 80$
C. $0 < t \le 100$
D. $0 < t \le 160$

Question #39
The graph shows the amount of money (m) Shauna is paid for working
(h) hours.
What is Shauna's hourly pay rate?

A. $8 per hour
B. $10 per hour
C. $12 per hour
D. $16 per hour

Question #40
The table shows the average height of an Arabian foal (baby
horse) at different ages.
What is the average rate of change in height of a foal from 3
to 6 months?

Age (months)	Height (inches)
0	42
3	51
6	56
9	61
12	62

A. $1\frac{2}{3}$ inches per month
B. 4 inches per month
C. $9\frac{1}{3}$ inches per month
D. 10 inches per month

Question #41
When completing the square to solve this quadratic, what term must be added to both sides of
the equation in order to create the perfect square trinomial? $z^2 - 8z + 2 = 11$
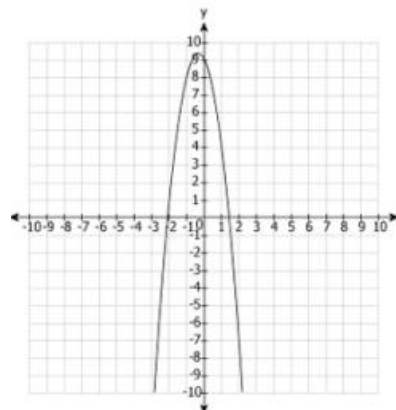
A. 16
B. 4
C. -4
D. -16

Question #42
The function $f(x)$ is listed and the graph of the function g (x) is shown. Which of these statements is true?
$f(x) = -x^2 - 2x + 10$

A. $f(x)$ has a maximum value closer to the x-axis.
B. $g(x)$ has a maximum value closer to the x-axis.
C. $f(x)$ has a minimum value closer to the x-axis.
D. $g(x)$ has a minimum value closer to the x-axis.

Question #43
Twin sisters, Nydea and Zakeya, decide to save for college. Both deposit $200 into 2 different savings accounts. Nydea's investment is modeled by the exponential equation $A(t) = 200(1.08)^t$, where $A(t)$ represents the amount of investment after t years. Zakeya's investment is represented by the table.

Time (years)	0	1	2	3	4
Investment ($)	200	210	220.50	231.53	243.11

What is the difference in the percent of increase at which the twins' investments grow?

A. 3%
B. 4%
C. 5%
D. 8%

Question #44
Two functions are represented in the tables.

x	1	2	3	4
y	5	9	13	17

x	1	2	3	4
y	1	4	16	64

Which description *best* matches the functions?

A. Function 1 is exponential, while Function 2 is linear.
B. Function 1 is linear, while Function 2 is exponential.
C. Both functions are exponential.
D. Both functions are linear.

Question #45

The table shows a relationship between x and y values.

x	y
0	0.25
1	1
4	64
5	256

What is an exponential function for the table in y = ab^x form?

A. y = 4 (0.25)^x

B. y = 4 (1.25)^x

C. y = 0.25 (4)^x

D. y = 1.25 (4)^x

Question #46

The graph shows the salary comparison of Miguel and Christian, who both work after school washing cars. Miguel's earnings are defined by the function f(x), and Christian's earnings are defined by the function g(x), where x is the total number of hours worked.

After how many hours do Miguel's earnings exceed those of Christian?
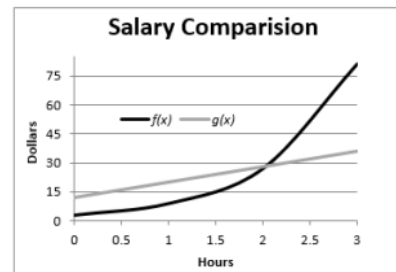
A. after 1 hour

B. after 1.5 hours

C. after 2 hours

D. after 2.5 hours

Question #47

The cost of picking strawberries from Berry Nice Farms can be modeled by the function f (x) = 3 + 5x, where (x) represents the number of pounds of strawberries picked. What does the number 5 most likely represent about the cost of picking strawberries at Berry Nice Farms?

A. the maximum number of buckets of strawberries that can be picked

B. the number of hours it will take to pick strawberries

C. the flat fee charged for picking strawberries

D. the price per pound for strawberries

Question #48
Sam builds a model for a 120 meter tall building. The height of the model is 60 cm.
What is the scale of the model Sam built?

A. 1 cm = 3 m
B. 1 cm = 4 m
C. 1.5 cm = 3 m
D. 2.5 cm = 4 m

Question #49
Edward buys a carton of apples and measures the weight of 10 apples to be 3.80 pounds.
What is the greatest possible error for the measurement of the weight of 10 apples?

A. .05 pound
B. .005 pound
C. 1 pound
D. 10 pounds

Question #50
Which of these measures is the most precise?

A. 44.4 mm
B. 44 mm
C. 44.4 cm
D. 44 cm

Question #51
Which of these has the same root index as $\sqrt[3]{5}$?

A. $8^{\frac{3}{2}}$
B. $3^{\frac{1}{2}}$
C. $9^{\frac{1}{5}}$
D. $12^{\frac{1}{3}}$

Question #52
Which statement explains why $(27)^{\frac{1}{3}} = 3$?

A. $27 \div 3 = 9$, and $(9)^{\frac{1}{3}} = 3$
B. $(27)^{\frac{1}{3}} = (3^3)^{\frac{1}{3}} = 3^{3 \times \frac{1}{3}} = 3^1$
C. Since the exponent is a fraction with denominator 3, the result is 3.
D. Because the exponent is fractional, the expression $(27)^{\frac{1}{3}}$ is equivalent to $\frac{1}{\sqrt[3]{27}} = 3$.

Question #53

Which expression is equivalent to $\sqrt{10}(-\sqrt{2} - 2\sqrt{10})$?

A. $2\sqrt{5} + 5$

B. $-3\sqrt{5} + 20$

C. $10 + 4\sqrt{3}$

D. $-2\sqrt{5} - 20$

Question #54

Which is equivalent to 3^{4x}?

A. $3^4 + 3^x$

B. $3^4 \times 3^x$

C. 12^x

D. 81^x

Question #55

If the sum of two numbers, n and m, is rational, which statement is true?

A. Both n and m may be rational but do not have to be.

B. Both n and m must be rational.

C. Both n and m must be irrational.

D. One number is rational, and the other is irrational.

Question #56

Which *best* describes $\frac{3}{2} \times \pi$ simplified, and why?

A. The simplified value is irrational because the product of a rational number and a non-zero irrational number is always irrational.

B. The simplified value is irrational because the sum of a rational number and an irrational number is always irrational.

C. The simplified value is rational because the product of a rational number and a non-zero irrational number is always rational.

D. The simplified value is rational because the sum of a rational number and an irrational number is always rational.

Question #57
The plot shows the number of hours in a year an average person spent surfing the Internet (S) from 1993 to 1999, where n is the number of years since 1990.
Which model *best* fits the data?
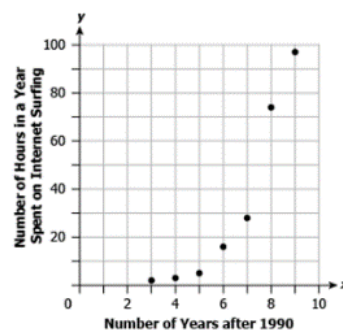
A. A linear model; the plot resembles a line with a positive slope where, as n increases, the values of S also increase.
B. An exponential model; the smaller values of n correspond to nearly constant values of S, and the large values of n correspond to the large values of S.
C. A linear model; the smaller values of n correspond to small values of S, and the larger values of n correspond to a rapid decrease in the values of S.
D. An exponential model; the plot shows that the number of hours spent on the Internet is decreasing as the number of years increases.

Question #58
Amy and John compared their scores in five different pop quizzes each scored out of a total of 10 points in the table shown. Compute the correlation coefficient between their scores.

Amy's Scores	John's Scores
5	7
4	3
8	8
6	7
6	5

A. -0.76
B. -0.15
C. 0.15
D. 0.76

Question #59
Julie wants to see if studying more for a test improved grades. So she got her classmates to write down how much they studied for a test and correlated it to the results on the test. The correlation was calculated to be 0.80.
What can Julie say about the relationship between time spent studying and grades on a test?

A. There is a weak correlation and thus time spent studying probably has little to do with the grade and is not the cause.
B. There is a strong correlation and thus we can conclude time spent studying must decrease the score on a test.
C. There is a strong correlation and thus we can conclude that the amount of time spent on a test is the reason for the variation of scores.
D. There is a strong correlation between time spent studying and grades. Although the relationship is strong, since we didn't control for other variables we cannot conclude that is the reason for the variation of scores.