Tennessee Comprehensive Assessment Program

TCAP

Algebra I
Test Practice

TN Department of Education

Metadata—Math

Items

Page Number	Grade	Item Type	Key	EOL	TN Standards	Calculator
1	AL1	MC	B	3	A1.F.LE.A.1.c	N
2	AL1	MC	B	3	A1.N.Q.A.1.c	N
3	AL1	MC	C	3	A1.A.REI.B.3.a	N
4	AL1	MC	B	4	A1.F.IF.B.5	N
5	AL1	MC	D	2	A1.S.ID.C.7	N
6	AL1	MS	B,D	3	A1.F.IF.C.7	N
7	AL1	MC	A	2	A1.A.CED.A.1	N
8	AL1	MC	B	3	A1.A.SSE.A.1.b	N
9	AL1	MC	D	3	A1.F.IF.A.3	N
10	AL1	MC	B	3	A1.A.REI.B.2.b	N
11	AL1	MC	C	4	A1.N.Q.A.1.a	N
12	AL1	TE	Row 1: False; Row 2: True; Row 3: False	3	A1.F.IF.C.9.a	N
13	AL1	MC	D	3	A1.S.ID.C.5	N
14	AL1	MC	B	3	A1.F.LE.A.2	Y
15	AL1	MC	B	3	A1.A.REI.A.1	Y
16	AL1	MC	C	3	A1.S.ID.B.4	Y
17	AL1	MC	D	3	A1.F.BF.A.1.a	Y
18	AL1	MC	C	4	A1.A.APR.A.1	Y
19	AL1	MC	D	3	A1.F.IF.C.8.a	Y
20	AL1	MC	A	3	A1.S.ID.A.1	Y
21	AL1	MC	B	4	A1.A.REI.D.5	Y
22	AL1	MC	B	2	A1.F.IF.A.2.a	Y
23	AL1	MC	C	3	A1.S.ID.C.6	Y
24	AL1	MC	A	3	A1.A.REI.B.3.a	Y
25	AL1	MC	D	3	A1.A.SSE.A.1.a	Y
26	AL1	MS	C,D	3	A1.A.REI.D.6	Y
27	AL1	MC	A	3	A1.S.ID.B.4	Y
28	AL1	MC	B	3	A1.F.IF.B.6	Y
29	AL1	MC	A	3	A1.F.IF.B.4	Y
30	AL1	MC	D	3	A1.S.ID.A.1	Y
31	AL1	MC	C	3	A1.A.APR.A.1	Y
32	AL1	FIB	-1	3	A1.A.REI.B.2.a	Y
33	AL1	MC	B	3	A1.F.LE.A.2	Y
34	AL1	MC	C	3	A1.A.REI.C.4	Y

35	AL1	MS	B,C,E	3	A1.F.IF.A.1	Y
36	AL1	MC	C	3	A1.F.IF.C.9.b	Y
37	AL1	MS	A,D	3	A1.A.REI.B.3.a	Y
38	AL1	MC	B	3	A1.A.REI.B.3.b	Y
39	AL1	MC	C	3	A1.A.CED.A.2	Y
40	AL1	MC	B	3	A1.N.Q.A.1.b	Y

Metadata Definitions

Grade	Grade level or Course.
Item Type	Indicates the type of item. MC= Multiple Choice; MS= Multiple Select FIB = Fill-in-the-blank; TE = Technology Enhanced
Key	Correct answer.
EOL	Evidence of Learning (EOL) statements provide indication of how students are tracking toward grade-level conceptual understanding of the Tennessee Mathematic Standards. Performance at Level 2 demonstrates that the student is **approaching** grade-level understanding and has a **partial** ability to apply the grade-/course-level knowledge and skills defined by the Tennessee Academic Standards Performance at Level 3 demonstrates that the student has a **comprehensive** understanding and **thorough** ability to apply the grade-/course-level knowledge and skills defined by the Tennessee Academic Standards Performance at Level 4 demonstrated that the student has an **extensive** understanding and **expert** ability to apply the grade-/course-level knowledge and skills defined by the Tennessee Academic Standards
TN Standards	Primary educational standard assessed.
Calculator	Y for items that permit calculator use.

00. A computer manufacturer designs a new device every year with 1.25 times as much memory as the device from the previous year.

Which statement about a function that models this situation is true?

A. The function is exponential because the memory of the device designed increases by a constant rate per year.

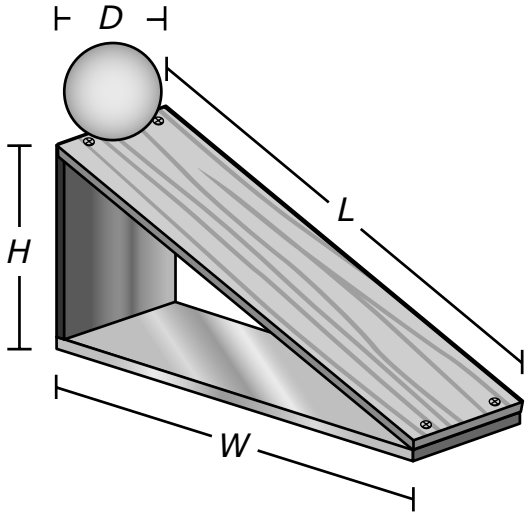
B. The function is exponential because the memory of the device designed increases by a constant factor per year.

C. The function is not exponential because the memory of the device designed increases by a constant rate per year.

D. The function is not exponential because the memory of the device designed increases by a constant factor per year.

00. Eva built a structure out of metal. She then created a ramp by connecting the ends of the structure with a plank of wood.

Eva places a ball at the top of the ramp, as shown.



Eva releases the ball and measures the time it takes for the ball to reach the end of the ramp. She will use only **one** additional measurement to calculate the average speed of the ball.

Which measurement would be **most** useful?

A. the diameter of the ball, *D*

B. the length of the plank of wood, *L*

C. the width of the metal structure, *W*

D. the height of the metal structure, *H*

00. What is the solution set to $(2x-1)^2 = 36$?

A. $\left\{\frac{5}{2}\right\}$

B. $\left\{\frac{7}{2}\right\}$

C. $\left\{-\frac{5}{2}, \frac{7}{2}\right\}$

D. $\left\{-\frac{7}{2}, \frac{5}{2}\right\}$

00. The function $P(b) = 4b - 15$ represents the amount of money Marisa makes by selling b bracelets. Which is the most appropriate domain for this function?

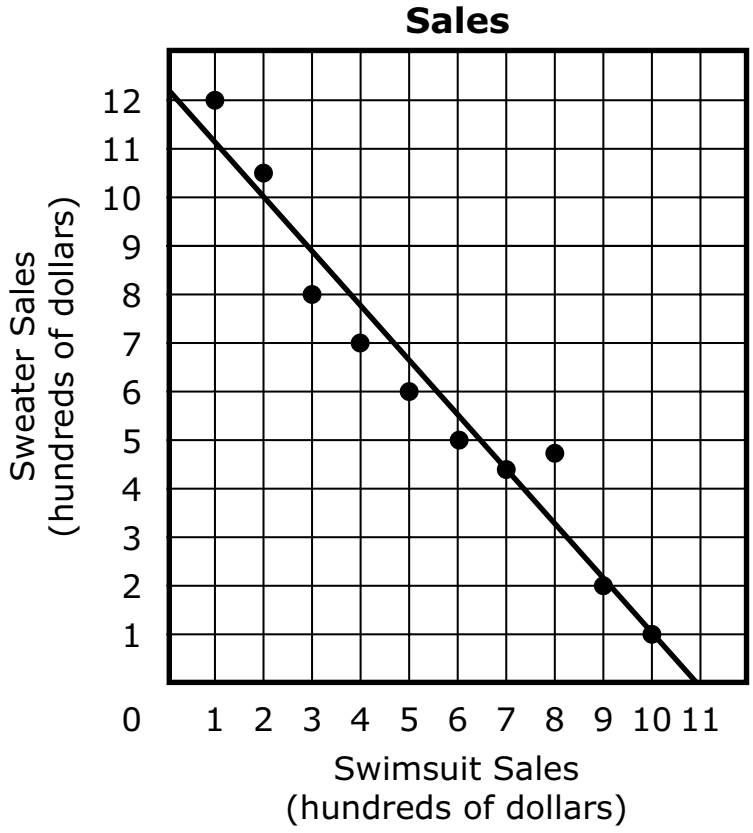
A. all real numbers

B. all integers ≥ 0

C. all positive real numbers

D. all integers ≥ 4

00. A clothing store collected data about swimsuit sales, x, and sweater sales, y, for 10 months. The graph shows a scatter plot of the data with a line of best fit.



Which statement **best** describes the relationship between the two variables?

A. There is causation because all the points lie near the line of best fit.

B. There is **no** causation, because the points do not all lie on the line of best fit.

C. There is causation because an increase in swimsuit sales causes a decrease in sweater sales.

D. There is **no** causation, because an increase in temperature may cause an increase in swimsuit sales and a decrease in sweater sales.

00. Which statements describe the graph of $y = 0.5^x$?

Select the **two** correct answers.

A. The graph is always increasing.

B. The graph is always decreasing.

C. The graph goes through the point (0, 0).

D. The graph goes through the point (0, 1).

E. The graph goes through the point (1, 0).

00. Today, Jake is 3 times older than his 19-year-old son.

Which equation can be used to determine y, the number of years from now when Jake will be twice as old as his son?

A. $3(19) + y = 2(19 + y)$

B. $2(19) + y = 3(19 + y)$

C. $2(19 + y) = 3(19)$

D. $3(19 + y) = 2(19)$

00. A house painter makes y gallons of gray paint. The gray paint mixture is 5% black paint and 95% white paint. The equation shown represents the gray paint mixture.

$$y = 0.05x + 0.95x$$

What does the expression $0.95x$ represent in this equation?

A. the number of gallons of black paint in the mixture

B. the number of gallons of white paint in the mixture

C. the part of 1 gallon of gray paint that is black

D. the part of 1 gallon of gray paint that is white

00. A landscaper changes the size of a rectangular garden. The landscaper adds x feet to the width of the garden. The function shown represents the perimeter of the new garden in feet.

$$P(x) = 2(x + 8) + 24$$

Which statement is true when $P(5) = 50$?

A. The perimeter increases by 50 feet when the width increases by 5 feet.

B. The perimeter increases by 50 feet when the width equals 5 feet.

C. The perimeter equals 50 feet when the width equals 5 feet.

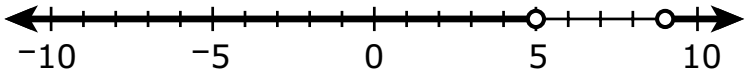
D. The perimeter equals 50 feet when the width increases by 5 feet.

00. An absolute value inequality is shown.

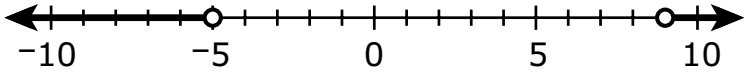
$$-3|x-2| < -21$$

Which number line represents the solutions to the inequality?

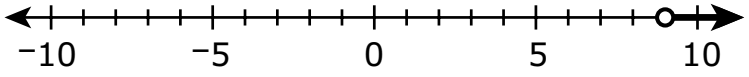
A.



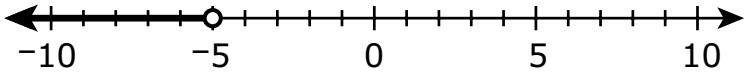
B.



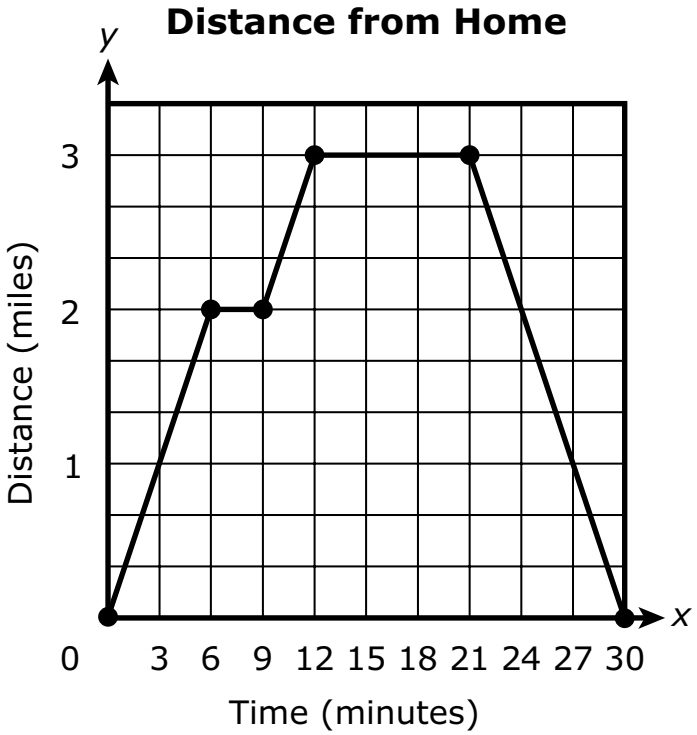
C.



D.



00. The graph shows a shopper's distance from home over time on a trip to two stores.



Which statement **best** justifies the scale of the *x*-axis?

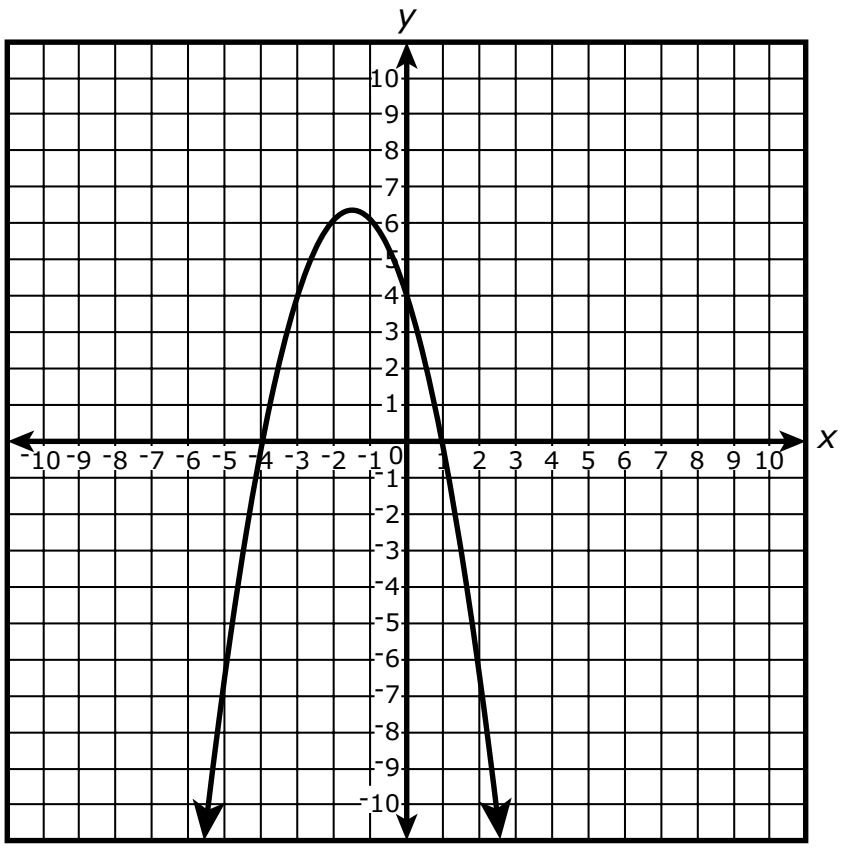
A. The shopper visited each of the two stores for 3 minutes.

B. The distance between home and the second store is 3 miles.

C. The times spent on parts of the trip are multiples of 3 minutes.

D. The distances traveled on parts of the trip are multiples of 3 miles.

00. The graph of the function $f(x)$ is shown.



The function $g(x)$ is defined as $g(x) = -(x - 2)(x + 2)$. Determine which statements are true or false about the functions $f(x)$ and $g(x)$.

Select **one** box per row.

		A	*B*
		True	**False**
1	The graphs of $f(x)$ and $g(x)$ have the same x-intercepts.	◯	◯
2	The graphs of $f(x)$ and $g(x)$ have the same y-intercept.	◯	◯
3	The maximum value of $f(x)$ is less than the maximum value of $g(x)$.	◯	◯

00. The owner of an ice cream shop records the number of customers who buy ice cream, y, and the outdoor temperature in degrees Fahrenheit (°F), x. The equation $y = 2.5x - 45$ can be used to model the relationship.

Based on the model, which statement is true?

A. When the temperature is 45°F, the owner can expect 0 customers to buy ice cream.

B. When the temperature is 0°F, the owner can expect about 45 customers to buy ice cream.

C. The number of customers who buy ice cream is expected to increase by 1 for every increase of 2.5°F in the temperature.

D. The number of customers who buy ice cream is expected to increase by about 2.5 for every increase of 1°F in the temperature.

00. The table describes a function.

x	$f(x)$
1	2
2	5
3	8

Which equation models the function?

A. $f(x) = 3^x - 1$

B. $f(x) = 3x - 1$

C. $f(x) = 2x$

D. $f(x) = 2^x$

00. Two students each solved the equation $3(x + 5) - x = 11x$.

The first two steps of their solution methods are shown.

Method 1

Equation:	$\mathbf{3(x + 5) - x = 11x}$
Results of Step 1:	$3x + 15 - x = 11x$
Results of Step 2:	$4x + 15 = 11x$

Method 2

Equation:	$\mathbf{3(x + 5) - x = 11x}$
Results of Step 1:	$3(x + 5) = 12x$
Results of Step 2:	$x + 5 = 4x$

Which statement accurately describes the validity of each method's first two steps?

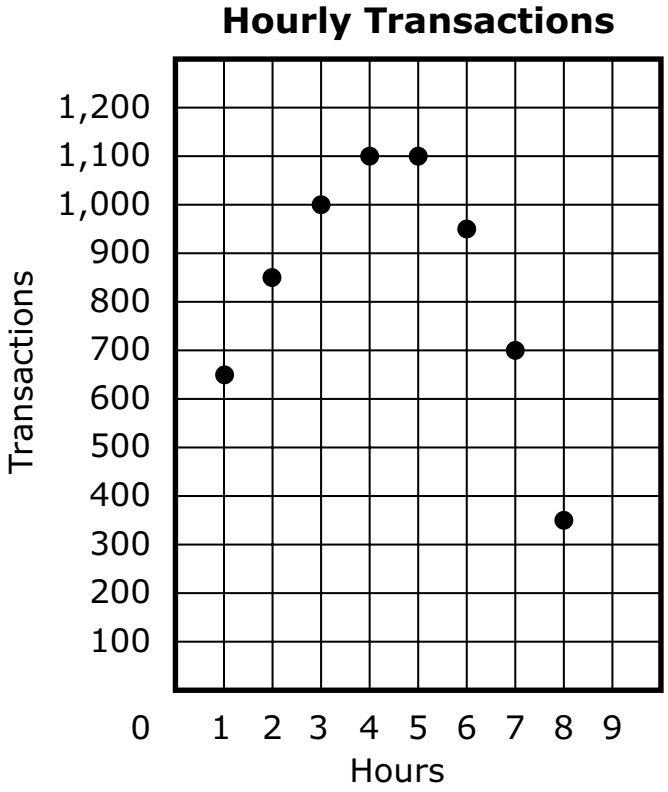
A. Only Method 1 is valid.

B. Only Method 2 is valid.

C. Both Method 1 and Method 2 are valid.

D. Neither Method 1 nor Method 2 is valid.

00. The scatter plot shows the number of transactions at a bank for different times after the bank opened on a randomly selected day.



Which function best shows the relationship between the hours after opening, x, and the number of transactions, $f(x)$?

A. $f(x) = 571(1.19)^x$

B. $f(x) = 1{,}062(0.937)^x$

C. $f(x) = -49x^2 + 409x + 257$

D. $f(x) = -25x^2 + 275x + 400$

00. The table represents the value of a bicycle with respect to its age.

Age (years)	0	1	2	3
Value ($)	600	510	433.50	368.48

Let t be the bicycle's age and $f(t)$ be the value of the bicycle.

Which function **best** represents the relationship between the value of the bicycle and its age?

A. $f(t) = 600 - t(0.85)$

B. $f(t) = 600 - (t - 1)0.85$

C. $f(t) = 600(0.85)^{t-1}$

D. $f(t) = 600(0.85)^{t}$

00. Which polynomial is equivalent to $2(4c^2+3)^2$?

A. $32c^4+18$

B. $64c^4+36$

C. $32c^4+48c^2+18$

D. $64c^4+96c^2+36$

00. Several rectangular dog kennels have a perimeter of 80 feet. The function $A(w) = -w^2 + 40w$ models the area of the kennel as a function of the width, w. A customer wants to buy the dog kennel with the largest area.

Which function reveals the maximum area of a rectangular dog kennel with a perimeter of 80 feet?

A. $A(w) = w(40 - w)$

B. $A(w) = w(w + 40)$

C. $A(w) = -(w + 20)^2 - 400$

D. $A(w) = -(w - 20)^2 + 400$

00. Cory participates in a speech competition. Each speech is scored in 3 categories:

- 50% for content
- 30% for delivery
- 20% for organization

Cory receives a score of 8.9 points for the content of his speech and 8.0 points for his delivery.

How many points does Cory need in the organization category to earn an overall score of **exactly** 8.5 points?

A. 8.25

B. 8.47

C. 9.15

D. 9.50

00. A function is described by the ordered pairs shown in the table.

x	$f(x)$
-5	4
-4	3
-2	1
0	-1
2	1
4	3
5	4

What type of equation is represented by the graph of the set of ordered pairs?

A. quadratic equation, because the points form a curve that is symmetric about the line $x = 0$ and does not have a constant slope

B. absolute value equation, because the graph is made of two rays with slopes 1 and -1 with a vertex point at $(0, -1)$

C. linear equation, because the graph is a set of points in a straight line with a constant slope

D. exponential equation, because the graph is a curve with $f(x)$ decreasing as x increases

00. For the function $f(x) = \sqrt{x^2 + 16}$, what is the value of $f(-3)$?

A. 1

B. 5

C. $\sqrt{7}$

D. $\sqrt{10}$

00. The table compares the fuel efficiency in the city and the fuel efficiency on the highway for 9 cars.

Fuel Efficiency

Fuel Efficiency in the City (miles per gallon)	Fuel Efficiency on the Highway (miles per gallon)
16	26
19	29
22	29
23	32
21	31
24	30
15	22
17	21
18	26

Which statement describes the linear relationship between the fuel efficiency in the city and the fuel efficiency on the highway for the 9 cars?

A. The two quantities are weakly correlated because the correlation coefficient is less than 0.8.

B. The two quantities are weakly correlated because the correlation coefficient must be 1 to be strongly correlated.

C. The two quantities are strongly correlated because the correlation coefficient is greater than 0.8 but less than 1.

D. The two quantities are strongly correlated because the correlation coefficient is greater than 1.

00. What are the solutions of $2(w+3)^2 - 9 = 15$?

A. $w = -3 \pm 2\sqrt{3}$

B. $w = -3 \pm \sqrt{3}$

C. $w = -\frac{3}{2} \pm \sqrt{6}$

D. $w = -3 \pm \frac{\sqrt{66}}{2}$

00. Raya and Antonio each have a job packaging items to be shipped. They each package items at a constant rate.

On Tuesday, Raya worked for x hours, Antonio worked for y hours, and the total number of items they packaged is given by the expression $21x + 18y$.

Which phrase **best** describes the meaning of the term $18y$ in the expression?

A. the number of items Raya packaged each hour

B. the number of items Antonio packaged each hour

C. the total number of items Raya packaged on Tuesday

D. the total number of items Antonio packaged on Tuesday

00. Given: $f(x) = 4\left(\frac{1}{3}\right)^x$ and $g(x) = 2(x-3)^2 - 8$.

Which intervals contain a value of x where $g(x) = f(x)$?

Select the **two** correct answers.

A. $-0.9 < x < -0.7$

B. $-0.7 < x < 0.7$

C. $0.7 < x < 0.9$

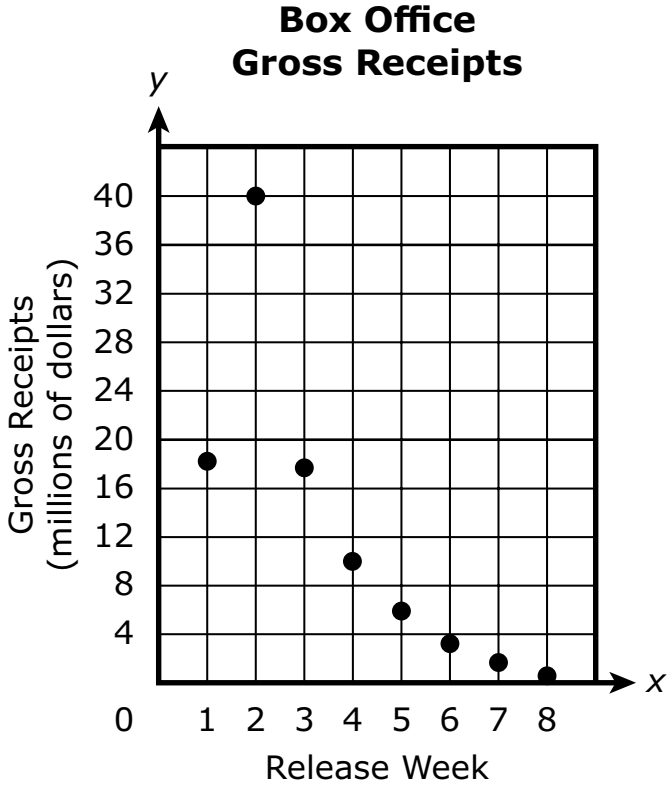
D. $4.9 < x < 5.1$

E. $5.1 < x < 6.1$

00. The table shows the U.S. box office gross receipts for the first 8 weeks of the release of a movie. The scatter plot shows the data in the table.

Box Office Gross Receipts

Release Week	1	2	3	4	5	6	7	8
Gross Receipts (millions of dollars)	17.87	39.82	17.65	9.93	5.8	3.15	1.63	0.61



Which equation **best** models the box office gross receipts?

A. $y = 70.63(0.58)^x$

B. $y = 28.95(0.62)^x$

C. $y = -4.28x + 31.31$

D. $y = -2.47x + 20.34$

00. The equation of a function is $f(x) = 2(3)^x$.

What is the average rate of change of the function over the interval $2 \leq x \leq 4$?

A. 18

B. 72

C. 144

D. 222

00. A body temperature of 98.6 degrees Fahrenheit (°F) is considered normal. However, body temperature varies from person to person. The function $f(x)$ can be used to describe how much a body temperature in degrees Fahrenheit, x, varies from a normal body temperature of 98.6°F. Some values of $f(x)$ are shown in the table.

Body Temperature

Body Temperature (°F)	Variation from Normal Body Temperature (°F)
95	3.6
97	1.6
98.6	0
99	0.4
100	1.4
102	3.4

Based on the information shown in the table, which statement about the graph of $f(x)$ is true?

A. The minimum value of $f(x)$ is 0°F.

B. The maximum value of $f(x)$ is 98.6°F.

C. As body temperature increases, the amount of variation from 98.6°F decreases.

D. Over the interval from 95°F to 98.6°F, the amount of variation from 98.6°F increases.

00. An owner of a coffee shop sells different kinds of coffee. The owner creates a coffee mixture that is 70% light roast coffee and 30% dark roast coffee.

- Light roast coffee costs $8.04 per pound.
- Dark roast coffee costs $3.81 per pound.

Which amount is closest to the price per pound of the coffee mixture?

A. $5.08

B. $5.93

C. $6.43

D. $6.77

00. Which expression is equivalent to $(x^3 + 4x^2) - (5x^2 - x)$?

A. $x^3 - 9x^2 + x$

B. $x^3 - x^2 - x$

C. $x^3 - x^2 + x$

D. $x^3 + 9x^2 - x$

00. A compound inequality is shown.

$$-15 \leq -2(x + 3) \leq -4$$

What is the **least** value of x that is a solution to the inequality?

Enter your answer in the space provided.

00. The sequence shown represents the number of chairs, $f(n)$, at n cafeteria tables.

8, 16, 24, 32, 40, 48, . . .

Which function models this sequence?

A. $f(n) = n + 8$

B. $f(n) = 8n$

C. $f(n) = 8^n$

D. $f(n) = \frac{n}{8}$

00. A baseball team played 23 games during the season. The number of games they won was 4 less than 2 times the number of games they lost.

How many games did the baseball team win during the season?

A. 4

B. 9

C. 14

D. 19

00. Which relationships represent functions of y in terms of x?

Select the **three** correct answers.

A. $f = \{(-5, 0), (-4, 1), (-3, 2), (-2, 3), (-2, 4)\}$

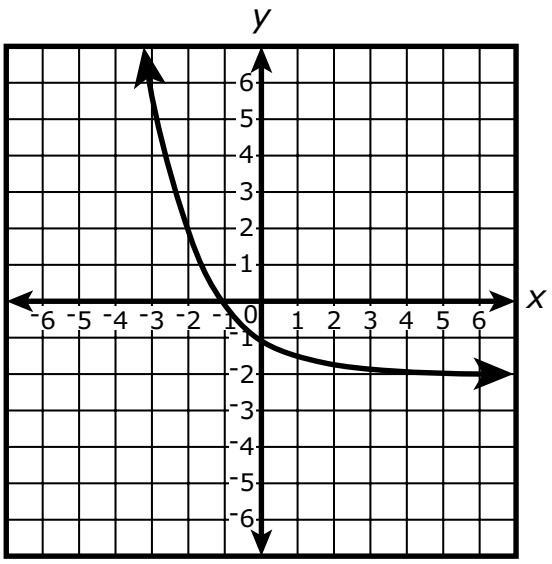
B. $g = \{(-2, 4), (-1, 1), (0, 4), (1, 1), (2, 4)\}$

C. $h = \{(0, -1), (1, -2), (-1, -2), (2, 4), (-2, 4)\}$

D. $j = \{(0, 2), (0, 4), (0, 5), (0, 7), (0, 9)\}$

E. $k = \{(1, -2), (2, -2), (3, -2), (4, -2), (5, -2)\}$

00. The graph of an exponential function is shown.



Based on the graph, which statement about the function appears to be true?

A. The graph has an x-intercept at $(0, -1)$.

B. The graph has a minimum value at $(6, -2)$.

C. The graph is decreasing when $x < 0$ and decreasing when $x > 0$.

D. The graph is increasing when $x < 0$ and decreasing when $x > 0$.

00. An equation is shown.

$$9p^2 + 9p - 10 = 0$$

What values of p make the equation true?

Select the **two** correct answers.

A. $-\frac{5}{3}$

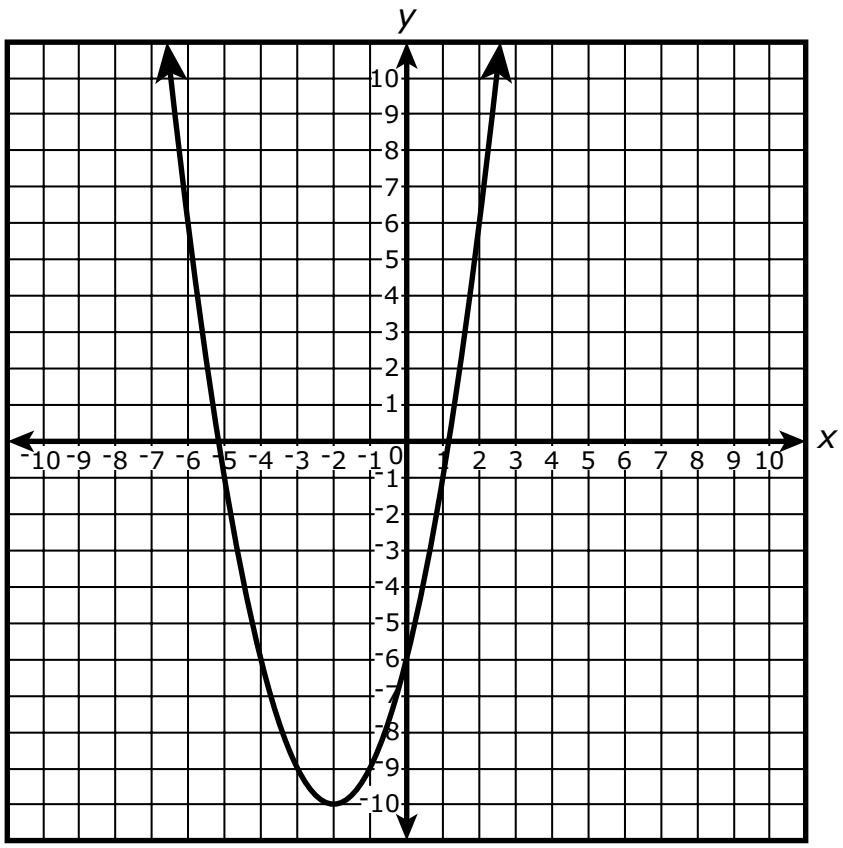
B. $-\frac{10}{9}$

C. 1

D. $\frac{2}{3}$

E. $\frac{5}{3}$

00. The graph of $y = x^2 + 4x - 6$ is shown.



Which value is a solution to the inequality $0 > x^2 + 4x - 6$?

A. 6

B. -3

C. -6

D. -10

00. A rock is dropped from a bridge at a height of 110 feet above the water. The rock is 46 feet above the water 2 seconds after it is dropped.

Which equation can be used to determine y, the height of the rock in feet above the water x seconds after it is dropped?

A. $y = -16(x - 46)^2 + 2$

B. $y = -16(x - 2)^2 + 46$

C. $y = -16x^2 + 110$

D. $y = -16(x - 110)^2$

00. Average speed can be calculated using the calculation $\frac{d}{t}$, where d is the distance traveled and t is time. Danika ran 200 meters in 45 seconds.

Which expression can be used to determine Danika's average speed in **kilometers per hour**?

A. $\frac{200 \times 60}{45 \times 1{,}000}$

B. $\frac{200 \times 60 \times 60}{45 \times 1{,}000}$

C. $\frac{200 \times 45}{60 \times 1{,}000}$

D. $\frac{200 \times 45}{60 \times 60 \times 1{,}000}$

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