Tennessee Comprehensive Assessment Program

TCAP

Algebra II
Test Practice

TN Department of Education

Metadata—Math

Items

Page Number	Grade	Item Type	Key	EOL	TN Standards	Calculator
1	AL2	MC	A	3	A2.A.REI.A.2	N
2	AL2	MC	C	3	A2.N.RN.A.1.c	N
3	AL2	MC	D	3	A2.F.BF.B.3	N
4	AL2	MC	B	2	A2.N.M.A.2.c	N
5	AL2	MS	A,C	3	A2.F.IF.A.1	N
6	AL2	MC	D	3	A2.F.BF.A.2	N
7	AL2	MC	B	3	A2.N.RN.A.1.c	N
8	AL2	MC	D	2	A2.N.M.A.3	N
9	AL2	MC	C	3	A2.A.APR.A.1	N
10	AL2	MS	A,B,C	3	A2.S.IC.A.3	N
11	AL2	MC	A	3	A2.F.LE.A.1.a	N
12	AL2	MC	B	3	A2.N.M.A.1	N
13	AL2	MC	A	3	A2.F.BF.A.1.b	N
14	AL2	MC	D	3	A2.A.APR.A.2	Y
15	AL2	MC	B	2	A2.N.Q.A.1.d	Y
16	AL2	MC	C	3	A2.F.LE.A.1.a	Y
17	AL2	MC	D	2	A2.A.CED.A.1	Y
18	AL2	MC	A	3	A2.F.IF.A.2	Y
19	AL2	MS	C,E	3	A2.S.ID.A.2	Y
20	AL2	MC	B	2	A2.A.CED.A.3	Y
21	AL2	MC	A	3	A2.S.CP.A.1	Y
22	AL2	MC	C	3	A2.S.ID.B.4	Y
23	AL2	MC	D	3	A2.A.SSE.A.1.b	Y
24	AL2	FIB	0.30	3	A2.A.REI.B.3	Y
25	AL2	MC	B	3	A2.S.ID.A.3	Y
26	AL2	MC	C	2	A2.S.CP.C.4	Y
27	AL2	MC	A	3	A2.F.IF.B.4	Y
28	AL2	MC	C	3	A2.F.IF.B.5.a	Y
29	AL2	MC	C	3	A2.A.REI.A.1	Y
30	AL2	TE	Row 1: Equal for City 1 and City 2 Row 2: Greater for City 1	3	A2.S.ID.A.1	Y
31	AL2	MC	B	3	A2.N.Q.A.1.b	Y

32	AL2	MC	D	3	A2.A.CED.A.2	Y
33	AL2	MC	D	3	A2.F.IF.A.3	Y
34	AL2	MC	B	3	A2.S.IC.A.2	Y
35	AL2	MS	A,C	2	A2.F.BF.B.4.a	Y
36	AL2	MC	C	3	A2.A.SSE.A.1.a	Y
37	AL2	MC	D	3	A2.N.M.A.2.b	Y
38	AL2	FIB	0.55	3	A2.S.CP.B.2.b	Y
39	AL2	MC	D	3	A2.F.IF.B.6.a	Y
40	AL2	MC	B	3	A2.A.REI.A.2	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. Ginger and Meredith solved $\sqrt{29 - 7x} = 3 - x$.

- Ginger claims $x = -5$ is a solution.
- Meredith claims $x = 4$ is a solution.

Which statement is true?

A. Only Ginger's claim that $x = -5$ is a solution is valid.

B. Only Meredith's claim that $x = 4$ is a solution is valid.

C. Both Ginger's and Meredith's claims are valid.

D. Neither Ginger's nor Meredith's claim is valid.

00. Two equations are given.

$3 = 9^x \quad 3 = 3^{\square}$

What goes in the box to make **both** equations equivalent?

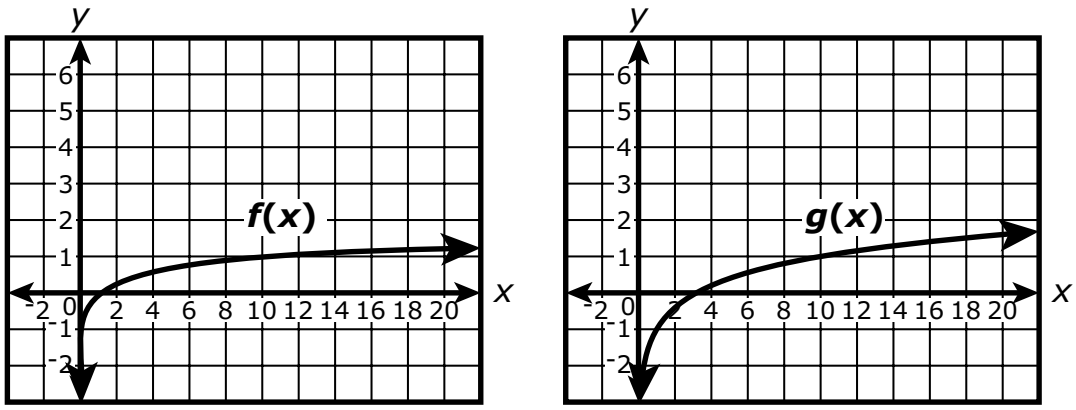
A. $\frac{1}{2}$

B. 2

C. $2x$

D. $x + 2$

00. The graph of $f(x) = \log(x)$ is transformed to the graph of $g(x)$, as shown.



Which transformations result in $g(x)$?

A. a vertical compression by a factor of $\frac{1}{2}$ and shift left 1 unit

B. a vertical stretch by a factor of 2 and shift left 1 unit

C. a vertical compression by a factor of $\frac{1}{2}$ and shift down 1 unit

D. a vertical stretch by a factor of 2 and shift down 1 unit

00. A florist sells two types of flower baskets. Matrices F and G give information about these flower baskets and customer orders for this weekend.

Number of Flowers in Each Basket

	Large	**Small**	
Tulips	3	1	
Roses	4	2	

$$F = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$$

Number of Orders of Each Basket

	Orders	
Large	10	
Small	4	

$$G = \begin{bmatrix} 10 \\ 4 \end{bmatrix}$$

The product FG gives the total number of tulips and roses needed for these orders.

Which matrix is FG?

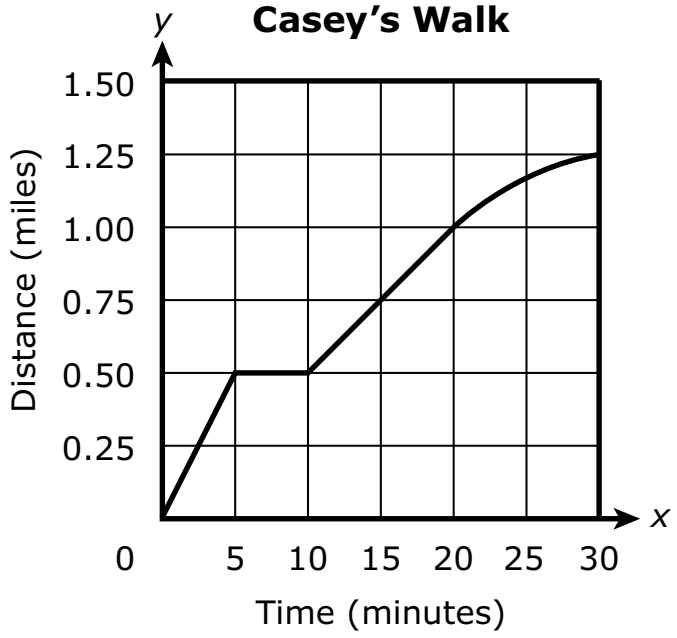
A. $\begin{bmatrix} 26 \\ 32 \end{bmatrix}$

B. $\begin{bmatrix} 34 \\ 48 \end{bmatrix}$

C. $\begin{bmatrix} 46 \\ 18 \end{bmatrix}$

D. $\begin{bmatrix} 56 \\ 84 \end{bmatrix}$

00. Casey took a walk through a park. The graph shows the distance, in miles, she walked during the first 30 minutes of her walk.



Based on the graph, which statements **must** be true?

Select the **two** correct answers.

A. Casey was not walking between 5 minutes and 10 minutes.

B. Casey's speed increased between 0 minutes and 5 minutes.

C. Casey's speed decreased between 20 minutes and 30 minutes.

D. Casey was walking fastest between 10 minutes and 20 minutes.

E. Casey never walked downhill between 0 minutes and 30 minutes.

00. Simone was given a task at work that she did for several days.

- On the first day, she completed the task in 60 minutes.
- On the second day, she completed the task in 58.5 minutes.
- On the third day, she completed the task in 57 minutes.
- On the fourth day, she completed the task in 55.5 minutes.
- The number of minutes it took Simone to complete the task continued to follow the same pattern.

Which function represents the number of minutes it took Simone to complete the task on the nth day?

A. $f(n) = f(1) - f(n - 1)$

B. $f(n) = f(1) + f(n - 1)$

C. $f(n) = f(1) + 1.5(n - 1)$

D. $f(n) = f(1) - 1.5(n - 1)$

00. For $x > 0$, which expression is equivalent to $\sqrt[6]{x^2}$?

A. $\sqrt[12]{x}$

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

C. x^3

D. x^{12}

00. Brian has some quarters and nickels. He has twice as many quarters as nickels, and the coins are worth a total of $11.

Which augmented matrix can be used to determine the number of quarters and the number of nickels Brian has?

A. $\left[\begin{array}{cc|c} 1 & 2 & 0 \\ 1 & 1 & 11 \end{array}\right]$

B. $\left[\begin{array}{cc|c} 1 & -2 & 0 \\ 1 & 1 & 11 \end{array}\right]$

C. $\left[\begin{array}{cc|c} 1 & 2 & 0 \\ 0.25 & 0.05 & 11 \end{array}\right]$

D. $\left[\begin{array}{cc|c} 1 & -2 & 0 \\ 0.25 & 0.05 & 11 \end{array}\right]$

00. A polynomial function is given.

$$p(x) = 4x^2 + 9x + 2$$

Which statement correctly explains whether the binomial $(x - 2)$ is a factor of $p(x)$?

A. The binomial $(x - 2)$ is a factor of $p(x)$ because $p(0) = 2$.

B. The binomial $(x - 2)$ is a factor of $p(x)$ because $p(-2) = 0$.

C. The binomial $(x - 2)$ is **not** a factor of $p(x)$, because $p(2) \neq 0$.

D. The binomial $(x - 2)$ is **not** a factor of $p(x)$, because $p(0) \neq -2$.

00. Which statements describe parameters?

Select the **three** correct answers.

A. The mean height of all 15 players on a basketball team is 73 inches.

B. There are 240 trees in an orchard, and 30% of them are apple trees.

C. Out of all 32 employees at a company, the range of employee ages is 25 years.

D. The standard deviation of the weights of a random sample of 95 bluebirds is 1.1 grams.

E. A teacher asked a random sample of 20 students what their favorite season is, and 45% said summer.

00. An equation is shown.

$$e^{10x} = 70$$

Which expression represents the exact solution to the equation?

A. $\frac{\ln 70}{10}$

B. $\frac{\log 70}{e}$

C. $\ln 7$

D. $\log 70$

00. Visitors to the zoo must purchase a ticket for entry. They may also purchase a wristband to ride the zoo train. Prices are different for children and adults. Some information about prices is given.

- An adult's entry ticket costs $15.
- An adult's wristband for the train ride costs $8.

The given matrix shows the price in dollars of entry tickets and wristbands for children and adults.

$$Z = \begin{bmatrix} 15 & 12 \\ 8 & 6 \end{bmatrix}$$

What does the second row of matrix Z represent?

A. prices of entry tickets

B. prices of wristbands

C. prices for children

D. prices for adults

00. Functions $f(x)$ and $g(x)$ are given.

$f(x) = \sqrt{2x + 1}$
$g(x) = 3x$

Which expression represents $f(g(x))$?

A. $\sqrt{6x + 1}$

B. $\sqrt{6x^2 + 1}$

C. $3\sqrt{2x + 1}$

D. $3x\sqrt{2x + 1}$

00. Lucia finds the zeros of $y = 3x^2 - 13x - 10$ and uses them to accurately graph the equation.

Which of these **must** be true about where her graph crosses the x-axis?

A. at $x = -5$ and $x = \frac{2}{3}$

B. at $x = -5$ and $x = 2$

C. at $x = -2$ and $x = 5$

D. at $x = -\frac{2}{3}$ and $x = 5$

00. Emmett is using leftover tile to renovate a portion of the bathroom floor.

- Each box of tile covers 10.45 square feet, and there are 3 boxes left to use.
- The dimensions of the area of flooring that the tile needs to cover is 4.41 feet by 6.73 feet.

Which expression is the **least** accurate representation of the amount of tile available to cover the desired area of flooring?

A. $\frac{(4)(6)}{11}$

B. $\frac{(5)(7)}{10}$

C. $\frac{(4.4)(6.7)}{10.5}$

D. $\frac{(4.5)(6.8)}{10.4}$

00. An equation is given.

$$e^{3x-2} = 7$$

Which number is the **best** approximation of the solution to the equation?

A. 0.732

B. 0.948

C. 1.315

D. 1.525

00. Ella opens a savings account with $500, but does not add any more money to the account after that. Her account earns 5% interest annually. After x years, she has a total of $578.81.

Which equation represents this situation?

A. $500 = 578.81(x)^{1.05}$

B. $500 = 578.81(1.05)^{x}$

C. $578.81 = 500(x)^{1.05}$

D. $578.81 = 500(1.05)^{x}$

00. The formula $p = -\log(x)$ gives the pH of a substance with hydrogen ion concentration x, which is measured in moles per liter.

What is the average rate of change of pH as x changes from 0.05 moles per liter to 0.63 moles per liter?

A. -1.90

B. -1.10

C. 0.15

D. 0.75

00. Yolanda recorded the amounts 14 people paid for lunch. Her data are shown in Set A. She discovered that she forgot to record the amounts 2 other people paid for lunch. Set B shows the data, including that for the 2 other people.

Set A	
$6.35	$8.35
$6.55	$8.35
$7.04	$8.99
$7.25	$9.45
$7.52	$9.72
$8.14	$10.05
$8.35	$10.62

Set B	
$6.35	$8.35
$6.55	$8.99
$7.04	$9.45
$7.25	$9.72
$7.52	$10.05
$8.14	$10.62
$8.35	**$15.27**
$8.35	**$15.89**

Which statements are true about Set A and Set B?

Select the **two** correct answers.

A. The mean for the data in Set A is equal to the mean for the data in Set B.

B. The standard deviation for the data in Set A is equal to the standard deviation for the data in Set B.

C. The standard deviation for the data in Set A is less than the standard deviation for the data in Set B.

D. The shape of the distribution of data in Set B is skewed more to the left than the shape of the data in Set A.

E. The shape of the distribution of data in Set B is skewed more to the right than the shape of the data in Set A.

00. The formula $W = \frac{S^2}{S^2 + A^2}$ is used to predict W, a baseball team's winning percentage.

- S represents the number of runs scored.
- A represents the number of runs allowed.

Which formula could be used to predict S, the number of runs scored?

A. $S = A\sqrt{\frac{W}{W+1}}$

B. $S = A\sqrt{\frac{W}{1-W}}$

C. $S = \frac{A}{\sqrt{W-1}}$

D. $S = \frac{A}{\sqrt{1-W}}$

00. A meteorologist uses historical data to calculate P(rain), P(cloudy), and P(rain and cloudy) for the month of February. One February morning, the meteorologist reports that it is raining. Which statement best describes the probability that it will also be cloudy on this day?

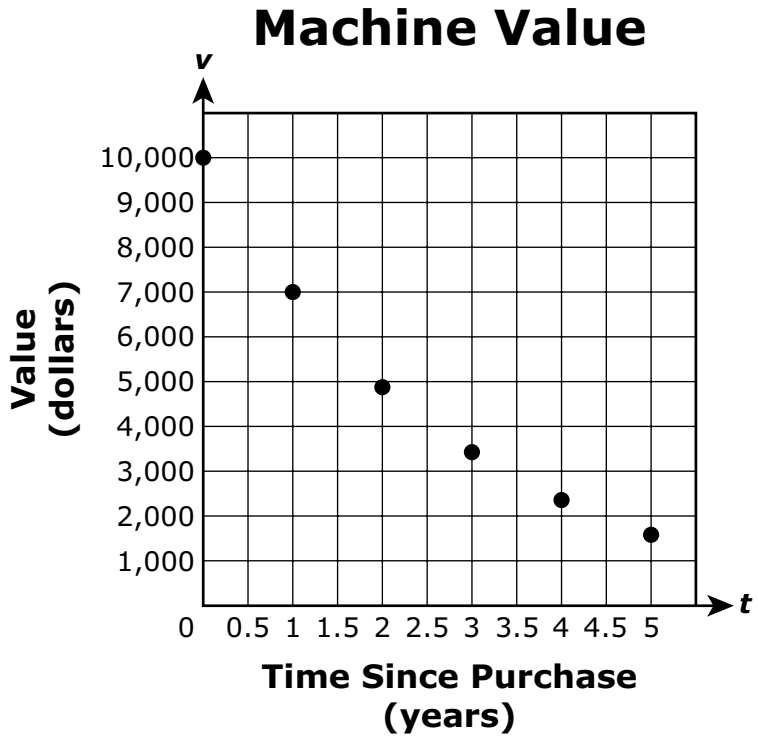
A. This is an example of conditional probability because rain has already occurred.

B. This is an example of conditional probability because the probabilities were calculated from historical data.

C. This is not an example of conditional probability because rain and cloudiness are independent events.

D. This is not an example of conditional probability because rain and cloudiness are mutually exclusive events.

00. The graph and table show the exponential decline in value of a factory machine as a function of time in years since its purchase.



Time Since Purchase (years)	0	1	2	3	4	5
Value (dollars)	10,000	7,000	4,900	3,430	2,401	1,681

Which amount is closest to the expected value of the machine after 5.5 years?

A. $849

B. $1,240

C. $1,400

D. $1,730

00. A certain cylinder has a radius of r inches. Its volume in cubic inches is given by the expression $2\pi r^3$.

Which statement about the cylinder **must** be true?

A. The cylinder's radius is 2 inches.

B. The cylinder's height is 2 inches.

C. The cylinder's radius is 2 times its height.

D. The cylinder's height is 2 times its radius.

00. Bella pledged different amounts to 3 friends for a charity walk. In the system of equations representing this situation, x represents the amount pledged per mile to Dianne, y represents the amount pledged per mile to Juan, and z represents the amount pledged per mile to Lynn.

- The amounts Bella pledged per mile for each friend added up to $1.10.
- The amount pledged per mile for Juan was equal to the sum of the amounts pledged for Dianne and Lynn.
- Dianne walked 5 miles, Juan walked 7 miles, and Lynn walked 9 miles for a total pledge from Bella of $7.60 to charity.

What is the amount per mile that Bella pledged to Dianne?

Enter your answer in the space provided.

00. The lengths of songs in a playlist are normally distributed with a mean time of 140 seconds and a standard deviation of 10 seconds.

Which number of seconds is closest to the length of a song on the playlist with a z-score of -0.5?

A. 130

B. 135

C. 145

D. 150

00. The table shows how a group of elementary school students get to school.

How Students Get to School

	Car	Bus	Totals
Third Graders	74	76	150
Fourth Graders	91	59	150
Fifth Graders	63	87	150
Totals	228	222	450

What is the probability a student takes a car to school given the student is a fifth grader?

A. 0.14

B. 0.28

C. 0.42

D. 0.51

00. What are the zeros for $f(x) = x^2 - x - 6$?

A. $x = -2, x = 3$

B. $x = 2, x = -3$

C. $x = -1, x = 6$

D. $x = 1, x = -6$

00. A function is given.

$$f(x) = (x-4)^2 - 4$$

Which equivalent function **best** reveals the zeros of $f(x)$?

A. $f(x) = x^2 - 8x + 12$

B. $f(x) = x^2 - 8x - 20$

C. $f(x) = (x-2)(x-6)$

D. $f(x) = (x+2)(x-10)$

00. Harper attempted to solve the equation $12 - 3\log_2(x+5) = 3$ using the steps shown, but her work is incorrect.

Equation:	$12 - 3\log_2(x+5) = 3$
Results of Step 1:	$-3\log_2(x+5) = -9$
Results of Step 2:	$\log_2(x+5) = 3$
Results of Step 3:	$x+5 = 9$
Results of Step 4:	$x = 4$

Which statement describes Harper's **first** mistake?

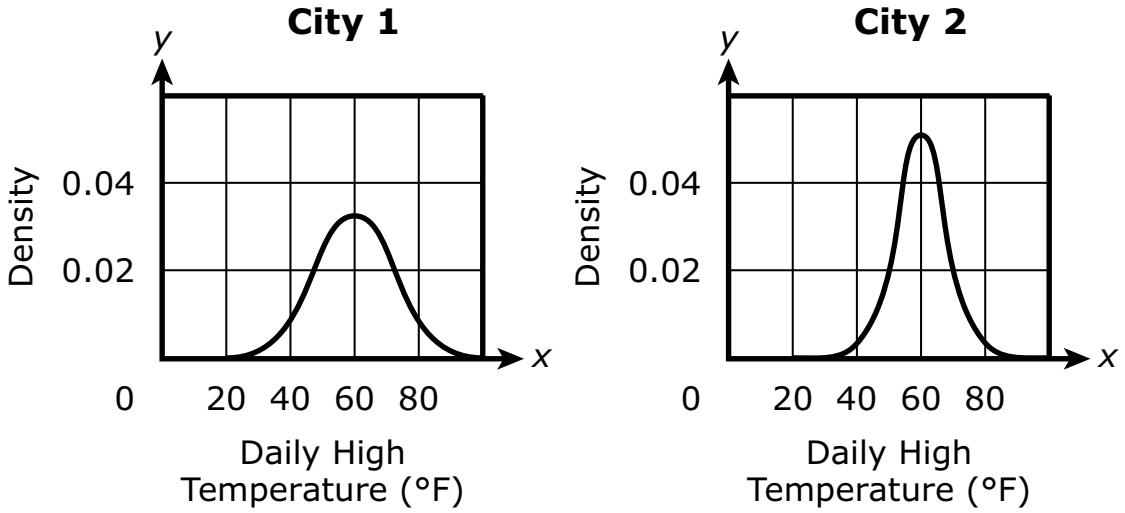
A. The results of Step 1 should have been $9\log_2(x+5) = 3$.

B. The results of Step 2 should have been $\log_2(x+5) = -6$.

C. The results of Step 3 should have been $x+5 = 8$.

D. The results of Step 4 should have been $x = 14$.

00. The given density curves represent the distribution of daily high temperatures in degrees Fahrenheit for two cities during one full year.



Use the density curves to compare the median and the standard deviation of the data for the two cities.

Select **one** box per row.

		A	*B*	*C*
		Greater for City 1	**Greater for City 2**	**Equal for City 1 and City 2**
1	Median	◯	◯	◯
2	Standard Deviation	◯	◯	◯

00. Jabari has a cube made of pottery clay.

- Each edge of the cube is 37 centimeters long.
- The density of the clay is 1,600 kilograms per cubic **meter**.

Jabari will use the formula $p = \frac{m}{V}$, where p is the density, m is the mass, and V is the volume, to calculate the mass of the cube. Which value is the **best** approximation of the mass in kilograms of the cube?

A. 32 kilograms

B. 81 kilograms

C. 219 kilograms

D. 433 kilograms

00. A store sells roses. Last week, the store sold 250 roses at a price of $4 per rose. The store manager predicts that each increase of $1 per rose will result in selling 40 fewer roses per week.

Which equation represents the predicted total weekly revenue, R, in dollars, if the store increases the price of each rose by x dollars?

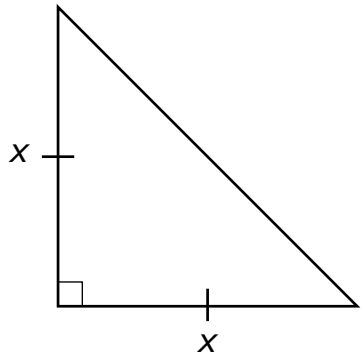
A. $R = x(40x - 250)$

B. $R = x(250 - 40x)$

C. $R = (4 + x)(40x - 250)$

D. $R = (4 + x)(250 - 40x)$

00. The figure shows an isosceles right triangle.



When the triangle's legs are each x units long, the area of the triangle in square units is given by $f(x) = \frac{1}{2}x^2$.

Which statement describes the length of each leg when the area of the triangle is 1 square unit?

A. Each leg is $\frac{1}{2}$ unit long because $f(1) = \frac{1}{2}$.

B. Each leg is $\frac{1}{2}$ unit long because $f\left(\frac{1}{2}\right) = 1$.

C. Each leg is $\sqrt{2}$ units long because $f(1) = \sqrt{2}$.

D. Each leg is $\sqrt{2}$ units long because $f(\sqrt{2}) = 1$.

00. The manager of a movie theater wants to know what people in her town think about the price of movie tickets at the theater. Each day for one month, she surveys 20 randomly selected people who buy a movie ticket.

Which statement **best** evaluates the manager's survey?

A. It is biased because the survey was not given to everyone who bought a ticket.

B. It is biased because it excludes people who did not go to the movies in that month.

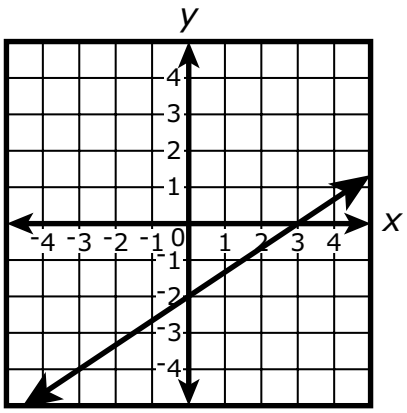
C. It is **not** biased because the people who were surveyed know the price of a movie ticket.

D. It is **not** biased because the survey was given to a random selection of people purchasing a ticket.

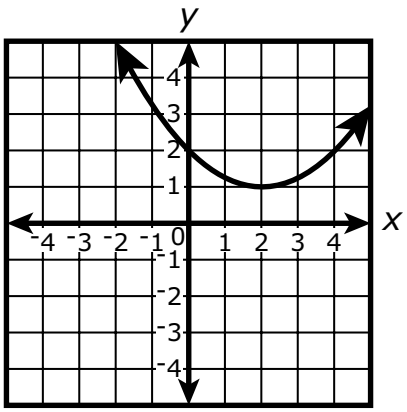
00. Which graphs represent functions that are one-to-one on their entire domain?

Select the **two** correct answers.

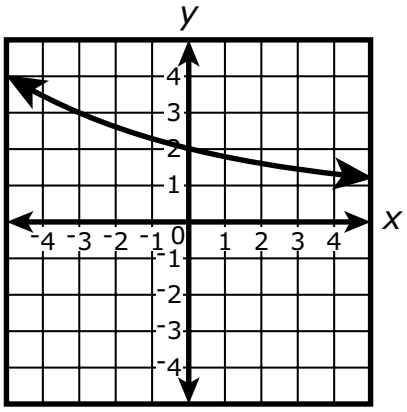
A.



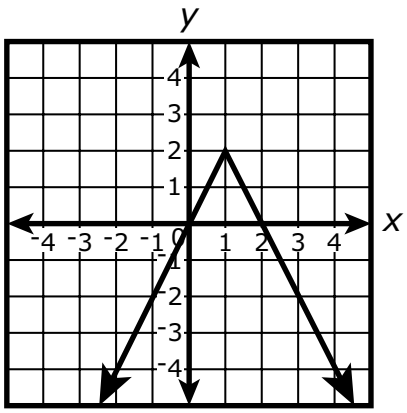
B.



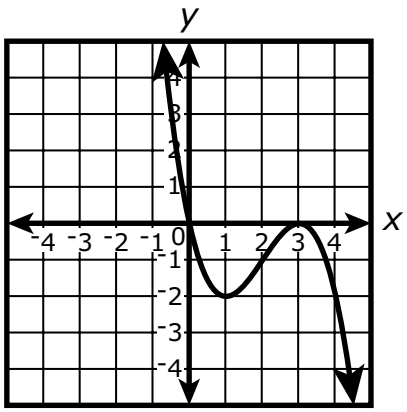
C.



D.



E.



00. The expression $25(1.12)^x$ represents the number of members of a school club x years after the club formed. Which statement correctly interprets a part of this expression?

A. The club had 12 members 1 year after it formed.

B. The club had 25 members 1 year after it formed.

C. The number of club members increased by 12% each year.

D. The number of club members increased by 25% each year.

00. A restaurant serves regular lemonade and flavored lemonade in two sizes. The given matrices show the prices of the two sizes of each type of lemonade.

$$R = \begin{bmatrix} 1.29 \\ 1.79 \end{bmatrix} \qquad F = \begin{bmatrix} 1.59 \\ 1.99 \end{bmatrix}$$

- Matrix R represents the prices in dollars of regular lemonade.
- Matrix F represents the prices in dollars of flavored lemonade.
- The first row of each matrix represents the price in dollars of a small cup of lemonade.
- The second row of each matrix represents the price in dollars of a large cup of lemonade.

Matrix $F - R$ represents the difference in price between a cup of flavored lemonade and the same size cup of regular lemonade.

Which matrix is $F - R$?

A. $\begin{bmatrix} 0.50 & 0.40 \end{bmatrix}$

B. $\begin{bmatrix} 0.30 & 0.20 \end{bmatrix}$

C. $\begin{bmatrix} 0.50 \\ 0.40 \end{bmatrix}$

D. $\begin{bmatrix} 0.30 \\ 0.20 \end{bmatrix}$

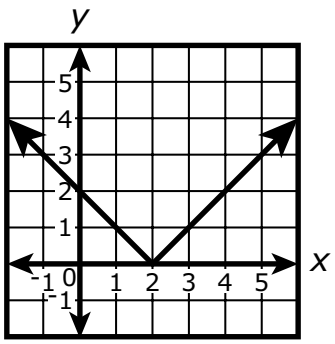
00. Adaline has 16 books on a shelf. She has read 12 of them. She will randomly select 2 of the books on the shelf to give to a friend.

What is the probability, as a **decimal number**, that Adaline has read both of the books she selects?

Enter your answer in the space provided.

00. The graph of function $f(x)$ and the equation of function $g(x)$ are given.

Graph of $f(x)$



Equation of $g(x)$

$g(x) = 2 - |x - 2|$

Which statement correctly compares $f(x)$ and $g(x)$?

A. They have the same vertex.

B. They have the same x-intercept.

C. They have the same y-intercept.

D. They have the same axis of symmetry.

00. An equation is shown.

$$\sqrt{21 - 4x} = -x$$

What is the solution set to the equation?

A. $\{-7, 3\}$

B. $\{-7\}$

C. $\{3\}$

D. $\{\}$

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