

SESSION 1

This session contains 34 multiple-choice questions. Fill in the circle for your answer to each multiple-choice question.

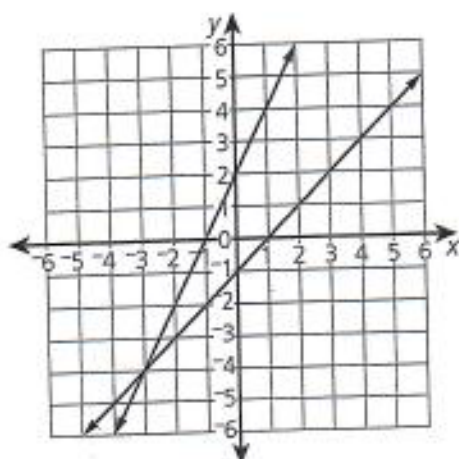
You may **not** use a calculator during this session.

Directions: Read each problem. Then fill in the circle of the best answer.

- 1 What is the value of $\frac{(7^2)(7^6)}{7^3}$?

(A) $\frac{1}{7^3}$
 (B) $\frac{1}{7}$
 (C) 7
 (D) 7^3

- 2 A system of equations is shown on this coordinate plane.



Which ordered pair represents the solution to this system of equations?

(A) $(-3, -4)$
 (B) $(-4, -3)$
 (C) $(-1, 0)$
 (D) $(0, -1)$

- 3 What is the number 0.00000482 written in scientific notation?

(A) 4.82×10^6
 (B) 4.82×10^5
 (C) 4.82×10^{-5}
 (D) 4.82×10^{-6}

- 4 Four athletes rode bikes and went swimming one day. The times each athlete did each activity are shown on the coordinate plane below.



Which athlete appears to have the greatest difference between the two times?

(A) Joy
 (B) Zhong
 (C) Fia
 (D) Mason

- 5 Look at the function table below.

x	y
2	7
4	11
6	15

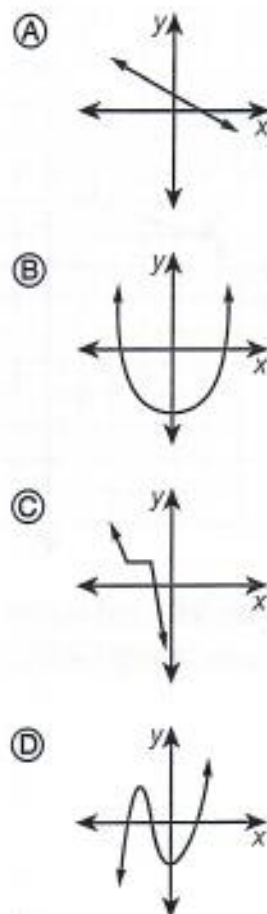
What is the value of y when x is -2 ?

- (A) -7
 (B) -1
 (C) 3
 (D) 7

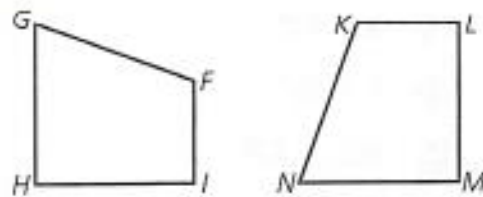
- 6 Which expression is equivalent to $(2^{-3})^3$?

- (A) -2^6
 (B) -2^9
 (C) $\frac{1}{2^6}$
 (D) $\frac{1}{2^9}$

- 7 Which of the following shows the graph of a linear function?



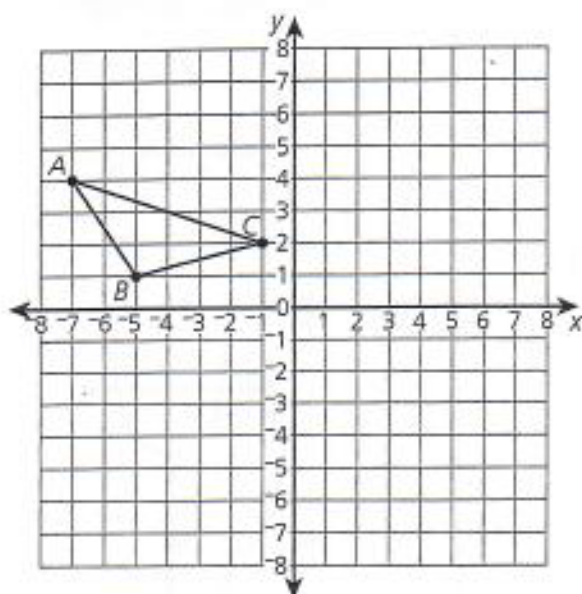
- 8 Figure $FGHI$ is rotated 90° counterclockwise to form its image, as shown.



Which two sides must be congruent?

- (A) \overline{GH} and \overline{NM}
 (B) \overline{GH} and \overline{LM}
 (C) \overline{HI} and \overline{KL}
 (D) \overline{HI} and \overline{NM}

- 9 Look at triangle ABC on the coordinate plane below.



Triangle ABC will be reflected across the y -axis and translated 4 units down to form triangle $A'B'C'$. What will be the coordinates of point C' ?

- (A) $(1, 2)$
 - (B) $(1, -2)$
 - (C) $(-1, -2)$
 - (D) $(-1, -4)$
- 10 Light travels at a speed of approximately 300,000,000 meters per second. How is this number expressed in scientific notation?

- (A) 3×10^8
- (B) 3×10^9
- (C) 300×10^6
- (D) 300×10^9

- 11 What is the solution to the system of equations shown below?

$$\begin{cases} -2x + 4y = 0 \\ 2x - 4y = 0 \end{cases}$$

- (A) (2, 0)
(B) (-2, 0)
(C) There is no solution.
(D) There are infinitely many solutions.

- 12 Which table of values represents a function?

(A)

x	1	3	5	7	9
y	4	4	4	4	4

(B)

x	0	3	5	3	7
y	0	1	2	3	4

(C)

x	2	1	0	1	2
y	5	4	3	2	1

(D)

x	3	3	3	3	3
y	4	6	8	10	12

- 13 Which of the following equations represents a linear function?

(A) $y = \frac{1}{x-1}$

(B) $y = \frac{1}{2} - x$

(C) $y = (x + 2)^2$

(D) $y = \sqrt{x} - 2$

- 14 Which of the following situations can be modeled with a linear function?

(A) the area, y , of a square with side x
(B) the area, y , of a circle with radius x
(C) the volume, y , of a cube with an edge x
(D) the circumference, y , of a circle with radius x

- 15 Felicia leases a car. She pays \$1,500 immediately and \$175 each month. Which equation can be used to model the total dollar amount, d , Felicia pays for the car after m months?

(A) $d = 175m + 1,500$
(B) $m = 175d + 1,500$
(C) $d = 1,500m + 175$
(D) $m = 1,500d + 175$

- 16 Melanie surveyed 100 people who went to a movie yesterday. She recorded the time of day each person went to the movie and whether or not they bought a snack. Her results are shown in this two-way table.

MOVIE SURVEY

Time	Got a Snack	
	Yes	No
Day	14	26
Night	36	24

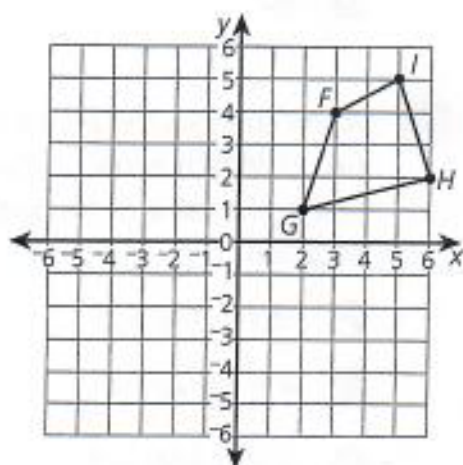
What is the relative frequency of people who saw a movie at night and got a snack to all people who saw a movie at night?

(A) 0.36
(B) 0.5
(C) 0.6
(D) 0.67

17 What is the value of $5^4 \div 5^{-1}$?

- (A) 20
- (B) 625
- (C) $\frac{1}{125}$
- (D) $\frac{1}{3,125}$

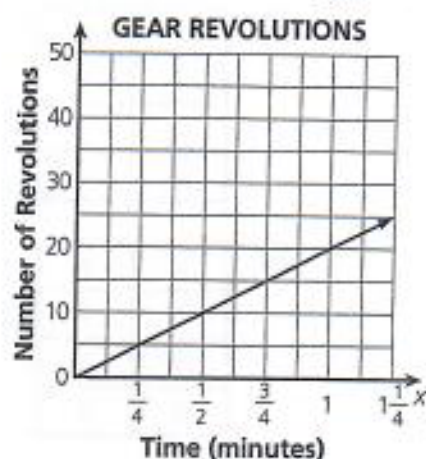
18 Kendra wants to create figure $F'G'H'I'$ so that it is congruent to figure $FGHI$ and completely in quadrant III of the coordinate plane below.



Which sequence will create figure $F'G'H'I'$ in the way Kendra wants it?

- (A) Reflect across the y -axis, then translate 6 units down.
- (B) Reflect across the x -axis, then rotate 180° .
- (C) Dilate by a scale factor of $\frac{1}{2}$ centered at the origin, then rotate 180° .
- (D) Translate 6 units down, then translate 3 units left.

19 The number of revolutions a gear makes is proportional to the number of minutes it revolves, as shown in this graph.



Which unit rate describes this relationship?

- (A) 10 revolutions per minute
- (B) 20 revolutions per minute
- (C) 25 revolutions per minute
- (D) 50 revolutions per minute

- 20 Which of the following relations is a linear function?

(A)

x	y
2	4
2	3
2	4

(B)

x	y
1	2
3	5
3	9

(C)

x	y
2	7
4	7
6	7

(D)

x	y
1	2
4	5
5	5

- 21 Look at the function table below.

x	y
-2	7
0	4
2	1
4	-2

What is the slope of the function?

- (A) $\frac{1}{2}$
(B) $-\frac{3}{2}$
(C) $\frac{5}{2}$
(D) $-\frac{7}{2}$

- 22 Alex belongs to the fan club for his local baseball team. He pays a \$20 membership fee each year and then is able to buy reduced tickets for \$8 each. Dave does not belong to the fan club. He pays the full price of \$12 for each ticket. How many games must Alex go before he begins to save money?

- (A) 4
(B) 5
(C) 10
(D) 60

- 23 A line contains the points (4, -2) and (-4, 2). Which equation can be used to find b , the value of the y -intercept of this equation?

- (A) $-2 = -2(4) + b$
(B) $4 = -2(-2) + b$
(C) $-2 = -\frac{1}{2}(4) + b$
(D) $4 = -\frac{1}{2}(-2) + b$

- 24** A bowl is in the shape of a half sphere. The bowl has a diameter of 6 inches. Approximately how many cubic inches of space are inside the bowl?
- (A) 6π cubic inches
 - (B) 12π cubic inches
 - (C) 18π cubic inches
 - (D) 36π cubic inches

- 25** Spartan Gym and Feel Great Fitness charge different monthly rates and different one-time membership fees. This system of equations represents the total cost, y , of each gym membership after x months.

Spartan Gym: $y = 40x + 50$

Feel Great Fitness: $y = 30x + 100$

Which statement about the costs of memberships at both gyms is true?

- (A) Spartan Gym always costs less than Feel Great Fitness.
 - (B) Feel Great Fitness always costs less than Spartan Gym.
 - (C) The cost of membership is the same at both gyms at 4 months.
 - (D) The cost of membership is the same at both gyms at 5 months.
- 26** The largest continent has an area of approximately 4.5×10^7 square kilometers. The smallest continent has an area of approximately 7.7×10^6 square kilometers. What is the difference, in square kilometers, between the areas of these two continents?
- (A) 3.2×10^{-1} square kilometers
 - (B) 3.2×10^1 square kilometers
 - (C) 3.73×10^6 square kilometers
 - (D) 3.73×10^7 square kilometers

- 27** A plastic cone is 9 centimeters tall and has a diameter of 6 centimeters. What is the approximate volume, in cubic centimeters, of the cone?

(A) 18π cubic centimeters
(B) 27π cubic centimeters
(C) 54π cubic centimeters
(D) 81π cubic centimeters

- 28** Matt is going to set the expression $6(x + 3)$ equal to another expression. Which expression would create an equation with infinitely many solutions?

(A) $x + 18$
(B) $6x + 3$
(C) $3(x + 6)$
(D) $6x + 18$

- 29** Gisa and Matilda are both saving money. This table shows the dollar amount, d , Gisa has saved after w weeks.

w	d
1	215
2	355
5	775
8	1,195

The function $d = 140w + 45$ represents the dollar amount, d , Matilda has saved after w weeks. Which statement is true?

- (A) Gisa saves less than Matilda each week.
(B) Gisa saves more than Matilda each week.
(C) Gisa and Matilda save the same amount each week.
(D) Gisa and Matilda started with the same amount already saved.

- 30** What value of x makes this equation true?

$$-(x + 3) = 2(x - 3)$$

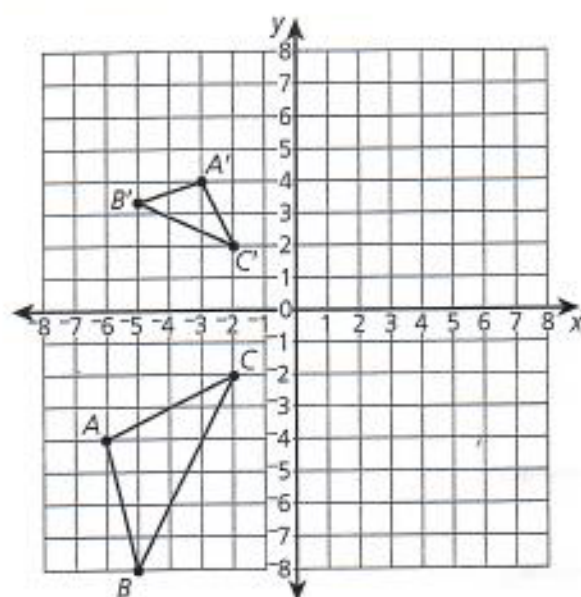
(A) 0
(B) 1
(C) 2
(D) 3

- 31 Which ordered pair represents the solution to this system of equations?

$$\begin{cases} y = \frac{2}{3}x + 3 \\ x + 3y = 0 \end{cases}$$

- (A) (0, 0)
- (B) (0, -3)
- (C) (-3, 1)
- (D) (3, 5)

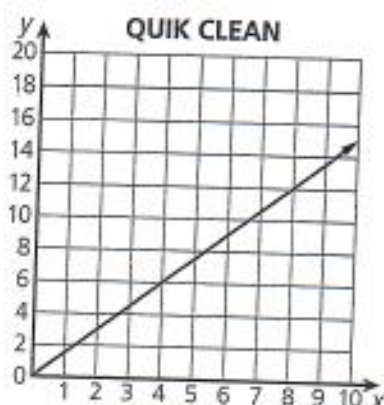
- 32 The coordinate plane below shows similar triangles ABC and $A'B'C'$.



Which sequence of transformations proves the similarity between the two triangles?

- (A) Rotate $\triangle ABC$ 90° counterclockwise and dilate it by a scale factor of 2 centered at point C.
- (B) Rotate $\triangle ABC$ 90° clockwise and dilate it by a scale factor of $\frac{1}{2}$ centered at point C.
- (C) Rotate $\triangle ABC$ 90° counterclockwise and dilate it by a scale factor of $\frac{1}{2}$ centered at the origin.
- (D) Rotate $\triangle ABC$ 90° clockwise and dilate it by a scale factor of 2 centered at the origin.

- 33** The graph and the table below show the relationship between y , the total cost, and x , the number of loads washed, at two laundromats.



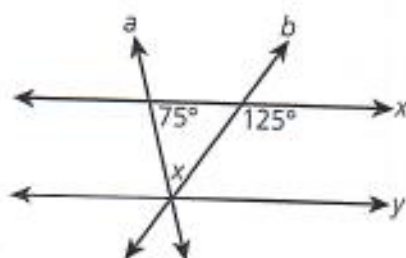
SUDSY SOLUTIONS

x	y
2	2.5
4	5
6	7.5
8	10
10	12.5

How much more will it cost to wash 12 loads of laundry at Quik Clean than at Sudsy Solutions?

- (A) \$0.25
- (B) \$2.50
- (C) \$3.00
- (D) \$9.00

- 34** Look at the diagram below.



What is the measure of the angle marked x ?

- (A) 50°
- (B) 55°
- (C) 75°
- (D) 125°

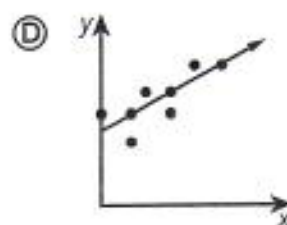
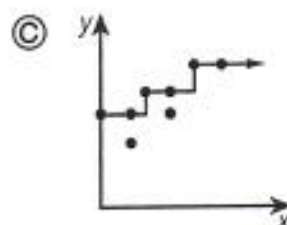
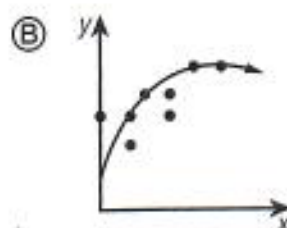
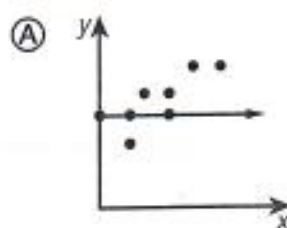
SESSION 2

This session contains 34 multiple-choice questions. Fill in the circle for your answer to each multiple-choice question.

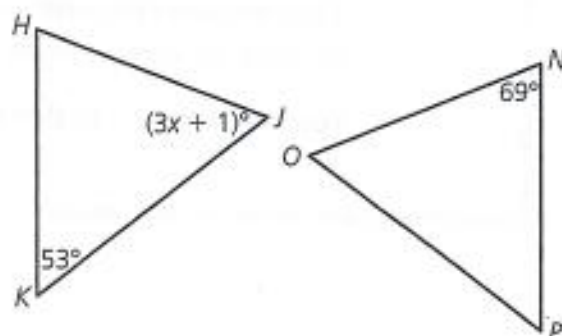
You may use a calculator during this session.

Directions: Read each problem. Then fill in the circle of the best answer.

- 35 Which scatter plot shows a line that best models the relationship between x and y ?

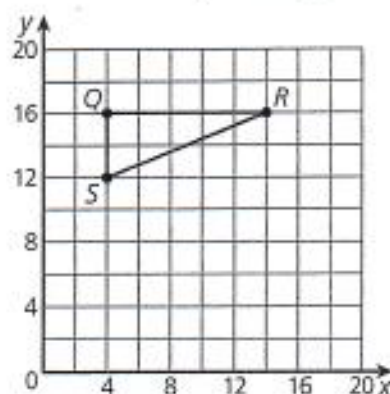


- 36 Triangle HJK is congruent to triangle NOP .



What must be the value of x ?

- (A) 18
(B) 19
(C) 21
(D) 23
- 37 Triangle QRS will be dilated by a factor of $\frac{5}{2}$ to form its image, triangle $Q'R'S'$.



What will be the length, in units, of line segment $\overline{Q'R'}$?

- (A) 4 units
(B) 5 units
(C) 10 units
(D) 25 units

- 38 Figures P and Q are shown below.

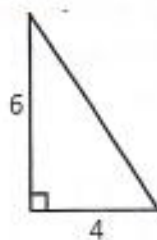


Figure P

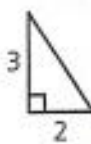
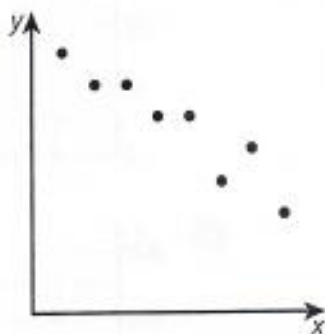


Figure Q

Are figures P and Q similar?

- (A) Yes, because both figures are right triangles.
- (B) No, because figure P is not the same size as figure Q .
- (C) Yes, because figure P is two times greater than figure Q .
- (D) No, because one side length is unknown on both figures.

- 39 Which statement best describes the data on this scatter plot?



- (A) It is linear because the points follow a general straight direction.
- (B) It is nonlinear because the points follow in a downward direction.
- (C) It is linear because each x -value corresponds to exactly one y -value.
- (D) It is nonlinear because each x -value corresponds to a different y -value.

- 40** Mr. Cooper wants to lengthen each side of a square animal pen by the same length. The equation below represents the perimeter p , in feet, of the animal pen when Mr. Cooper lengthens each side by s feet.

$$p = 4(s + 6)$$

By how many feet should Mr. Cooper lengthen each side so that the larger animal pen has a perimeter of 68 feet?

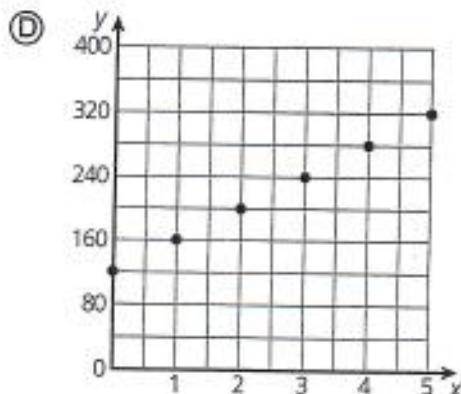
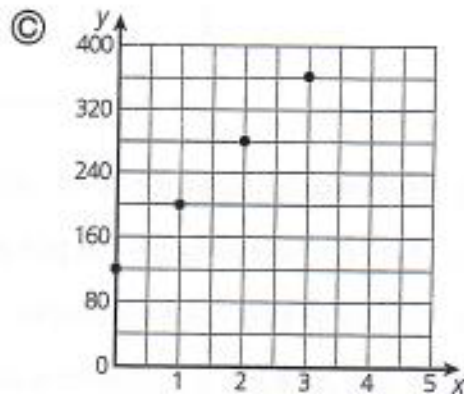
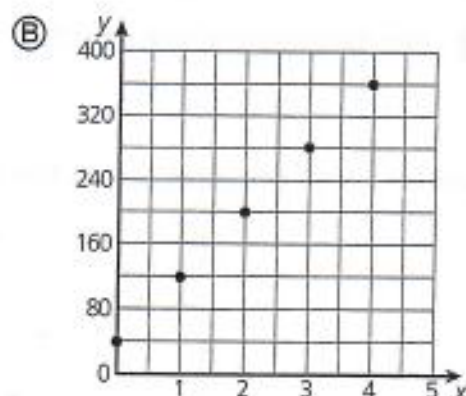
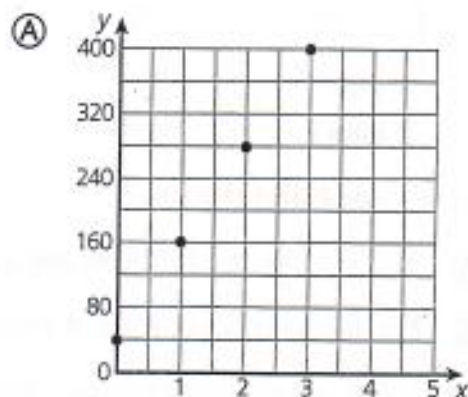
- (A) 11 feet
- (B) 14.5 feet
- (C) 15.5 feet
- (D) 23 feet

- 41** Find the value of the expression below.

$$\left(\frac{(4^3)(4^4)}{4^5}\right)^2$$

- (A) 256
- (B) 16
- (C) $\frac{1}{16}$
- (D) $\frac{1}{256}$

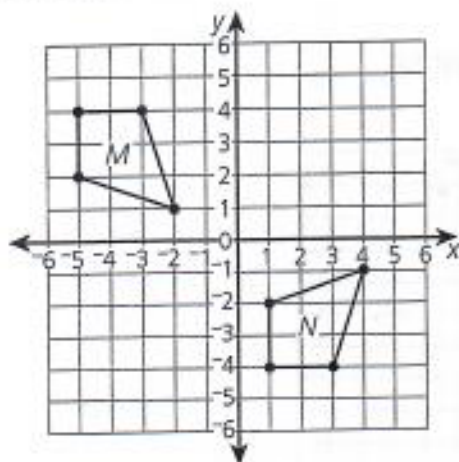
- 42** Jorge's cellphone cost \$120. His monthly plan costs \$40. Which graph shows Jorge's total cost, y , in dollars, for the cellphone for x months?



- 43** Parallelogram $WXYZ$ is rotated 90° clockwise around the origin to form its image, $W'X'Y'Z'$. Which of the following statements must be true?

- (A) Side $X'Y'$ is parallel to side $W'Z'$.
- (B) Side $W'X'$ is parallel to side $X'Y'$.
- (C) Side $Y'Z'$ is parallel to side YZ .
- (D) Side $W'Z'$ is parallel to side XY .

- 44** Figures M and N are shown below.



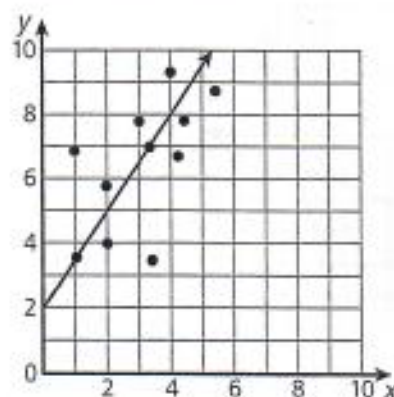
Which set of transformations on figure M could be used to prove it is congruent to figure N ?

- (A) rotate 180° clockwise around the origin and translate 2 units right
- (B) rotate 90° clockwise around the origin and reflect across the x -axis
- (C) reflect across the x -axis and translate 6 units right
- (D) reflect across the y -axis and translate 3 units down

- 45 The total surface area of all the land on Earth is approximately 6.0×10^7 square miles. Land covers approximately 0.3 of the entire surface of Earth. Which number is closest to the approximate total surface area, in square miles, of Earth?

- (A) 5.7×10^7 square miles
- (B) 1.8×10^8 square miles
- (C) 2.0×10^8 square miles
- (D) 2.1×10^9 square miles

- 46 This scatter plot shows a line of best fit.



Based on the line of best fit, for each increase of x what is the approximate increase of y ?

- (A) $\frac{2}{3}$
- (B) $\frac{3}{2}$
- (C) 2
- (D) 3

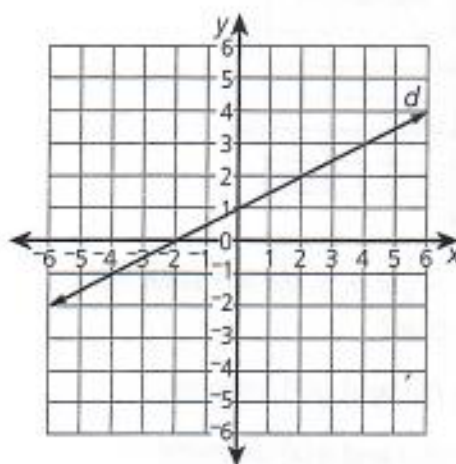
- 47 This equation models the relationship between y , the ounces of water in a water cooler, and x , the number of paper cups filled.

$$y = -6x + 640$$

What does the number 640 in this equation represent?

- (A) the number of paper cups that can be filled
- (B) the number of ounces of water that fit into each paper cup
- (C) the number of ounces of water in the water cooler before any paper cups are filled
- (D) the number of ounces of water left in the water cooler after each paper cup is filled

- 48 Line d is shown on this coordinate plane.



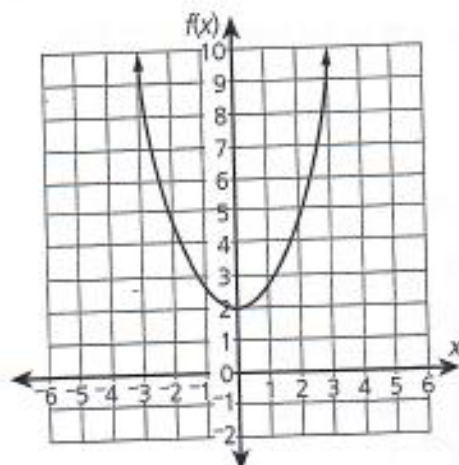
The equation of line f is $y = 2x - 1$. Which statement best describes whether the point $(0, 1)$ is a solution to the system of equations containing lines d and f ?

- (A) It is a solution because the point lies on line d .
- (B) It is a solution because the point lies on line d and line f .
- (C) It is not a solution because the point does not lie on line f .
- (D) It is not a solution because the point does not lie on either line d or line f .

49 Which of the following equations has exactly one solution?

- (A) $3x + 5 - x - 2x = 1$
- (B) $8 - 2(x + 1) = 6x + 6$
- (C) $5x + 3 + x = 3(2x + 1)$
- (D) $4(x - 4) = 2x + 2(x - 4)$

50 Function $f(x)$ is graphed on the coordinate plane below.



Function $g(x)$ is modeled by $g(x) = -\frac{1}{4}x + 3$. Which statement related to these functions must be true?

- (A) As x increases, values of both $f(x)$ and $g(x)$ increase.
- (B) As x increases, values of both $f(x)$ and $g(x)$ decrease.
- (C) For all values of x , the rate of change of $f(x)$ is the same but the rate of change of $g(x)$ differs.
- (D) For all values of x , the rate of change of $g(x)$ is the same but the rate of change of $f(x)$ differs.

- 51 The smallest email Andre has is 4 kilobytes in size. The largest email he has is 8 megabytes in size.

- A kilobyte is approximately 1×10^3 bytes.
- A megabyte is approximately 1×10^6 bytes.

How many times greater is the largest email Andre has compared to the smallest email?

- (A) 200
(B) 300
(C) 2,000
(D) 3,000

- 52 A cylindrical rain barrel has a diameter of 2 feet and a height of 3.25 feet. One cubic foot of space holds approximately 7.5 gallons of water. About how many gallons of water will this rain barrel hold when it is filled?

- (A) 8.12π gallons
(B) 24.375π gallons
(C) 48.75π gallons
(D) 146.25π gallons

- 53 This table shows some points on the graph of a function.

x	y
0	3
2	6
4	9
6	12

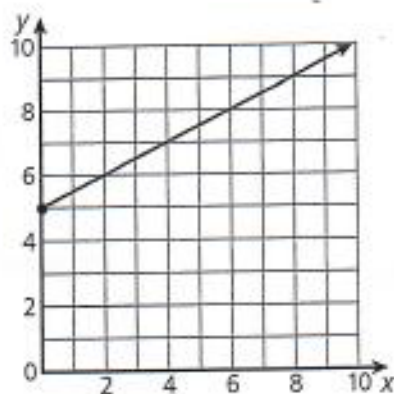
Which function increases at a faster rate than the function in the table?

- (A) $y = \frac{5}{3}x + 1$
(B) $y = \frac{3}{4}x + 4$
(C) $y = \frac{3}{2}x + 5$
(D) $y = \frac{5}{6}x + 3$

- 54 The population of a city is 6.9×10^6 people. Over the next ten years, the population increases by 1.2×10^5 people. What is the new population of the city?

- (A) 7.02×10^6
(B) 7.02×10^{11}
(C) 8.1×10^6
(D) 8.1×10^{11}

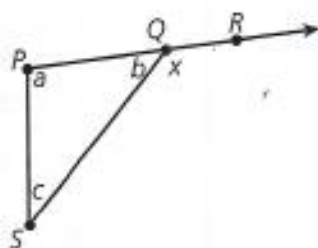
- 55** This graph shows how the height in inches, y , of a plant changes after x weeks.



What does the point $(0, 5)$ on this graph represent?

- (A) The plant is 5 weeks old.
- (B) The plant grew for a total of 5 weeks.
- (C) The plant grows at a rate of 5 inches per week.
- (D) The initial height of the plant was 5 inches.

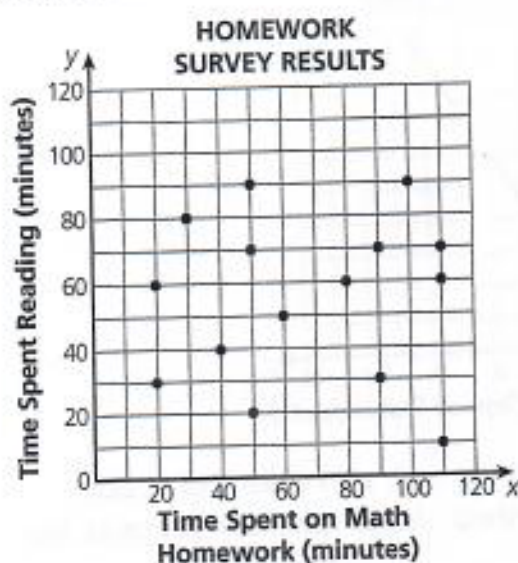
- 56** Triangle PQS is shown in this diagram.



The internal angles of triangle PQS are labeled a , b , and c . Which equation describes the degree measure of the angle marked x ?

- (A) $x = b$
- (B) $x = a + b$
- (C) $x = a + c$
- (D) $x = a + b + c$

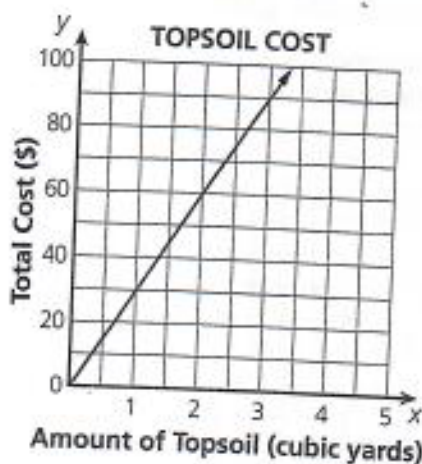
Taryn surveyed her classmates about the amount of time they spent on math homework and the time they spent reading last week. The results of her survey are shown on this scatter plot.



Which conclusion is best supported by the data in the scatter plot?

- (A) The time spent reading is not affected by the time spent on math homework.
- (B) The time spent reading increased as the time spent on math homework increased.
- (C) The time spent reading decreased as the time spent on math homework increased.
- (D) The time spent reading increased and then decreased as the time spent on math homework increased.

- 58 This graph shows the relationship between x , the number of cubic yards of topsoil, and y , the total cost of topsoil at a garden shop.



The equation $y = 25x$ represents the cost, y , in dollars, of x cubic yards of compost at the garden shop. Which statement is true of the costs of topsoil and compost?

- (A) Topsoil costs \$5 more per cubic yard than compost.
 - (B) Compost costs \$5 more per cubic yard than topsoil.
 - (C) Topsoil costs \$10 more per cubic yard than compost.
 - (D) Compost costs \$10 more per cubic yard than topsoil.
- 59 Line k contains the points $(-7, 7)$ and $(1, -1)$. Line m contains the points $(-7, 1)$ and $(1, 5)$. What point lies on both lines k and m ?
- (A) $(-7, 4)$
 - (B) $(-3, 3)$
 - (C) $(1, 2)$
 - (D) $(2, -2)$

60

The two-way table below shows the number of eighth-grade students in Springfield Middle School that play a musical instrument and play a sport.

SPRINGFIELD MIDDLE SCHOOL STUDENTS		
Play a Sport	Play a Musical Instrument	
	Yes	No
Yes	41	39
No	80	28

Which statement is true based on the data?

- (A) About half the students play a sport.
- (B) About half the students play a musical instrument.
- (C) About half the students who play a musical instrument also play a sport.
- (D) About half the students who play a sport also play a musical instrument.

61

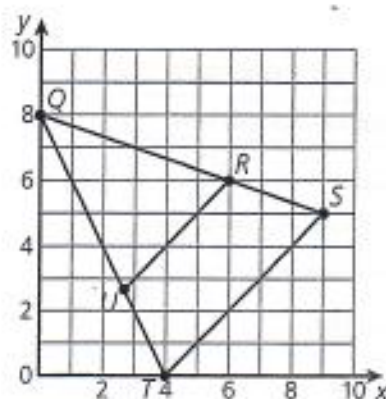
Natasha has an antique lamp. This table shows the relationship between the numbers of years Natasha has owned the lamp and its dollar value.

ANTIQUE LAMP	
Years	Value (\$)
4	200
6	250
8	300
10	350

Based on the data, which statement is true?

- (A) The value of the lamp when Natasha bought it was \$50.
- (B) The value of the lamp when Natasha bought it was \$100.
- (C) The lamp increases in value by \$50 each year.
- (D) The lamp increases in value by \$100 each year.

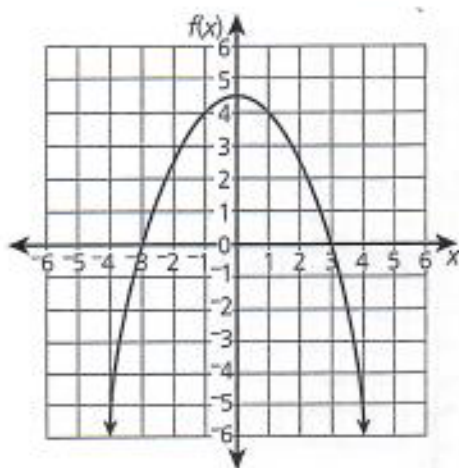
- 62 Triangle QST is similar to triangle QRU .



Which equation explains why the slopes of line segments \overline{QR} and \overline{QS} are the same?

- (A) $\frac{6-8}{6-0} = \frac{5-8}{9-0}$
- (B) $\frac{6-0}{6-8} = \frac{9-0}{5-8}$
- (C) $\frac{5-6}{6-0} = \frac{9-6}{6-8}$
- (D) $\frac{6-0}{5-6} = \frac{6-8}{9-6}$

- 63 The graph of function $f(x)$ is shown on this coordinate plane.



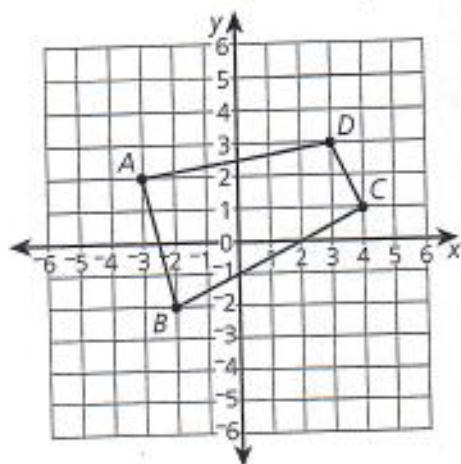
Which statement is true of this function?

- (A) The rate of change decreases for values $x < 0$.
- (B) The rate of change increases for values $-3 < x < 3$.
- (C) The rate of change at $x = -3$ is greater than the rate of change at $x = -1$.
- (D) The rate of change at $x = -1$ is greater than the rate of change at $x = -3$.

- 64 Which statement regarding triangles must be true?

- (A) Two triangles are similar if one pair of corresponding angles are congruent.
- (B) Two triangles are similar if two pairs of corresponding angles are congruent.
- (C) Two triangles are congruent if one pair of corresponding angles are congruent.
- (D) Two triangles are congruent if two pairs of corresponding angles are congruent.

- 65 Look at figure $ABCD$ on the coordinate plane below.



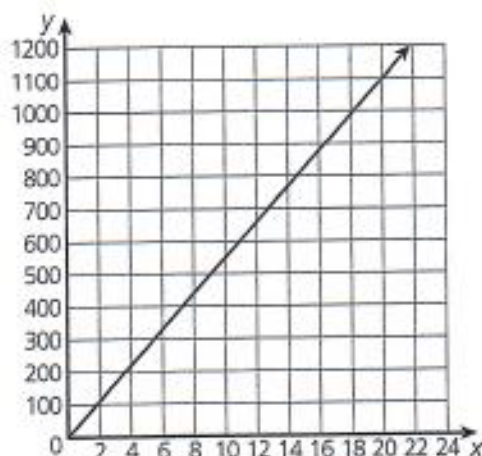
What will be the coordinates of figure $A'B'C'D'$, the image of $ABCD$ under a dilation of 3 centered at the origin?

- (A) $A'(9, 6)$, $B'(6, 6)$, $C'(12, 3)$, $D'(9, 9)$
(B) $A'(-9, 6)$, $B'(-6, -6)$, $C'(12, 3)$, $D'(9, 9)$
(C) $A'(-9, 6)$, $B'(-6, -6)$, $C'(-12, 3)$, $D'(-9, 9)$
(D) $A'(9, -6)$, $B'(6, -6)$, $C'(-12, -3)$, $D'(-9, -9)$
- 66 Jamil feeds his cat the same amount of cat food every day. A graph of the relationship between y , the number of cups of food, and x , the number of days, includes the points $(5, 4)$ and $(10, 8)$. How many cups of cat food does Jamil feed his cat each day?

- (A) $\frac{4}{5}$ cup
(B) $\frac{5}{4}$ cups
(C) 2 cups
(D) 5 cups

67

The graph below shows the relationship between x , the number of hours a certain sawmill is operated, and y , the total charge in dollars for cutting logs.



Mr. Weston estimates it will take 3 hours to cut his load of logs. Which of the following equations represents a sawmill where Mr. Weston will pay less for 3 hours of use than at the sawmill represented above?

- (A) $y = 60x$
- (B) $y = 55x$
- (C) $y = 45x + 40$
- (D) $y = 48x + 15$

68

How many solutions does this equation have?

$$-\frac{5}{8}m + \frac{5}{8}(m + 8) = -5$$

- (A) zero
- (B) one
- (C) two
- (D) infinitely many

SESSION 3

This session contains six short constructed-response items and four extended constructed-response items. Write your answers in the spaces provided.

You may use a calculator during this session.

Directions: Read each part of the problem. Then write the answer to each part.

- 69** Teddy incorrectly solved the equation $3 - (x - 1) = 2(x + 3)$ using the steps shown below.

$$3 - (x - 1) = 2(x + 3)$$

Step 1: $3 - x - 1 = 2(x + 3)$

Step 2: $3 - x - 1 = 2x + 6$

Step 3: $2 - x = 2x + 6$

Step 4: $2 = 3x + 6$

Step 5: $-4 = 3x$

Step 6: $-\frac{4}{3} = x$

Part A: Identify the step that Teddy made his error in and describe the error.

Part B: What is the correct solution to this equation?

Answer: _____

Last year, Irene opened a bank account with an initial deposit of \$250. At the end of each month, she deposited the same dollar amount to the account, as shown in the table below.

IRENE'S BANK ACCOUNT

End of Month (m)	Total Dollar Amount in Account (d)
1	290
2	330
3	370
4	410

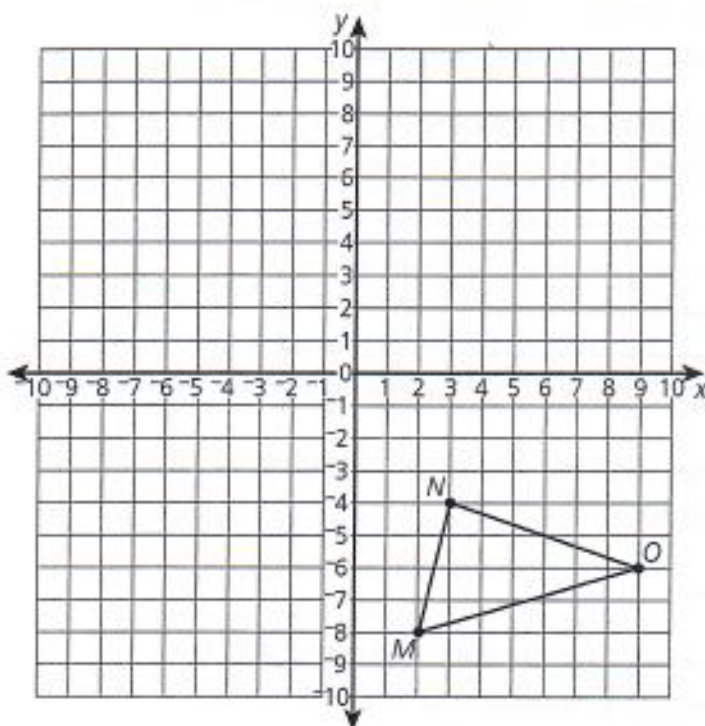
Part A: How much money did Irene deposit to the account at the end of each month?

Answer: \$ _____

Part B: Write an equation that can be used to determine d , the total dollar amount deposited into Irene's bank account after m months.

Answer: _____

- 71** Triangle MNO is shown on the coordinate plane below.



Part A: Whitney reflects $\triangle MNO$ across the line $x = 1$ to form $\triangle M'N'O'$. Draw $\triangle M'N'O'$ on the coordinate plane above. List the congruent side and angle pairs for $\triangle MNO$ and $\triangle M'N'O'$ below.

Part B: Whitney wants to draw $\triangle M''N''O''$ congruent to $\triangle MNO$ in quadrant II of the coordinate plane. Describe a transformation or sequence of transformations that Whitney can use to draw $\triangle M''N''O''$. Explain how you know you are correct.

The tables below show the relationship between the numbers of phone calls a customer service representative had during a two-week period and the average length, in seconds, of each call.

CUSTOMER SERVICE CALLS

Week 1

Number of Calls	Average Length of Call (seconds)
65	136
34	180
47	160
28	184
60	145

Week 2

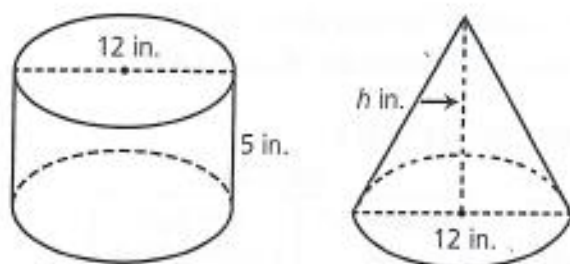
Number of Calls	Average Length of Call (seconds)
72	128
50	152
33	169
40	172
59	161

Part A: Plot the points from the tables above to create a scatter plot below.



Part B: Based on the scatter plot you made in Part A, what conclusion can you make regarding the number of calls the customer service representative had and the average length of the calls? Justify your reasoning.

The cylinder and cone shown below have the same volume.



Part A: What is the volume, in cubic inches, of the cylinder? Give your answer in terms of π .

Answer: _____ cubic inches

Part B: What is the height, h , in inches, of the cone? Give your answer in terms of π .

Show your work.

Answer: _____ inches

The World Ocean is made up of Earth's five oceans. The approximate volumes of four of these oceans are shown in the table below.

EARTH'S OCEANS

Ocean	Volume (cubic kilometers)
Arctic	1.88×10^7
Atlantic	3.1×10^8
Indian	2.64×10^8
Pacific	6.6×10^8

Part A: The Indian Ocean contains approximately 20% of the water in the World Ocean. What is the approximate volume, in cubic kilometers, of water in the World Ocean? Write your answer in scientific notation.

Answer: _____ cubic kilometers

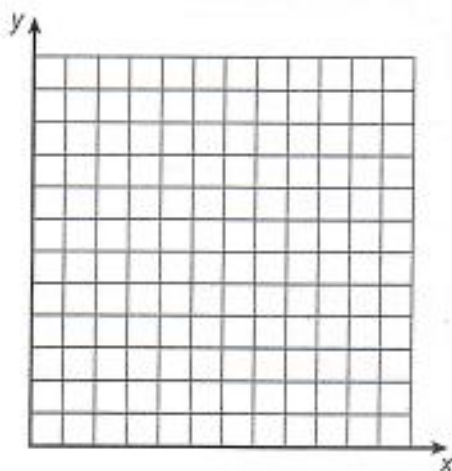
Part B: The Southern Ocean, the fifth ocean, contains the rest of the water in the World Ocean. What is the approximate volume of water, in cubic kilometers, contained in the Southern Ocean? Write your answer in scientific notation.

Show your work.

Answer: _____ cubic kilometers

- 75** The cost of a salad bar is \$4 per pound.

Part A: Use the coordinate plane below to graph the relationship between x , the weight in pounds of a salad from this salad bar, and y , its total cost in dollars.



Part B: What is the equation of the line you graphed in Part A?

Answer: _____

The table below shows the relationship between x , the weight in pounds of a salad, and y , the total cost in dollars, from a different salad bar.

x	y
3	11.25
6	22.50
9	33.75

Part C: Which salad bar is less expensive? Explain how you know.

Reliable Car Rental charges customers who rent a car a base rate plus a per-mile rate for the number of miles they drive the car. The table below models the rates charged by Reliable Car Rental.

RELIABLE CAR RENTAL RATES

Distance Driven (miles)	Total Cost (dollars)
50	120
100	160
150	200
200	240

Part A: What is the total cost to rent a car from Reliable Car Rental if the car is driven 250 miles?

Answer: \$_____

Apex Car Rental charges a base rate of \$150 and a per-mile rate of \$0.60 per mile to rent a car.

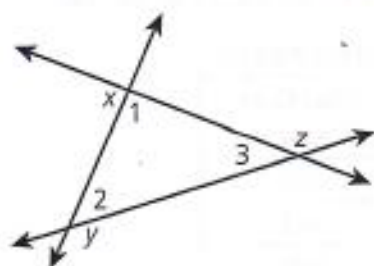
Part B: Which rental company charges a smaller base rate on a car rental?

Show your work.

Answer: _____

Part C: After how many miles does it become less expensive to rent from Apex Car Rental than from Reliable Car Rental? Explain how you know.

Three lines form a triangle, as shown in this diagram.



Part A: What is $m\angle 1 + m\angle 2 + m\angle 3$, in degrees?

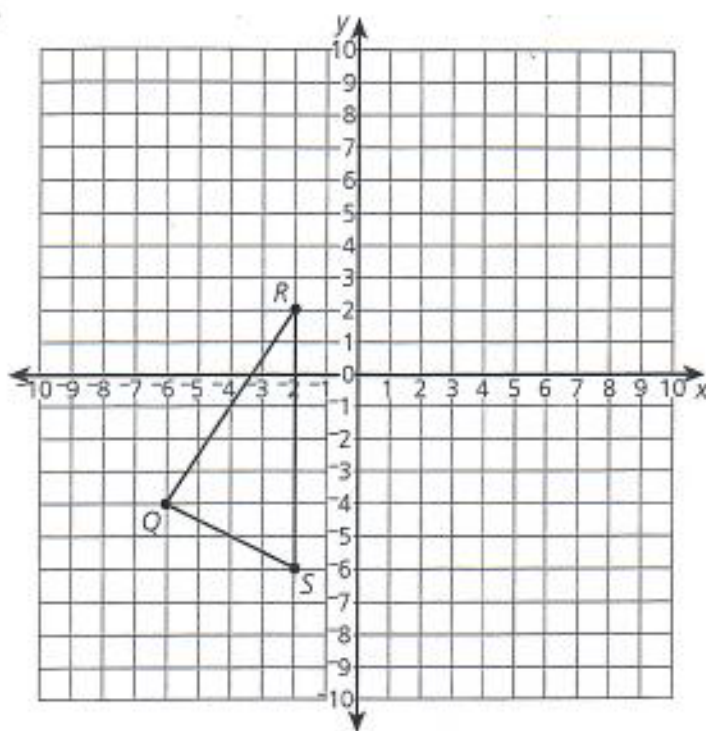
Answer: _____°

Part B: What is $m\angle x + m\angle 1$, in degrees?

Answer: _____°

Part C: What is $m\angle x + m\angle y + m\angle z$, in degrees? Explain how you know you are correct.

- 78** Look at $\triangle QRS$ on the coordinate plane below.



Part A: Roberto reflected $\triangle QRS$ across the y -axis. Then he dilated it by a scale factor of $\frac{3}{2}$ centered at the origin to make $\triangle Q'R'S'$. Draw $\triangle Q'R'S'$ on the coordinate plane above.

Part B: Next Roberto rotated $\triangle Q'R'S'$ 90° counterclockwise around point S' and dilated it by a scale factor of $\frac{2}{3}$ centered at the origin to make $\triangle Q''R''S''$. What are the coordinates of $\triangle Q''R''S''$?

Point Q'' : _____

Point R'' : _____

Point S'' : _____

Part C: Describe the relationships between triangles QRS , $Q'R'S'$, and $Q''R''S''$ based on their sizes.
