NAEP

Grade 8 Mathematics Warm Ups

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1. A nickel, a dime, and a quarter are flipped at the same time. Each coin can land either heads up (H) or tails up (T). List all the different possible outcomes for this event in the chart below. The list has been started for you.

Nickel	Dime	Quarter
H	H	H
H	H	T

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2. Rima and Eric have earned a total of 135 tokens to buy items at the school store. The ratio of the number of tokens that Rima has to the number of tokens that Eric has is 8 to 7. How many tokens does Rima have?

A. 8
B. 15
C. 56
D. 72
E. 120

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3. Points A and B are on a number line. The coordinate of point B is 3 and the coordinate of the midpoint of segment AB is -5. What is the coordinate of point A?

A. -13

B. -2

C. -1

D. 8

E. 11

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4. Last month Bonnie recorded the weights of 11 dogs. Statistics for these weights are given below.

WEIGHTS OF DOGS LAST MONTH

Minimum	31 pounds
Maximum	93 pounds
Mean	81 pounds
Mode	88 pounds
First Quartile	78 pounds
Median	88 pounds
Third Quartile	90 pounds

This month, Bonnie weighed the 11 dogs again. The weight of one dog changed from 31 pounds to 27 pounds. The weights of all the other dogs stayed the same.

Which of the following statistics changed from last month to this month?

A. Maximum

B. Mean

C. Mode

D. First Quartile

E. Median

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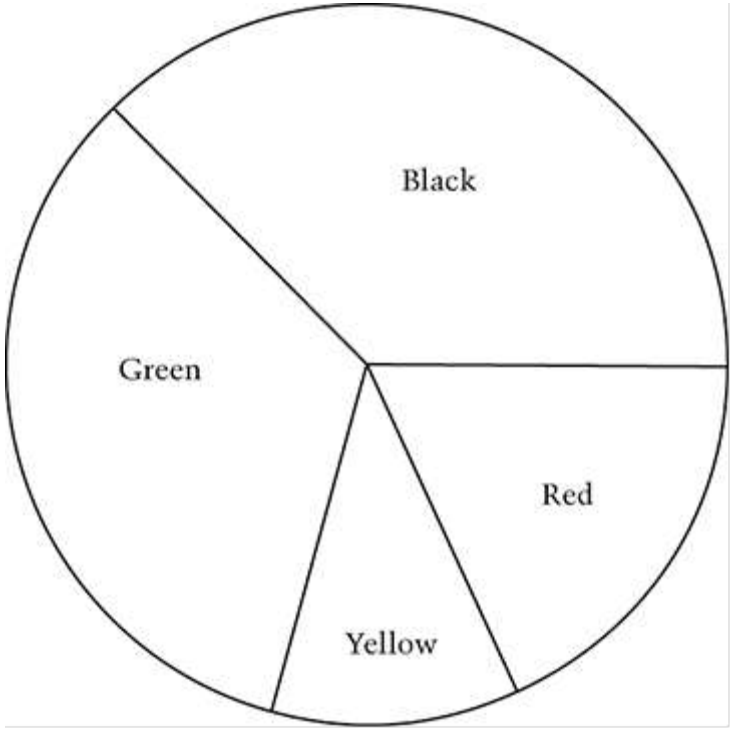

5. The figure above shows a game board. What is the measure, in degrees, of the largest section of the board?

Answer: _____

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6. On a floor plan, a length of 1 inch represents 4 feet. Which of the following segments would represent an 11-foot-long wall on this floor plan?

A. _____

B. _____

C. _____

D. _____

E. _____

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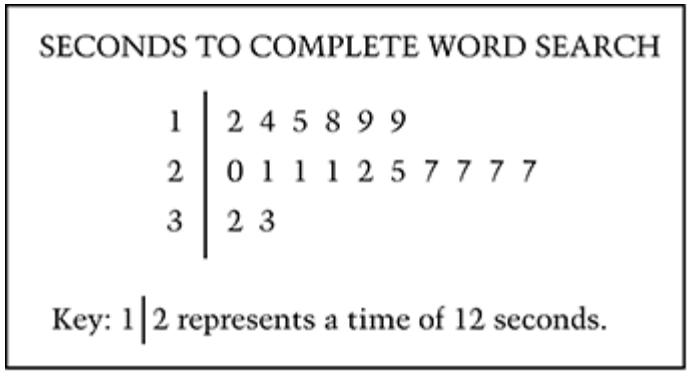
The stem-and-leaf plot below shows the number of seconds it took each student in a class of 18 to complete a word search.



7. How many students took more than 25 seconds to complete the word search?

A. 4

B. 5

C. 6

D. 7

E. 10

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8. One side of a rectangle is 14 meters. The perimeter of the rectangle is 44 meters. What is the area of this rectangle?

A. 22 square meters

B. 64 square meters

C. 112 square meters

D. 121 square meters

E. 196 square meters

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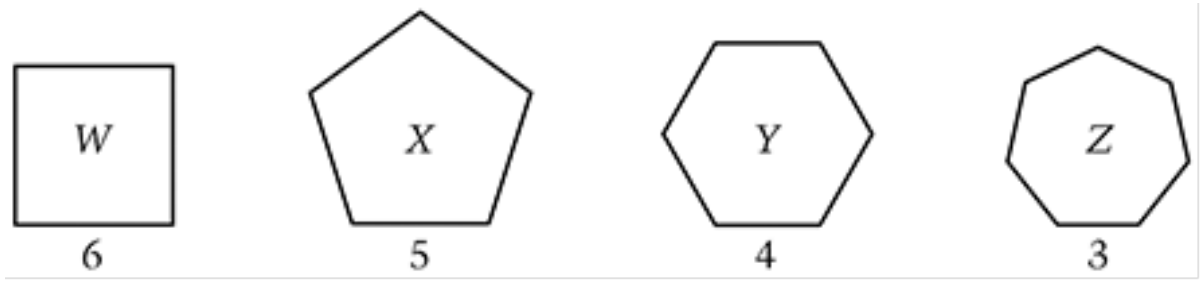

9. In each polygon shown above, the lengths of all sides are equal. The length of one side of each polygon is indicated. Which two polygons have the same perimeter?

A. W and X
B. W and Y
C. W and Z
D. X and Y
E. X and Z

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10. Which of the following are properties of every isosceles right triangle?

A. Three sides of equal length and three 90^{o} angles
B. Three sides of equal length and exactly one 90^{o} angle
C. Exactly two sides of equal length and three 90^{o} angles
D. Exactly two sides of equal length and exactly one 90^{o} angle
E. No sides of equal length and exactly one 90^{o} angle

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11. Fred and three of his friends have decided to rent an apartment. Their monthly expenses are shown in the table below.

MONTHLY EXPENSES

Category	Amount per Month
Rent	$900
Utilities	$100 to $150
Food	$200 to $450

The four people will share all the expenses equally.

Show how Fred would determine the greatest amount he would have to pay in any month.

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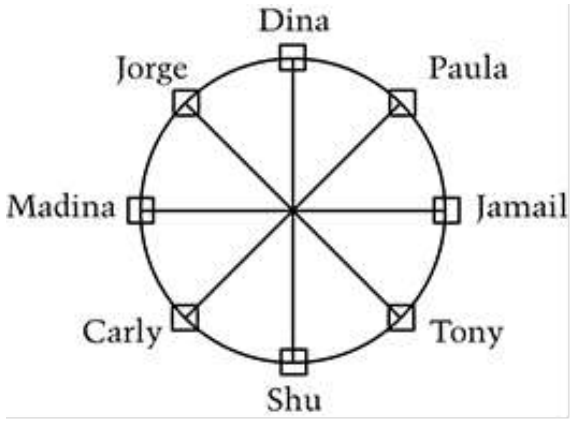

12. The figure above shows a Ferris wheel stopped with Dina at the top. Who will be at the top after a 135° clockwise rotation?

A. Tony

B. Carly

C. Madina

D. Jorge

E. Paula

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Richard wants to estimate the average (mean) monthly temperature of the United States last year. He will choose one of the following two methods to do this.

Method 1	Richard selects his state and 9 other states that are near his state. Then he finds the average (mean) monthly temperature of each of those 10 state and uses those numbers to compute the average monthly temperature of the United States.
Method 2	Richard selects 10 different states by writing the names of all 50 states on cards, with one state's name on each card. Then he places all of the cards in a hat and takes out 10 cards without looking. Finally, he finds the average (mean) monthly temperature of each of those 10 states and uses those numbers to compute the average monthly temperature of the United States.

13. Which method should Richard choose? Explain your reasoning.

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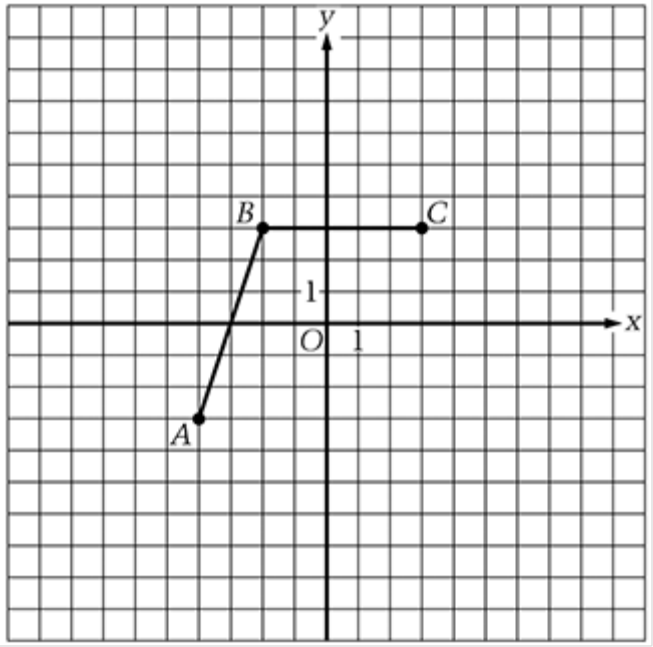

14. Which of the following coordinates of a point D would for a trapezoid ABCD in the figure above?

A. (-3, 1)

B. (-3, 5)

C. (0, -2)

D. (5, -6)

E. (8, -3)

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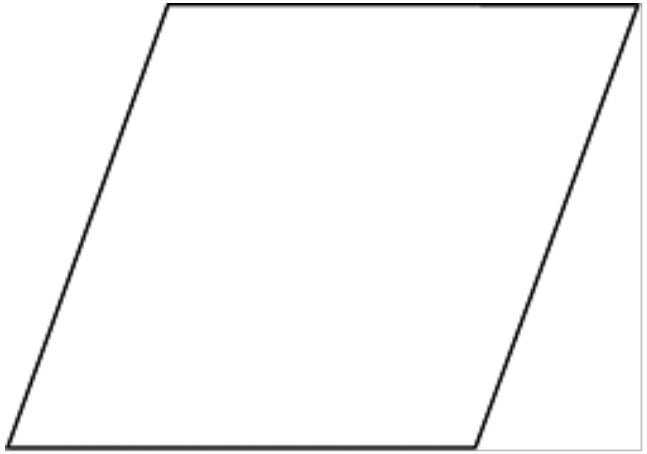
15. Draw two lines of symmetry for the rhombus below.



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16. Which of the following geometric solids has both of the properties listed?

› The base is a polygon with 4 sides of equal length.
› The other faces of the solid meet at a common vertex.

A. Cone
B. Cube
C. Rectangular prism
D. Right cylinder
E. Square pyramid

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Helga's process of calculating the tip to leave in a restaurant starts with the bill for food and drink.

- First, she rounds the bill to the nearest ten cents.
- Then she moves the decimal point in the rounded total one place to the left.
- Finally, she doubles the amount.

17. Helga's process calculates approximately what percent of the original bill?

A. 2%
B. 5%
C. 10%
D. 15%
E. 20%

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18. Tyler drinks 24 fluid ounces of milk each day for 7 days. How many quarts of milk doe he drink in the 7 days? Do not round your answer. (1 quart = 32 fluid ounces)

Answer: _____ quarts

Show how you found your answer.

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19. The ratio of boys to girls to adults at a school party was 6:5:2. There were 78 people at the party. How many of them were adults?

A. 6

B. 12

C. 18

D. 30

E. 36

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20. Liz is conducting an experiment to see whether students learn vocabulary words by a new method faster than they learn them by the old method. Fifty students will participate in the experiment. She pairs off the 50 students so that the two students in each pair have similar levels of vocabulary. One student in each pair then learns words by the old method. The other student in the pair learns words by the new method. Why did Liz pair off her 50 students instead of just having all 50 of them use the new method?

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21. Mary draws a circle and a square on a piece of paper. What is the greatest possible number of points of intersection between the circle and square?

A. 2
B. 4
C. 6
D. 8
E. 10

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22. (a) If c and d are different prime numbers less than 10 and the sum c + d is a composite number greater than 10, what is one possible pair of values for c and d?

c = _____ d = _____

(b) If j and k are different prime numbers less than 10 and the sum j + k is a prime number less than 10, what is one possible pair of values for j and k?

j = _____ k = _____

(c) If s and t are different prime numbers greater than 10, explain why the sum s + t cannot be a prime number.

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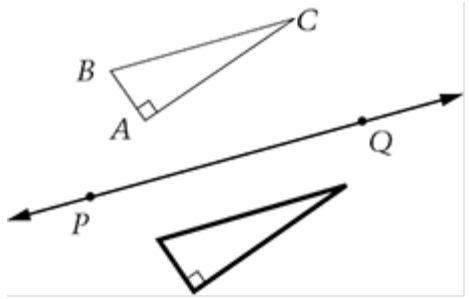
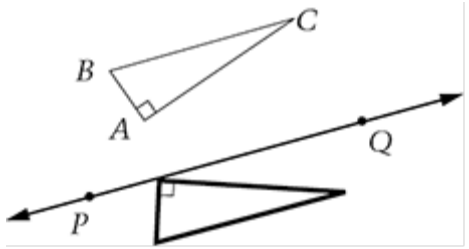
23. Which of the following figures shows the reflection of triangle ABC over line PQ?

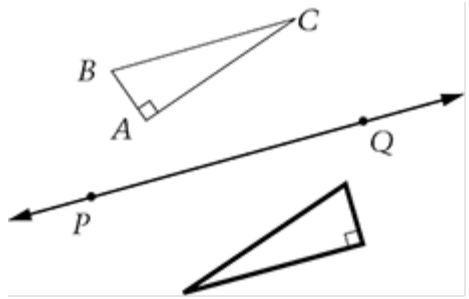
A.



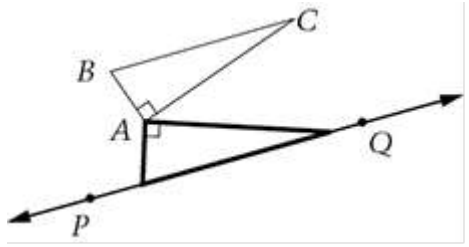
C.



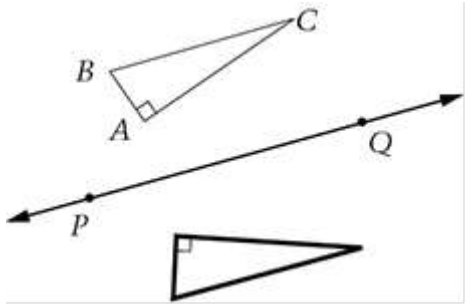
E.



B.



D.



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24. On average, thunder is heard in Tororo, Uganda, 251 days each year. What is the probability that thunder will be hear in Tororo on any day? (1 year = 365 days)

Give your answer to the nearest percent.

Answer: _____ %

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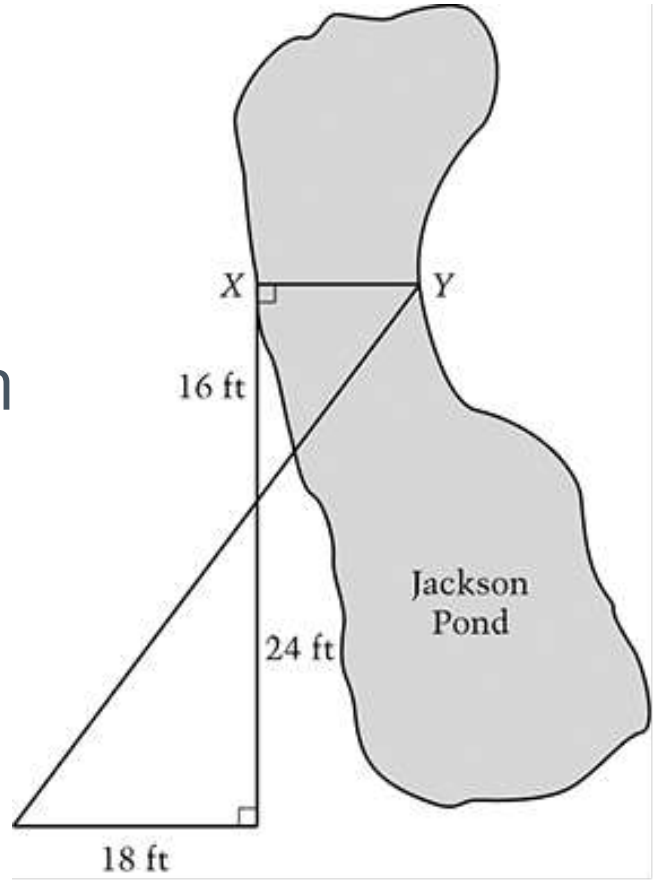
The figure below shows Jackson Pond.



25. What is the distance across Jackson Pond from point X to point Y?

A. 8 feet

B. 10 feet

C. 12 feet

D. 14 feet

E. 22 feet

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26. A company from Japan was doing business in the United States. In 2007 it had an annual income of $1,000,000 and annual expenses of $800,000. The formula below shows the relationship between income, expenses, and profit.

Income = Expenses + Profit

About how much was this company's profit, in Japanese yen, in 2007? (In 2007, 1 United States dollar was approximately equal to 127 yen.)

A. 1,600 yen

B. 200,000 yen

C. 2,500,000 yen

D. 18,000,000 yen

E. 25,000,000 yen

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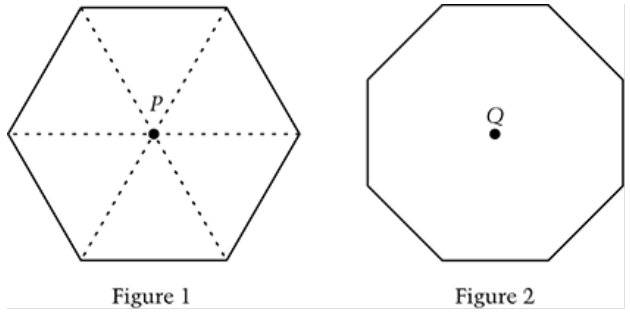

Figure 1 Figure 2

27. Figure 1 is a regular hexagon with its center at point P. The dotted lines divide the hexagon completely into 6 congruent triangles sharing a vertex at point P.

Figure 2 is a regular octagon with its center at point Q. The octagon can be completely divided into congruent triangles sharing a vertex a point Q.

This division could produce

A. Sixteen congruent equilateral triangles.
B. Sixteen congruent isosceles triangles.
C. Eight congruent right triangles.
D. Eight congruent equilateral triangles.
E. Eight congruent isosceles triangles.

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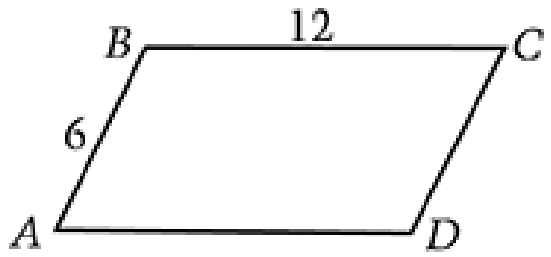

28. Parallelograms ABCD and PQRS above are similar. What is the length of side QR?

A. 4.5

B. 9

C. 12

D. 15

E. 18

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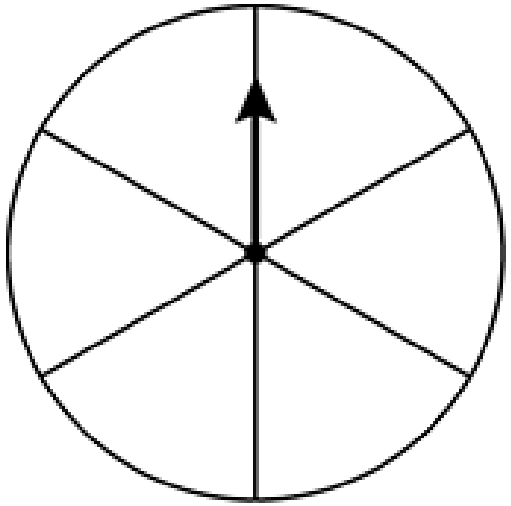
29. The circular spinner shown below is divided into 6 congruent sectors. The sectors are yellow or blue.



Label each of the sectors either yellow (Y) or blue (B) so that the probability of spinning the arrow once and landing on yellow is $\frac{1}{3}$.

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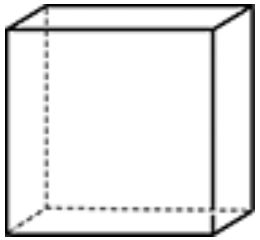
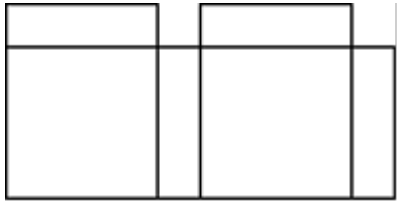
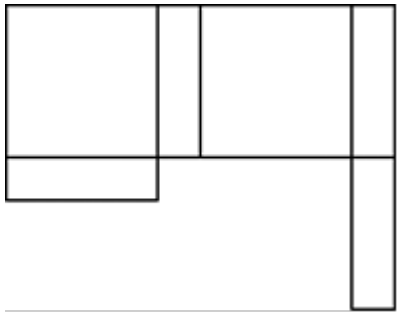
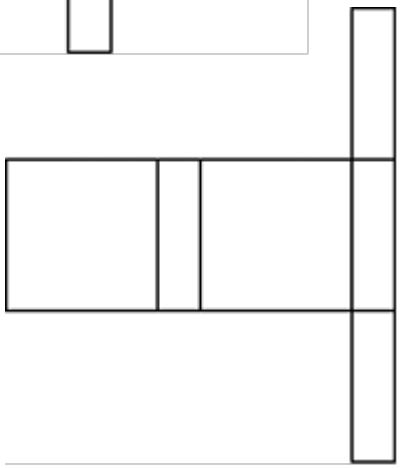


30. The box pictured above has six faces that do not overlap. The box will unfold into one of the figures below. Which figure is it?

A. 

B. 

C. 

D. 

E. 

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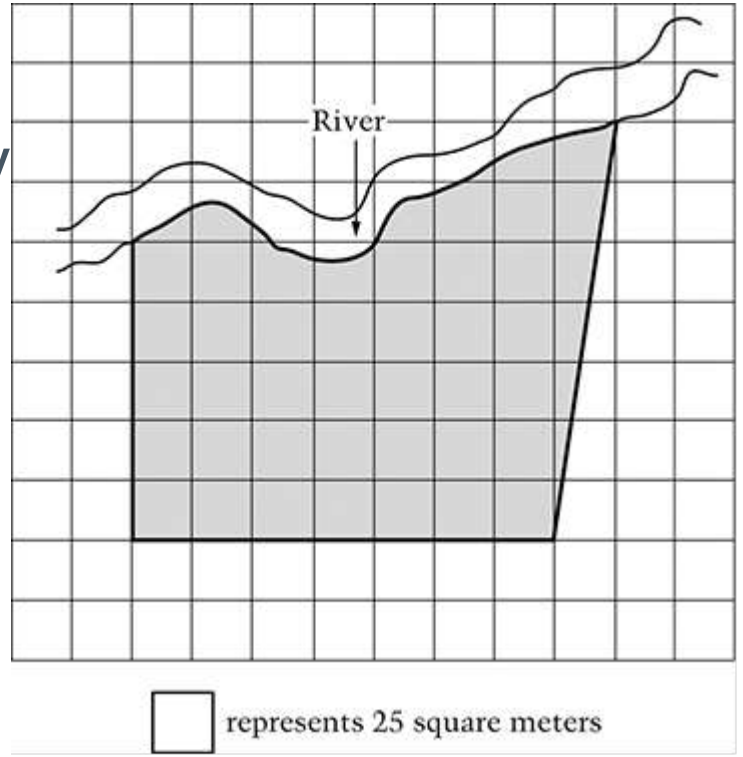
31. On the scale drawing to the right, the shaded area represents a piece of property along the river. Which of the following measurements is the best estimate of the area of the property?



A. 750 square meters
B. 850 square meters
C. 900 square meters
D. 1,050 square meters
E. 1,200 square meters

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32. What is the radius of the largest circle that can be drawn on a 36-by-36-inch square piece of poster board?

A. 3 inches
B. 6 inches
C. 9 inches
D. 18 inches
E. 36 inches

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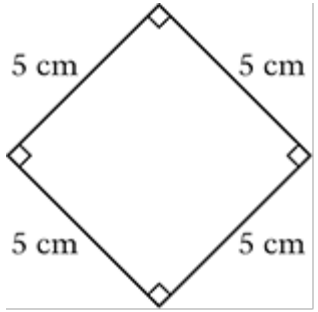
33. When asked to classify the figure below, here is what four students said.



› Ken: "It's a parallelogram."

› Lynn: "It's a square or a rhombus."

› Marianne: "It's a polygon."

› Rosa: " I think that it's both a quadrilateral and a rectangle."

› Which student or students correctly classified the figure?

A. Lynn only
B. Ken and Marianne only
C. Lynn and Rosa only
D. Ken, Lynn, and Rosa only.
E. Ken, Lynn, Marianne, and Rosa

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34. In order to prepare a piece of ground for building a brick patio, a rectangle measuring 8 feet by 10 feet must be marked off. Then the dirt within the rectangle must be dug out to a depth of 6 inches. Finally, the resulting space must be filled with sand.

A. What is the volume of sand needed, in cubic feet, to fill the space? Show your work.

Answer: _____ cubic feet

B. Sand costs $4 per cubic foot. What is the total cost of the sand needed to fill this space, including a $35 delivery charge?

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35. Which of the following is a unit of volume?

A. Acre
B. Gram
C. Liter
D. Meter
E. Ton

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36. Which of the following true statements proves that 119 is <u>not</u> a prime number?

A. 17 x 7 = 119

B. 119 is greater than 100.

C. 110 is an odd number.

D. 119 is not divisible by 3.

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37. The point (3, 7) is a vertex of a triangle. When the triangle is reflected over the y-axis, what are the coordinates of the image of the vertex?

A. (-3, -7)

B. (-3, 7)

C. (3, -7)

D. (3, 7)

E. (7, 3)

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38. The table below shows the distance of eight planets and the dwarf planet Pluto from the sun, to the nearest million kilometers.

DISTANCE FROM SUN (in millions of kilometers)

Mercury	58
Venus	108
Earth	150
Mars	228
Jupiter	778
Saturn	1,427
Uranus	2,871
Neptune	4,497
Pluto	5,914

One astronomical unit (AU) is defined as the distance between Earth and the Sun (1 AU $\approx$ 150 million kilometers). To the nearest whole number, how many astronomical units is Pluto from the Sun?

A. 6,064 AU

B. 5,914 AU

C. 5,764 AU

D. 150 AU

E. 39 AU

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39. The point (4, k) is a solution to the equation $3x + 2y = 12$. What is the value of k?

A. -3
B. 0
C. 2
D. 3
E. 4

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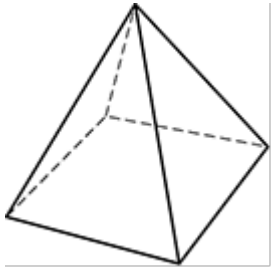

40. The figure above shows a pyramid with a square base. How many edges does the pyramid have?

A. Three

B. Four

C. Five

D. Seven

E. Eight

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41. Each of the 6 faces of a fair cube is painted red, yellow, or blue. This cube is rolled 500 times. The table below shows the number of times each color landed face up.

Color	Red	Yellow	Blue
Total	100	340	60

Based on these results, what is the most likely number of yellow faces on the cube?

A. One

B. Two

C. Three

D. Four

E. Six

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42. A turkey is put in the oven at 10:30 a.m. If the turkey takes 2¾ hours to cook, at what time should it be taken out of the oven?

A. 12:15 p.m.

B. 12:45 p.m.

C. 1:15 p.m.

D. 1:45 p.m.

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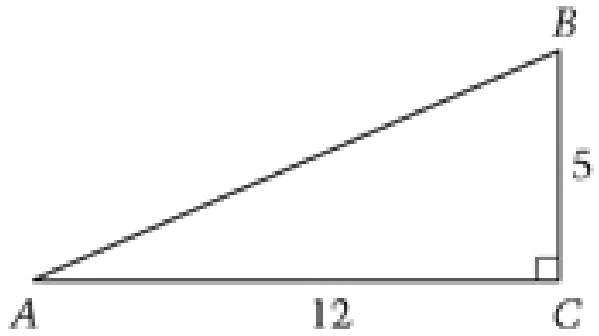

43. In the right triangle above, what is the length of AB?

A. 8.5
B. 12
C. 13
D. 17
E. 30

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44. How many square tiles, 5 inches on a side, does it take to cover a rectangular area that is 50 inches wide and 100 inches long?

Answer: _____

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45. Leroy has one quarter, one dime, one nickel, and one penny. Two of the coins are in his left pocket and the other two coins are in his right pocket. The coins have been randomly placed in the two pockets.

What is the probability that Leroy will be able to purchase a 30-cent candy bar with the two coins in his left pocket?

Using the coins, explain your reasoning.

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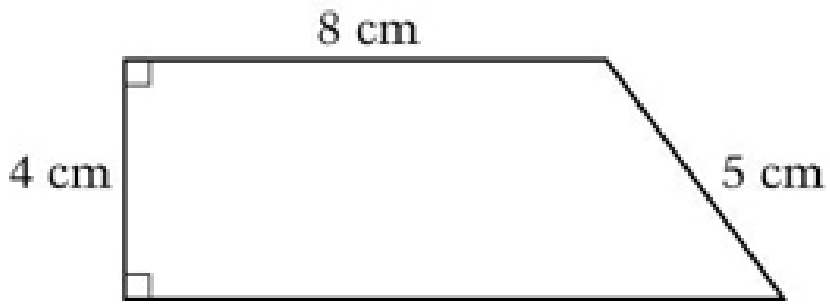

46. What is the area of the figure shown above?

A. 28 square centimeters
B. 32 square centimeters
C. 38 square centimeters
D. 44 square centimeters
E. 64 square centimeters

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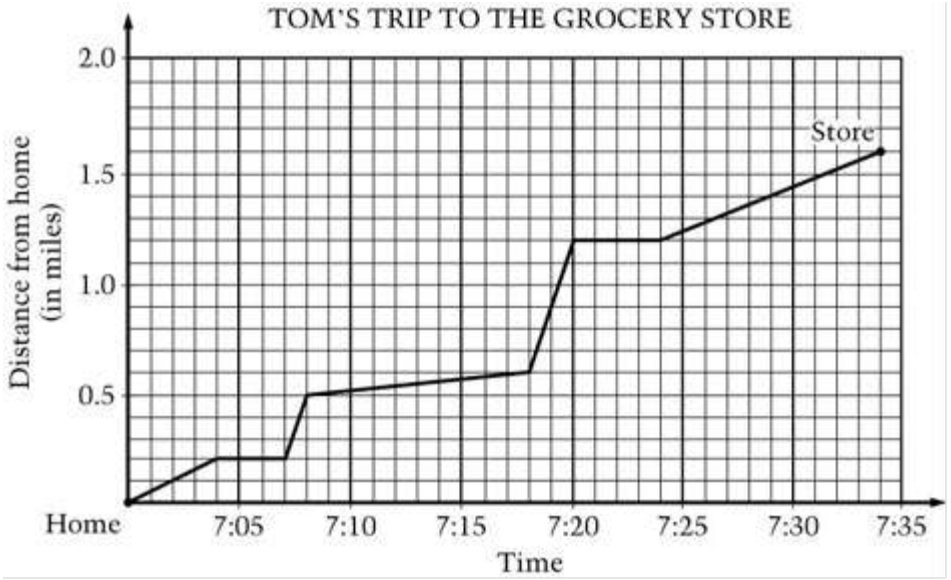
47. Tom went to the grocery store. The graph below shows Tom's distance from home during his trip.



Tom stopped twice to rest on his trip to the store. What is the total amount of time that he spent resting in minutes?

A. 5 B. 7 C. 8 D. 10 E. 25

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48. For a school report, Luke contacted a car dealership to collect data on recent sales. He asked, "What color do buyers choose most often for their car?" White was the response. What statistical measure does the response "white" represent?

A. Mean
B. Median
C. Mode
D. Range
E. Interquartile range

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49. How many degrees are in the acute angle formed by the hands of the clock in the figure above?

A. 10^{o}
B. 30^{o}
C. 36^{o}
D. 60^{o}
E. 120^{o}

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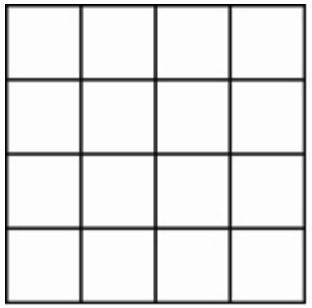
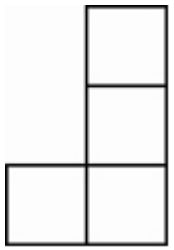
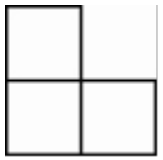
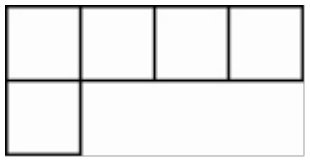


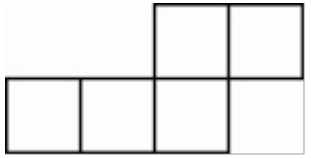
50. Identical puzzle pieces have been put together to form the large square shown above. Which of the following could be the shape of each puzzle piece?

A. 

C. 

E. 

B. 

D. 

NAEP Grade 8 Math Warm Ups

51. The Morrisons are going to build a new one-story house. The floor of the house will be rectangular with a length of 30 feet and a width of 20 feet.

The house will have a living room, a kitchen, two bedrooms, and a bathroom. In part (a) below create a floor plan that shows these five rooms by dividing the rectangle into rooms.

The floor plan should meet the following conditions.

- Each one of the five rooms must share at least one side with the rectangle in part (a); that is, each room must have at least one outside wall.
- The floor area of the bathroom should be 50 square feet.
- Each of the other four rooms (not the bathroom) should have a length of at least 10 feet and a width of at least 10 ft.

(Continued on next slide)

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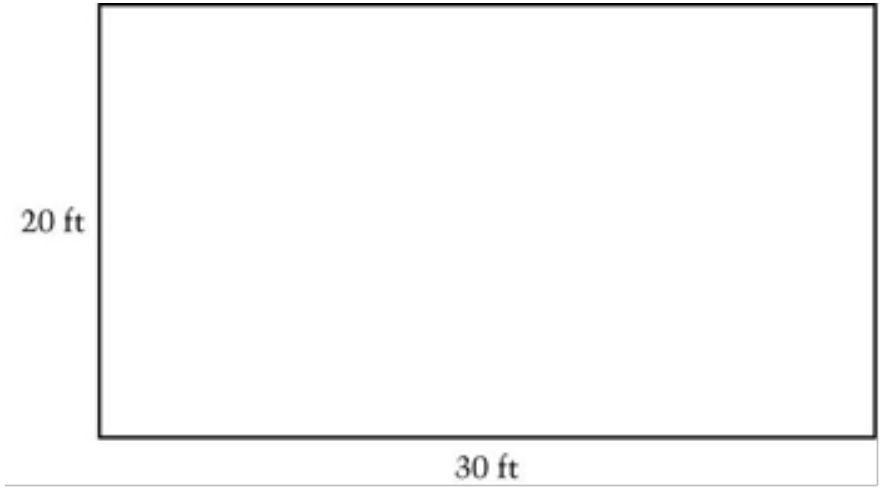
51. Be sure to label each room by name (living room, kitchen, bedroom, etc.) and include its length and width, in feet. (Do not draw any hallways on your floor plan.)

(a) Draw your floor plan on the figure below. Remember to label your rooms by name and include the length and width, in feet, for each room.



Room	Floor Area (in square feet)
Living	
Kitchen	
Bedroom	
Bedroom	
Bathroom	
Total Floor Area	600

(b) Complete the table by filling in the floor area, in square feet, for each room in your floor plan.

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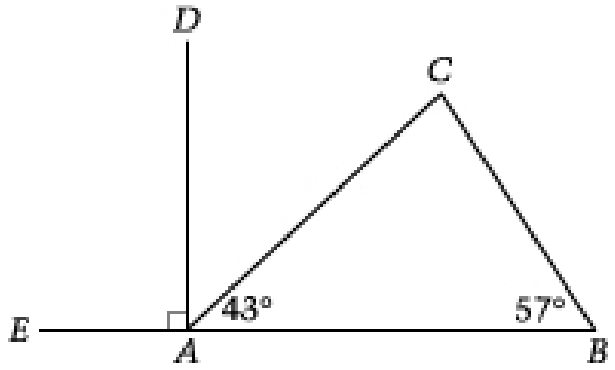

52. In the figure above, what is the measure of angle DAC?

A. 47°
B. 57°
C. 80°
D. 90°
E. 137°

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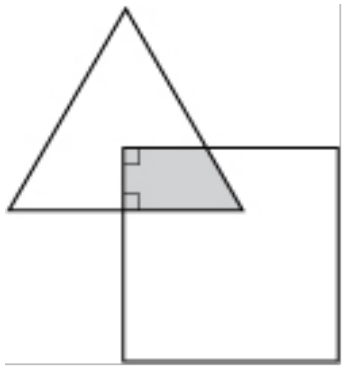


53. In the figure above, the intersection of the triangle and the square forms the shaded region. What is the shape of this region?

A. An equilateral triangle

B. A rectangle

C. A square

D. A rhombus

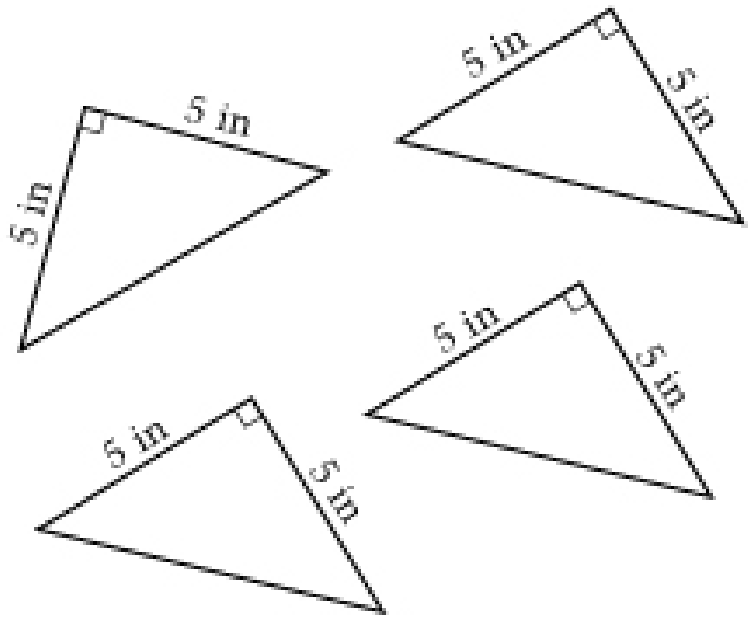
E. A trapezoid

NAEP Grade 8 Math Warm Ups

54. How many 200-milliliter servings can be poured from a pitcher that contains 2 liters of juice?

A. 20
B. 15
C. 10
D. 5
E. 1

NAEP Grade 8 Math Warm Ups



55. Make a drawing to show how the four triangles shown above could fit together without overlapping to make a rectangle that is not a square. Show the dimensions of the rectangle on your drawing.

What is the area of this rectangle?

NAEP Grade 8 Math Warm Ups

56. Mr. Hardt bought a square piece of carpet with an area of 39 square yards. The length of each side of this carpet is between which of the following?

A. 4 yards and 5 yards
B. 5 yards and 6 yards
C. 6 yards and 7 yards
D. 7 yards and 8 yards
E. 9 yards and 10 yards

NAEP Grade 8 Math Warm Ups

57. The figure above shows two right angles. The length of AE is x and length of DE is 40. Show all of the steps that lead to finding the value of x. Your last step should give the value of x.

NAEP Grade 8 Math Warm Ups

(1, 1)	(2, 1)	(3, 1)
(1, 2)	(2, 2)	(3, 2)
(1, 3)	(2, 3)	(3, 3)

58. A pair of numbers will be chosen at random from the list above. What is the probability that the first number in the pair will be less than the second number in the pair?

Answer: _____

NAEP Grade 8 Math Warm Ups

59. The table below shows the number of customers at Malcolm's Bike Shop for 5 days, as well as the mean (average) and the median number of customers for these 5 days.

Number of Customers at Malcolm's Bike Shop	
Day 1	100
Day 2	87
Day 3	90
Day 4	10
Day 5	91
Mean (average)	75.6
Median	90

Which statistic, the mean or the median, best represents the typical number of customers at Malcolm's Bike Shop for these 5 days?

Explain your reasoning.

NAEP Grade 8 Math Warm Ups

60. Three tennis balls are to be stacked one on top of another in a cylindrical can. The radius of each tennis ball is 3 centimeters. To the nearest whole centimeter, what should be the minimum height of the can?

Explain why you chose the height that you did. Your explanation should include a diagram.

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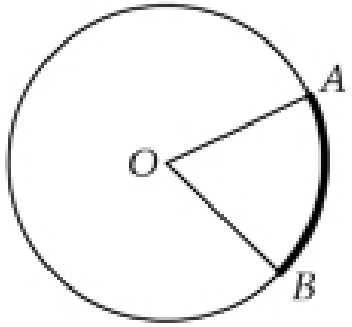


61. The circle above has center O. If the length of the darkened arc is $\frac{1}{6}$ of the circumference, what is the degree measure of AOB?

A. 75^{o}

B. 60^{o}

C. 45^{o}

D. 36^{o}

E. 30^{o}

NAEP Grade 8 Math Warm Ups

62. Nick has a square piece of paper. He draws the two diagonals of the square, finds the point where they intersect, and labels that point A. Then he folds each of the four corners of the paper onto point A. What geometric shape is produced?

A. A square

B. A right triangle

C. An isosceles triangle

D. A pentagon

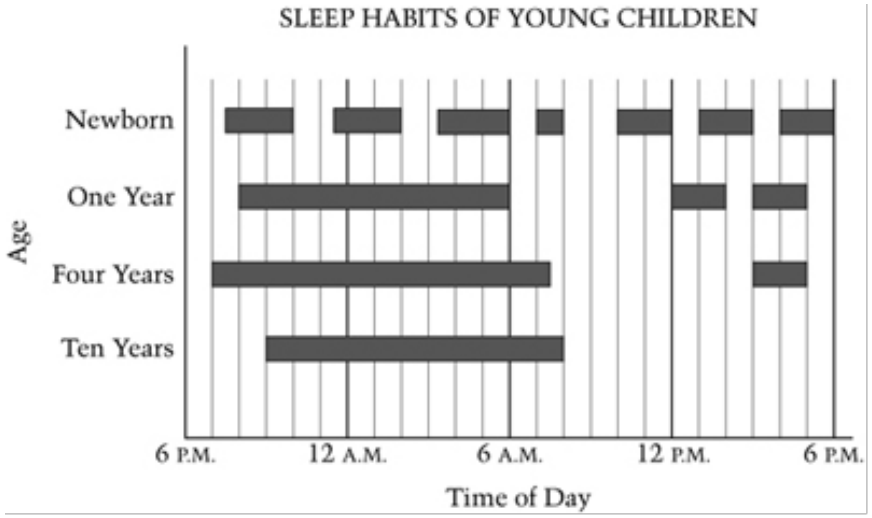
E. A hexagon

NAEP Grade 8 Math Warm Ups

63. The graph below and written summary on the next slide present information about the sleep habits of newborn babies, one year olds, four year olds, and ten year olds. Each solid bar represents a period of sleep.

Some of the information presented in the summary does not agree with the information in the graph.

For example, there is an error in sentence 1 that has already been identified and corrected for you.



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- In sentences 2 and 3 below, underline the information that is not correct based on the graph. There is an error in each statement.
- Then, write the correct information about the errors in sentence

(1) According to research that has been done on sleep habits and patterns of sleep in children, the number of hours that a newborn baby sleeps in a 24-hour period of time is less (*more*) than that of a ten year old.

(2) From the time a child is born until it reaches age ten, the number of different time periods of sleep increases as the child grows older.

(3) Newborns need 2 more hours of sleep than ten year olds between 6 a.m. and 6 p.m.

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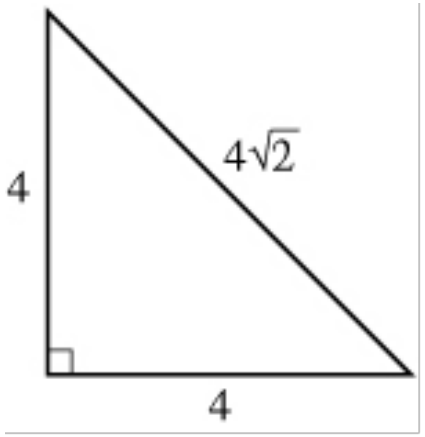
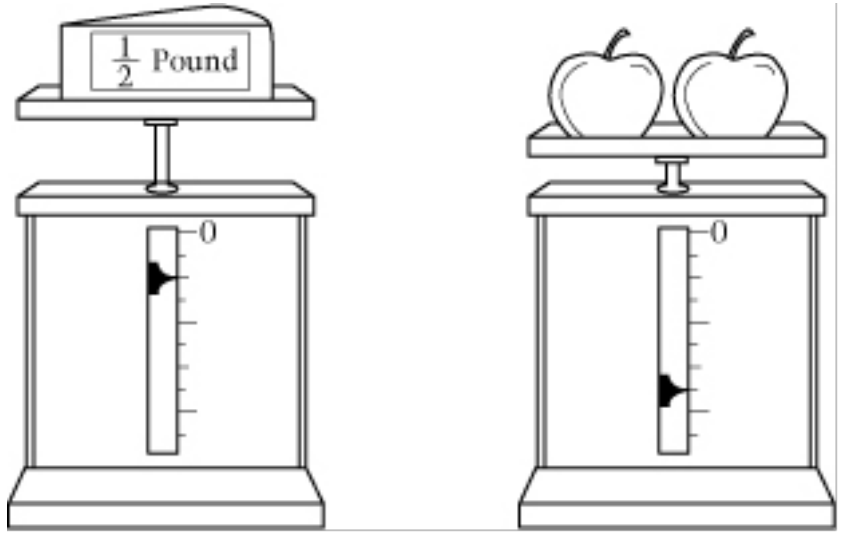


64. What kind of triangle is shown above?

A. Equilateral
B. Isosceles
C. Scalene
D. Acute
E. Obtuse

NAEP Grade 8 Math Warm Ups

65. Both figures below show the same scale. The marks on the scale have no labels except the zero point.



The weight of the cheese is ½ pound. What is the total weight of the two apples?

Total weight of the two apples = _____ pounds.

NAEP Grade 8 Math Warm Ups

66. What is the intersection of rays PQ and QP in the figure above?

A. Segment PQ

B. Line PQ

C. Point P

D. Point Q

E. The empty set

NAEP Grade 8 Math Warm Ups

67. Sara was asked to draw a parallelogram. She drew the figure below.

Is Sara's figure a parallelogram? Why or why not?

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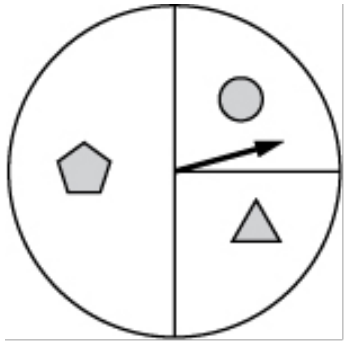

68. If Rose spins a spinner like the one above 300 times, about how many times should she expect it to land on the space with a circle?

A. 75

B. 90

C. 100

D. 120

E. 150

NAEP Grade 8 Math Warm Ups

69. At the school carnival, Carmen sold 3 times as many hot dogs as Shawn. The two of them sold 152 hot dogs altogether. How many hot dogs did Carmen sell?

A. 21
B. 38
C. 51
D. 114
E. 148

NAEP Grade 8 Math Warm Ups

70. Li's English book weighs 3 pounds, her math book weighs 5 pounds, her history book weighs 4 pounds, and her science book weighs 6 pounds. How many different combinations of one or more books can Li pack in her backpack so that the total weight of the books is 12 pounds or less?

A. 9
B. 10
C. 11
D. 12
E. 18

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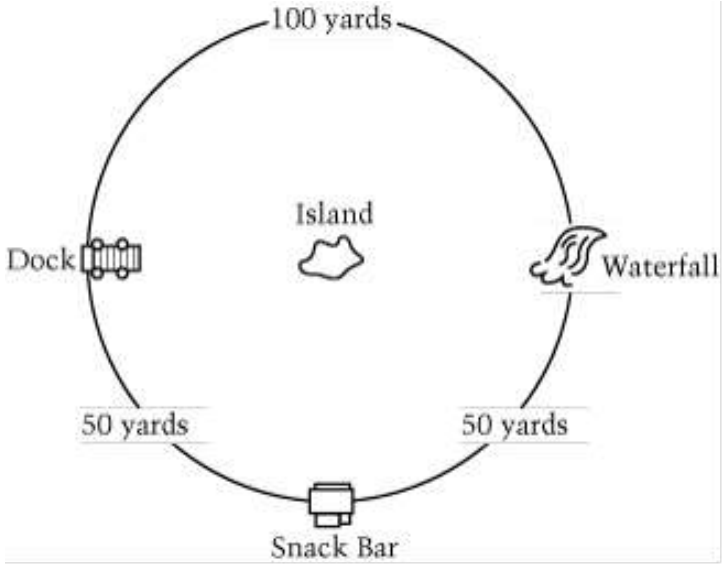
The distance around a circular pond are shown below. From the snack bar, Jake notices an island in the center of the pond.



71. Of the following, which is the best approximation of the distance in yards from the snack bar to the center of the island?

A. 16 B. 20 C. 32 D. 50 E. 64

NAEP Grade 8 Math Warm Ups

72. An airplane climbs at a rate of 66.8 feet per minute. It descends at twice the rate that it climbs. Assuming it descends at a constant rate, how many feet will the airplane descend in 30 minutes?

A. 96.8
B. 133.6
C. 1,002
D. 2,004
E. 4,008

NAEP Grade 8 Math Warm Ups

73. In the past year and a half, Alfred's dog gained an average of ¼ pound each month. Today, Alfred's dog weighs 75.5 pounds. How much did the dog weigh a year and a half ago?

A. 57.5 pounds
B. 71.0 pounds
C. 71.5 pounds
D. 74.0 pounds
E. 79.5 pounds

NAEP Grade 8 Math Warm Ups

74. A certain even number is divisible by 9. This number is between 100 and 120. What is the number?

_____

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75. Peter bought 45 sheets of plywood at a total cost of $400. He plans to sell each sheet of plywood for $15. If Peter has no other expenses, what is the fewest number of sheets he must sell to make a profit?

A. 3

B. 15

C. 16

D. 26

E. 27