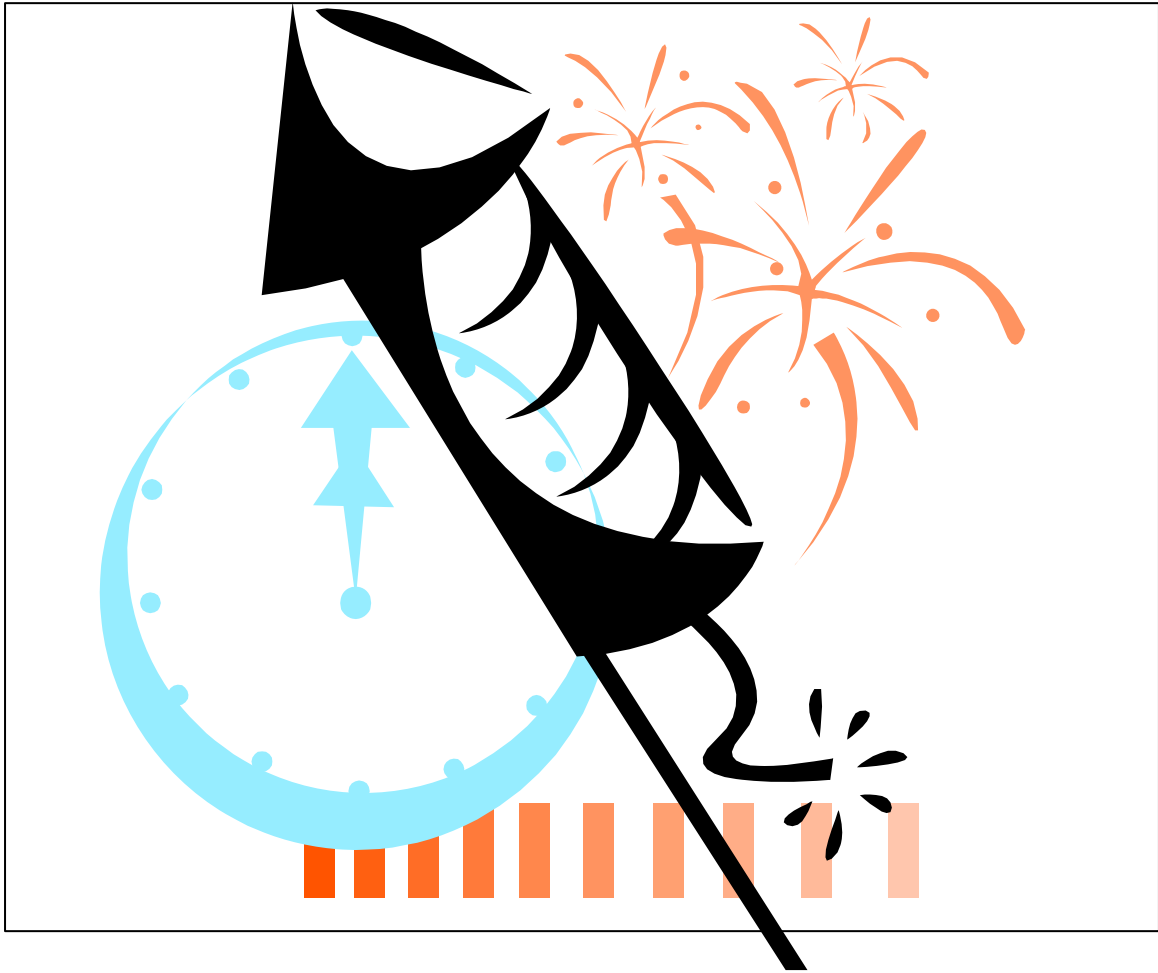


MIDDLE SCHOOL COUNTDOWN



TO FCAT 2009

Number Sense Topics

Basic Operations

Classifying Numbers

Estimation

Percents

Scientific Notation

Radicals

Strand A - Number Sense, Concepts and Operations

Strand A measures a student's ability to identify the four basic operations (+, -, x, ÷).

1. Multiple Choice:

Scientists believe that the temperature at the core of Earth is 7.2×10^3 degrees Fahrenheit. What is this temperature in standard notation?

- A. 72 B. 720 C. 7,200 D. 72,000

2. Gridded Response:

A city youth program has a total yearly budget of \$220,000. Of the total budget, 17% is spent on administrative costs, 25% is spent on supplies, and 30% is spent on art programs. The rest of the budget is spent on sports programs. How much money is spent on sports programs?

3. Short/Extended Response:

Order each set of numbers from Least to greatest. Show your work.

$$10^1, 2^3, 3^2$$

Number Sense Problems

Classifying Numbers

4. Multiple Choice:

Pamela deposits an amount of money into her bank account. The amount is a prime number. Which amount could she have deposited?

- A. \$31 C. \$56
B. \$45 D. \$99

5. Gridded Response:

What is seven and thirty-six thousandths written in standard form?

6. Short/Extended Response:

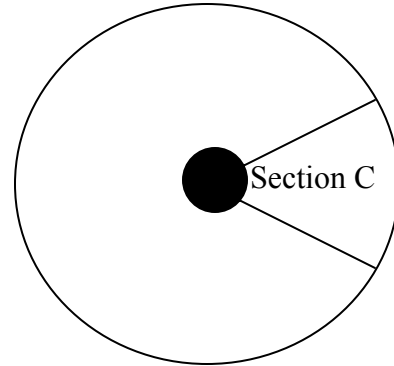
Write the following number in exponential form.
503,401,340

Number Sense Problems

Estimation/Reasonable Results

7. Multiple Choice:

The director of the Theater in the Round is estimating the number of people in attendance at a play. The people are evenly distributed throughout the theater. There are approximately 60 people sitting in Section C. What is the approximate number of people in attendance?



- A. 290 people
- B. 350 people
- C. 410 people
- D. 470 people

8. Gridded Response:

After delivering 25 newspapers, Art had fewer than 60 left. At most, how many newspapers did he have originally?

9. Short/Extended Response:

A gallon of paint covers between 350 and 400 square feet of surface. Hector wants to paint the 4 walls of his bedroom. Two of the walls are 9 feet by 10 feet, and the other two are 9 feet by 15 feet. He calculates that he needs to buy one gallon of paint. Are his calculations correct? Why or why not?

Number Sense Problems

Percentages

10. Multiple Choice:

On his mathematics test, Carlos had 20 correct out of 25 problems. Which of the following is NOT another way of expressing 20 out of 25 ? (MA.A.1.3.4)

A. $\frac{4}{5}$ C. 80%

B. .80 D. $\frac{5}{4}$

11. Gridded Response:

DeAngelo and some friends from his bicycle club went on a training ride from West Palm Beach to Miami. They planned to ride 45 miles from West Palm Beach to Fort Lauderdale, another 10 miles to Hollywood, and finally 15 miles to Miami. Paulette's bicycle got a flat tire north of Miami, and she was unable to complete the training ride. Her odometer showed she had traveled 60 miles. Approximately what percent of the training ride did Paulette complete? (MA.A.3.4.3)

12. Short/Extended Response:

During a sale, Ms. Chin was asked to reduce the price of certain items. On Wednesday morning, she marked an \$80 dress down 10%. On Thursday morning, she marked the price of the same dress down another 20%. On Friday morning, she marked the price of the same dress down another 40%

Part A: Determine the price of the dress on Wednesday, Thursday, and Friday

Part B: What is the total percentage change of the dress from Tuesday to Friday?

Number Sense

Scientific Notation Problems

13. Multiple Choice:

At its farthest point of orbit, Mercury is 69, 800, 000 kilometers from the sun. What is the scientific notation for this distance?

- A. 69.8×10^6 C. 6.98×10^6
B. 69.8×10^7 D. 6.98×10^7

14. Gridded Response:

A micrometer is an instrument that can be used to measure the thickness of metal. A particular piece of metal is 0.0057 centimeter thick. How many spaces would the decimal have to be moved in order to convert this measurement into proper scientific notation?

15. Short/Extended Response: What number is 100 times greater than 5.37×10^4 ?

Show and explain your work.

Number Sense Problems

Irrational Numbers

16. Multiple Choice:

Which of the following numbers could Mary Not use to create a rational number?

- A. $\sqrt{6.25}$ C. $\sqrt{55}$
B. $\sqrt{16}$ D. $\sqrt{400}$

17. Gridded Response:

Brandon won a contest. He needs to answer this skill-testing question to collect his prize:

What is the least whole number that $\sqrt{99}$ is less than?

18. Short/Extended Response:

Zack said that the square root of any decimal is always an irrational number.

- Do you agree with Zack?
- Explain why or why not.

Measurement Topics

2D/3D Measurements

Arcs and Angles in Circles

Area and Perimeter

Area by Dissection

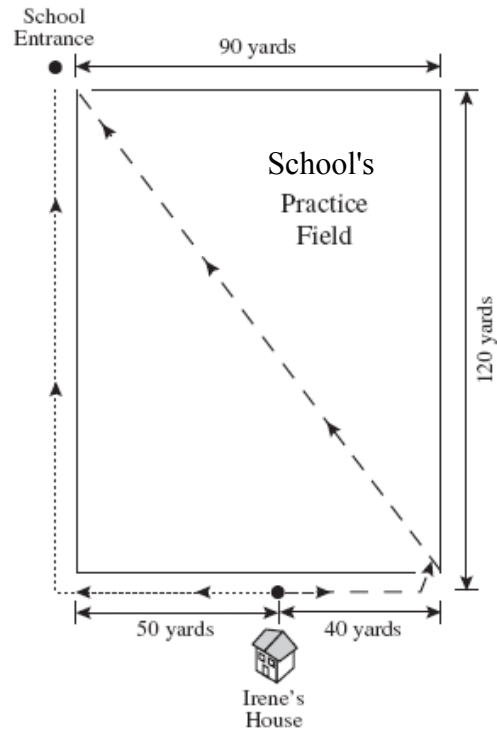
Conversions

Rate Time and Distance

Measurement 2D/3D Measurements

19. Multiple Choice :

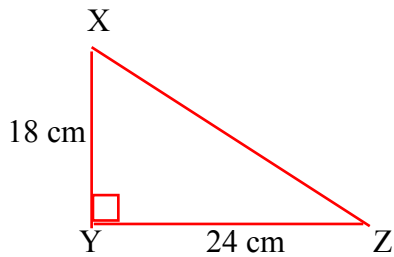
Irene's house is located near the perimeter fence of her school's rectangular practice field, as shown in the diagram to the right. There are two paths Irene can follow from her house to the school entrance. She can walk along the fence that surrounds the practice field to get to the entrance of her school (Path 1). She can also go through the gate and cut across the practice field (Path 2). Which of the following statements comparing Irene's two paths to school is true? $a + b = c$



- A. Path 2 is about 20 yards shorter.
- B. Path 2 is about 60 yards shorter.
- C. Path 1 is about 20 yards shorter.
- D. Path 1 is about 40 yards shorter.

20. Gridded Response :

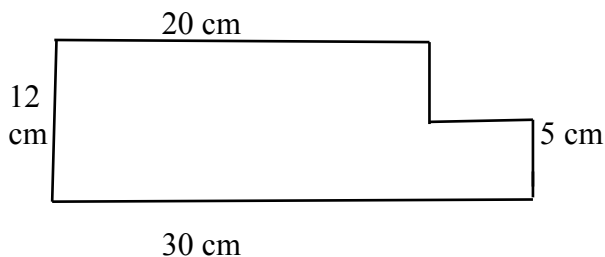
What is the length of side XZ in centimeters?



- A. 21 centimeters
- B. 27 centimeters
- C. 30 centimeters
- D. 36 centimeters

21. Short/Extended Response :

The diagram below shows a rectangle with one corner broken off. What is the area of the figure shown in the diagram? Show your work and give a final solution.

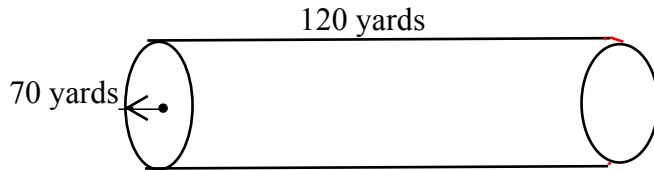


Measurement Problems

Arcs and Angles in Circles

22. Multiple Choice:

The track around the football field is in the shape of two straight segments 120 yards long with the ends of the track on the shape of two semicircles with a radius of 70 yards. What is the distance around the track?

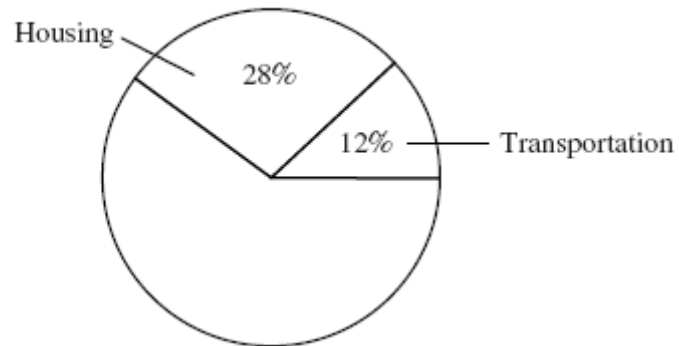


- A. 283.06 C. 697.6
B. 340.5 D. 959.5

23. Gridded Response:

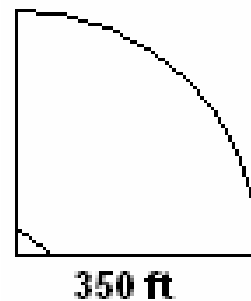
The circle graph to the right shows that 28% of the Walker family's monthly expenses is for housing and 12% is for transportation. How many **degrees greater** is the measure of the angle that represents housing than the measure of the angle that represents transportation?

WALKER FAMILY MONTHLY EXPENSES



24. Short/Extended Response:

A baseball field is in the shape of $\frac{1}{4}$ of a circle. In spring training, the players begin practice by jogging around the field 3 times. How far does each player jog? Show all work necessary to find the answer.



Measurement Problems

Area and Perimeter

25. Multiple Choice:

A track is in the shape of a rectangle and two semi-circles. The rectangle is 4 yards by 10 yards. To the nearest yard, what is the perimeter of the track?



- A. 28 yards C. 40 yards
B. 33 yards D. 80 yards

26. Gridded Response:

Sally is trying to determine the dimensions of the classroom. Since she doesn't have a yardstick, she paces the room off and finds that it is 15 paces wide and 23 paces long. She knows that every one of her paces is equal to 15 inches. What is the area of the room to the nearest square foot?

27. Short/Extended Response:

Giovanni has a play area for his dog in the shape of a rectangle that is eight feet long and ten feet wide. If he doubles the length and width, what will be area of the new figure? Show your work below and give a final solution.

Measurement Problems

Area

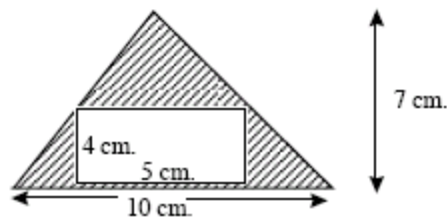
28. Multiple Choice:

How much wrapping paper is needed to cover a box that is 5 in., by 6 in., by 9 in.?

- A. 129 square inches
- B. 258 square inches
- C. 270 square inches
- D. 540 square inches

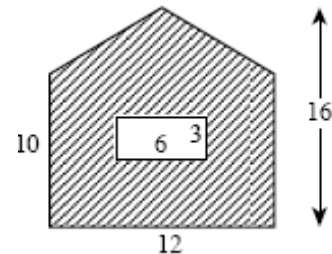
29. Gridded Response:

Find the area of the shaded region.



30. Short/Extended Response:

Kevin has decided to paint the side of his house, but he's not sure how much paint he needs. In the diagram to the right, the unshaded region represents the window on the side of the house, which is not to be painted.



Part A: Explain to Kevin a method he could use to find the area of the side of his house.


Part B: Find the area (the dimensions in the diagram are in feet)

Measurement Problems Conversions

31. Multiple Choice:

Malcolm's lawnmower has a fuel tank with a $1\frac{1}{2}$ gallon capacity. He added $2\frac{3}{4}$ quarts of fuel to completely fill the tank. How many *ounces* of fuel were in the tank before Malcolm added fuel to fill the tank?


- A. 52 ounces
- B. 88 ounces
- C. 104 ounces
- D. 192 ounces



1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts

32. Gridded Response:

The Franklin family's house is on a $2\frac{1}{2}$ acre plot of land. They use $\frac{1}{10}$ of the land for a vegetable garden. How many square feet are in the Franklin's vegetable garden?



1 yard = 3 feet = 36 inches
1 mile = 1,760 yards = 5,280 ft
1 acre = 43,560 square feet

33. Short/Extended Response:

Laurie made 1 gallons of fruit punch for a party. The cups she used can each hold 10 fluid ounces. How many 10-fluid ounce cups can be completely filled with fruit punch?

Show your work and give a final solution below.

Measurement

Rate, Time, and Distance

34. Multiple Choice:

Shelia has a summer job. She earns \$12.25 per hour. How much will she earn before taxes if she worked 32 hours the first week on her new job?

- A. \$0.392 C. \$39.20
B. \$3.92 D. \$392.00

35. Gridded Response:

Frank had a 5-foot-long piece of wood. How many 8-inch pieces can he cut from the wood?

36. Short/Extended Response:

Mitzi is putting lace trim around the edges of a square quilt. The quilt is 5.5 feet long. If the lace trim costs \$3.09 per foot, about how much will Mitzi spend for the trim? Explain how you found your answer and include a diagram.

Geometry and Spatial Sense Topics

Angle Relationships

Coordinate Geometry

Two Dimensional Shapes

Properties of Polygons

Similar Figures

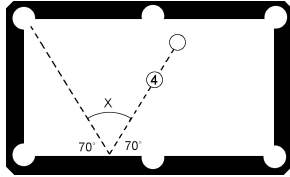
Transformations

Geometry and Spatial Sense Problems

Angle Measures & Relationships

37. Multiple Choice:

Emily is playing pool. She wants to hit the number 4 ball into the corner pocket as shown.



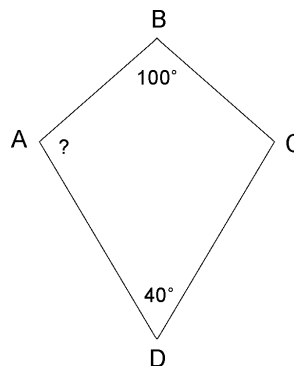
Emily knows the angle measures as shown in the figure above. What is the measure of angle X ?

- A 40°
- B 60°
- C 110°
- D 220°

38. Gridded Response:

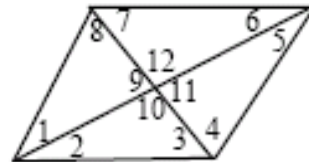


In the quadrilateral shown to the right, $\angle DAB$ is congruent to $\angle DCB$. What is the measure, in degrees, of $\angle DAB$?



39. Short/Extended Response:

The figure to the right is a rhombus. Give an example of each of the following types of angles using the angle's number:



Adjacent Angles _____

Vertical Angles _____

Complementary Angles _____

Acute Angle _____

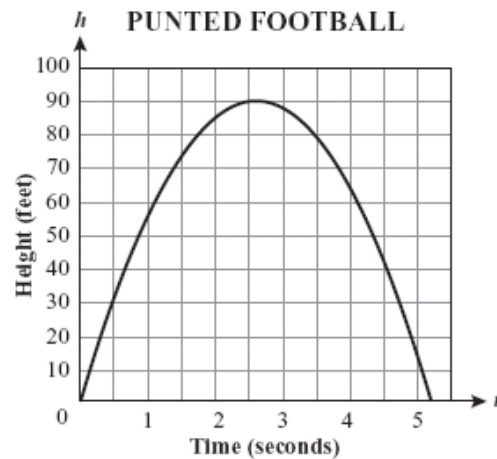
Right Angle _____

Geometry and Spatial Sense Problems

Coordinate Geometry

40. Multiple Choice:

The graph on the coordinate grid to the right represents the height of a football kicked by a football team's punter and the number of seconds the football is in the air. The stands at the football field are 50 feet in height. Based on the graph, when is the football at a height greater than the stands?



- A. at no time throughout the football's path
- B. from about 0.8 seconds until about 4.2 seconds
- C. from about 4.3 seconds until the ball hits the ground
- D. from the time the football is kicked until about 0.7 seconds

41. Gridded Response:

In which quadrant does the point $(-9, 7)$ lie?

42. Short/Extended Response

Use the rule to complete the table. Then graph the function.

Rule: $x + 2$

X	Y
2	
4	
6	
8	

Geometry: Two Dimensional Shapes

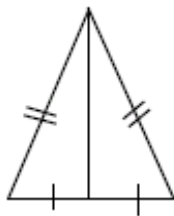
43. Multiple Choice:

Which of these shapes has eight sides?

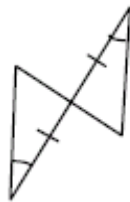
- F octagon
- G decagon
- H hexagon
- I pentagon

44. Gridded Response:

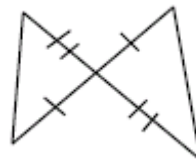
Based on the markings present in the diagrams below, which pair of triangles could be proven congruent by ASA?



1



2



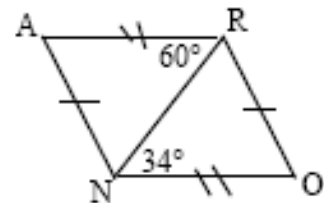
3



4

45. Short/Extended Response:

Explain completely why the information being provided in the diagram to the right cannot be correct. Be as precise in your explanation as possible and use appropriate terminology where applicable.



Geometry and Spatial Sense Problems

Properties of Polygons

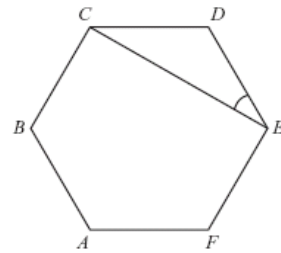
46. Multiple Choice:

Crystal has a triangle-shaped garden. The sides of the garden are 6 feet, 8 feet, and 10 feet in length. Two of the sides are perpendicular. What type of triangle is the shape of the garden?

- A. acute equilateral triangle C. obtuse isosceles triangle
 B. right scalene triangle D. right isosceles triangle

47. Gridded Response:

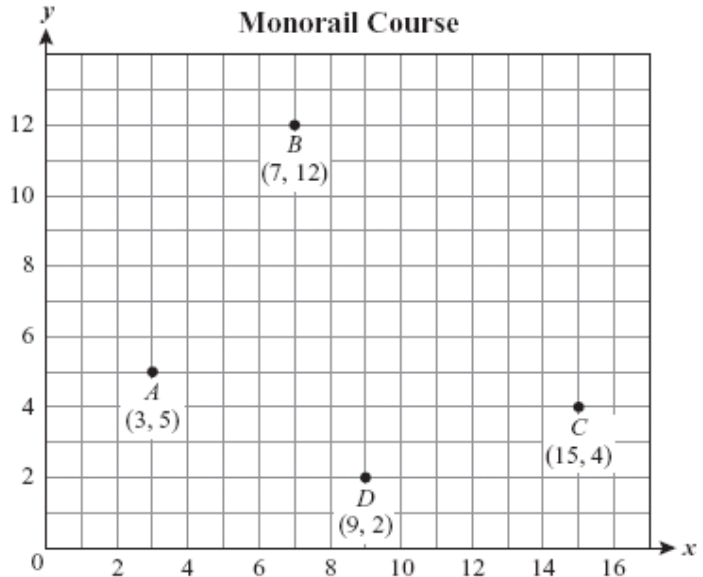
Figure ABCDEF to the right is a regular hexagon. What is the measure, in degrees, of $\angle DEC$?



48. Short/Extended Response:

The course of the monorail at an amusement park must be changed to make room for a new parking lot. Engineers have decided that only the main supporting column located at point C on the grid to the right should be relocated.

Find the coordinates of C if it was moved to the left 3 places then, up 3 places.



Geometry and Spatial Sense Problems

Similar Figures

49. Multiple Choice:

Two rectangular boxes are geometrically similar. The height of the larger box is 4 times the height of the smaller box. If the volume of the smaller box is 8 cubic centimeters, what is the volume of the larger box?

Rectangular Solid $V = lwh$



- A. 8 cm^3 C. 108 cm^3
B. 64 cm^3 D. 512 cm^3

50. Gridded Response:

Gutzon Borglum, the sculptor of Mount Rushmore, created a scale model of the four presidents' faces that were to be carved into the mountain. He used a scale of 1 inch to 12 feet. (That is, 1 inch on the model equaled 12 feet on the mountain.) If the presidents' noses are each 18 feet long on Mount Rushmore, how long is each nose on the scale model?

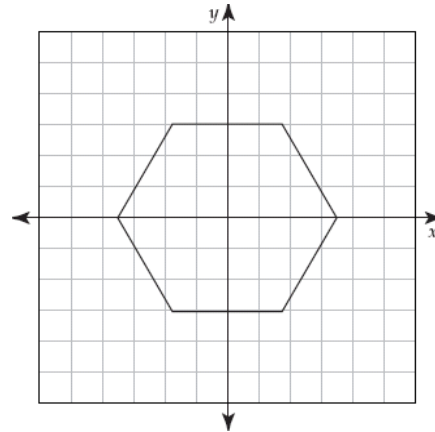
51. Short/Extended Response:

Sara baked a cake in the shape of a regular octagon. She wanted to cut the cake in half so that the two halves are congruent and mirror images of each other. How many lines of symmetry does the cake have? Draw your figure below and explain your answer.

Geometry and Spatial Sense Problems Transformations/Graphing

52. Multiple Choice:

The figure to the right is a regular hexagon. Which of the following transformations of the hexagon above will change the appearance of the hexagon on the grid?



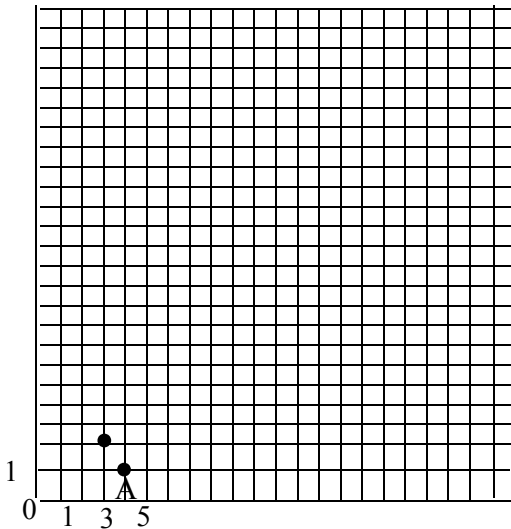
- A. reflection across the x-axis
- B. reflection across the y-axis
- C. rotation of 60° counterclockwise
- D. rotation of 90° clockwise

53. Gridded Response:

Ruth's house is 12 miles south of the park and Chris's house is 9 miles west of the park. What is the shortest distance length from Riuth's to Chris's house? Use a sketch with labels, to solve the problem.

54. Short/Extended Response:

Theo rotated point $A(4,1)$ 90 degrees. clockwise around the origin, and then translated the new image 2 units to the left. What is the location of the translated image? First, complete the labeling of your graph with variables, title, and numbering, then give your solution below.



Algebraic Thinking Topics

Solving Equations

Functions

Inequalities

Linear Systems

Pattern Recognition

Translating Words to Alg. Expressions

Algebraic Thinking

Solving Equations

55. Multiple Choice :



Right Circular
Cylinder

$$V = \pi r^2 h$$

$$S.A. = 2\pi r h + 2\pi r^2$$

A cosmetic company currently sells its face soap in cylindrical jars that have a height of 2 inches (in.) and a radius of 1.5 inches. The company wants to enlarge its jars to put more face soap in each jar. They want the new jar to have exactly twice the volume of the current jar. Which change in dimensions will achieve this goal?



- A. double the radius C. double the diameter
B. double the height D. double the radius and the height

56. Gridded Response:

1 ton = 2,000 pounds

Each of 3 trucks delivers 3.25 tons of gravel. What is the total amount of gravel being delivered?

57. Short/Extended Response :

Terrance applies the rule $2x + 3$ to the following numbers: 3,5,6, and 8. Make a function table, using these numbers as x, to display the values of x and y.

Explain your answer.

X	Y

Algebraic Thinking Problems Patterns & Functions

58. Multiple Choice:

What is the next term in the following sequence?

9, 16, 25, 36, _____

- A. 42
- B. 45
- C. 47
- D. 49

59. Gridded Response:

Given the function: $y = 3x + 4$, which of the following sets of numbers would complete the table with the correct values?

x	y
-2	-2
-1	
0	
1	
2	

- A. 4, 8, 12, 16
- B. 1, 4, 7, 10
- C. -3, 0, 3, 6
- D. -5, 0, 5, 10

60. Short/Extended Response:

The table below represents the function $y = 7 - 2x$. What does y equal when $x = -3$?

x	10	5	1	-3	-8
y	-13	-3	5	?	23

Explain how you found your answer.

Algebraic Thinking Problems

Inequalities

61. Multiple Choice:

Mark's canteen will hold 20 ounces of water. Which expression best describes the amount of water in the canteen at any given time? Let W represent the water in the canteen.

- A. $W = 20$ C. $W \leq 20$
B. $W \geq 20$ D. $W \neq 20$

62. Gridded Response :

At Mathematics Field Day, the mathematics club plans to give each participant a math pin. The company that manufactures the pins charges \$1.10 per pin and a one-time design fee of \$45. Because the club is sponsored by the school, no tax will be added. If the club spends no more than \$150 on the pins, what is the greatest number of math pins the club can order?

63. Short/Extended Response :

A farmer wants to raise chickens and turkeys. He can have no more than a total of 16 animals and no more than 12 turkeys.

Write the two inequalities that represent the conditions described above.

Algebraic Thinking Problems

Linear Equations

64. Multiple Choice:

In her purse, Tasha has 13 coins that total \$1.60. The coins are quarters and dimes. How many dimes does she have?

- A. 1 dime C. 6 dimes
B. 2 dimes D. 11 dimes

65. Gridded Response:

Andrew lives 1 mile from the mall. At 1:00 P.M., he walked directly from his house to the mall at a rate of 2 miles per hour. What time did he arrive at the mall?

66. Short/Extended Response :

Complete parts A and B for the equations $x - y = 3$ and $x + y = 7$:

Part A: Find the solution that satisfies both equations

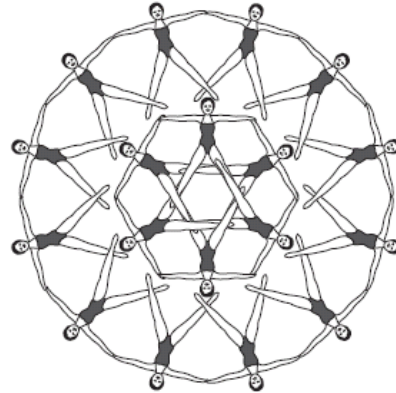
Part B: Verify this solution by sketching a graph of the two equations

Algebraic Thinking Problems

Pattern Recognition

67. Multiple Choice:

Alexi is planning the finale of a synchronized swimming show. The figure to the right represents a pattern he wants to create. The pattern has an innermost ring of 6 swimmers. Each additional ring will need 2 swimmers for each swimmer in the previous ring. If the finale consists of 4 rings formed according to this pattern, what will be the **total** number of swimmers needed to form all 4 rings?



- A. 36 C. 90
B. 48 D. 96

68. Gridded Response:

If the linear pattern continues as shown in this table, what will be the corresponding value of y when $x = 20$?

X	Y
2	6
4	12
6	18
8	24
10	30

69. Short/Extended Response :

Robert is stacking logs for his father. The log pile is in the shape of a trapezoid with 20 logs in the bottom row and 5 logs in the top row. Each row has one less log than the row below it. You may draw your figure below, then complete Parts A and B.

Part A: Determine the total number of rows in the pile.

Part B: Determine the total number of logs in the pile.

Algebraic Thinking

Translating Words to Algebraic Expressions

70. Multiple Choice:

Each person in the fishing derby caught 8 fish. An additional 12 fish were caught and released by various fishermen. What does a represent in the expression below?

$$8a + 12$$

- A. the total number of fish C. the number of fish released
- B. the total number of
fishermen in the derby D. the time spent fishing

71. Gridded Response:

In the last basketball game, sisters Sari and Sandi scored a total of 42 points. Sari scored 3 less than 2 times the number of points Sandi scored. How many points did Sandi score?

72. Short/Extended Response:

The sum of the length and width of a rectangle is 44 inches. The length is 3 times the width. Find the dimensions of the rectangle. Show/explain all steps that lead to your answer.

Data Analysis and Probability Topics

Range & Central Tendency

Event Probabilities

Various Graph Types

Scatter Plots

Miscellaneous

Data Analysis and Probability Problems

Range and Central Tendency

73. Multiple Choice:

The number of portable buildings produced by Chambers Manufacturing last week was 70 on Monday, 60 on Tuesday, 80 on Wednesday, and 50 on Thursday. After production on Friday, the mean number of buildings produced for the week was 67. What is the median number of buildings produced last week by Chambers Manufacturing?

- A. 67 C. 70
B. 68 D. 75

74. Gridded Response:

Ed has worked six weeks at Jimbo's Pizzeria. For the first 5 weeks that Ed worked, his mean pay was \$120.00. He earned \$180.00 during his 6th week. What was his mean pay for all 6 weeks?

75. Short/Extended Response:

The office manager in a small office was asked to reduce fax machine usage. To keep track of the usage, the employees used a log to record the number of faxes sent each day. The data recorded during a 14-day period are shown below.

9, 8, 10, 6, 9, 1, 0, 8, 7, 5, 9, 10, 2, 0

Part A: Find the mean of the data

Part B: Find the median of the data

Part C: Find the mode of the data

Part D: Find the range of the data

Data Analysis and Probability

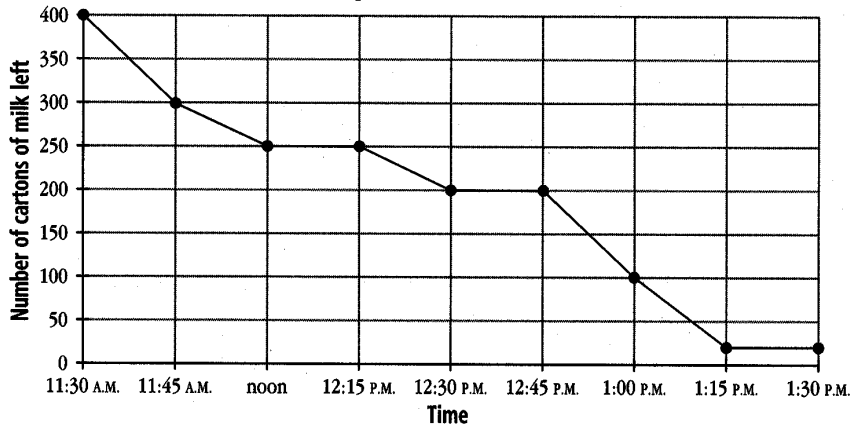
Scatter Plots

76. Multiple Choice:

Questions 9-15 Each day the cafeteria workers at Edison Middle School start out with 400 cartons of milk. They collected some data and made the following graph.

What is the total number of cartons of milk sold during the time period displayed?

Milk Consumption at Edison Middle School

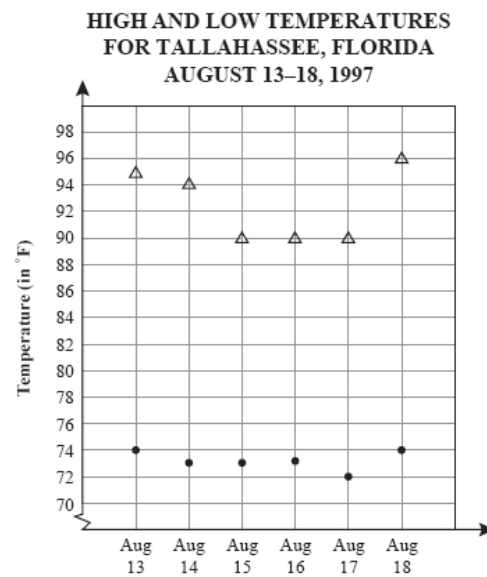


- A. 25 cartons B. 375 cartons
C. 125 cartons D. 400 cartons

77. Gridded Response:

The scatter plot to the right shows high and low temperature information for Tallahassee, Florida, for six consecutive days in August 1997. What was the mean high temperature over the six days?

KEY	
△	High Temperature
●	Low Temperature



78. Short/Extended Response:

Construct a scatter plot for the following information and explain whether there is positive, negative, or no correlation to the data.

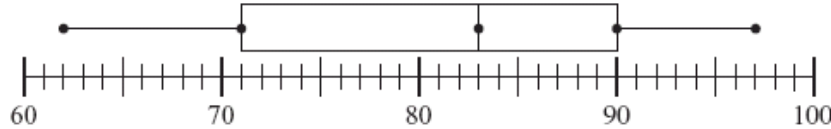
Student	Homework (Minutes)	Television (Minutes)
1	30	60
2	90	90
3	90	0
4	75	120
5	60	150
6	75	90
7	45	60
8	60	0
9	0	210
10	45	30

Data Analysis and Probability Problems

Data From Various Graph Types

79. Multiple Choice:

The box-and-whisker plot below shows the daily high temperature in Jacksonville over a 6 month period.



Which of the following is a correct interpretation of the box-and-whisker plot?

- A. The median high temperature was 80.5° .
- B. The range of temperatures was 18° .
- C. The lowest temperature recorded was 60° .
- D. The highest temperature recorded was 97° .

80. Gridded Response :

The stem-and-leaf plot to the right shows the hourly wages of a group of 25 workers. The workers are performing similar tasks but, because of differences in length of work experience and skill, are paid at different rates. What percent of the workers are paid less than \$18 per hour?

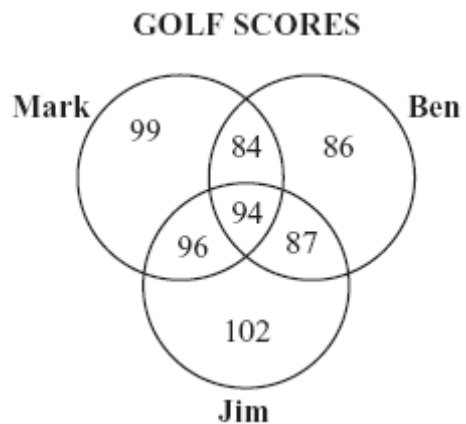
WORKERS' HOURLY WAGES

Stem	Leaf
16	7 8 8 8 9
17	5 6 6 7 7 8 8 9 9
18	0 0 0 1 1 5
19	0 0 2 3 3

KEY	
17	5 = \$17.50

81. Short/Extended Response:

Jim, Ben, and Mark played in a four-day golf tournament. The four scores for each golfer are shown in the Venn diagram to the right.



Part A: What is the lowest score that Mark and Jim have in common?

Part B: What was the score that all three golfers had in common?

Part C: In golf, the winner is the person with the lowest score. Who won the tournament? Show/explain the work necessary to find your answer.

Data Analysis and Event Probability Problems Miscellaneous

82. Multiple Choice :

Four students ran for student government president at Central High School. The results of the election are listed by class below. Based on the information in the table, which of the following statements can be verified?

CENTRAL HIGH SCHOOL ELECTION RESULTS

Class	Presidential Candidates				Total Number of Votes by Class
	Joe	Alexa	Karen	Sergio	
Freshmen	146	210	100	160	616
Sophomores	60	100	110	60	330
Juniors	80	163	110	65	418
Seniors	190	222	206	218	836
Total By Candidate	476	695	526	503	

- A. Only one candidate received more than one-fourth of the votes.
- B. Alexa received the most senior votes because she is a senior this year.
- C. Karen received more sophomore votes than Sergio and Joe combined.
- D. Fewer freshmen than seniors voted because fewer freshmen were enrolled.

83. Gridded Response:

If you choose two letters at random from the letters in the word GRADUATION, what is the probability that both letters selected will be consonants? Grid your answer in fraction form.

84. Short/Extended Response :

A company that makes computer CDs has manufacturing plants in three cities. The plant in Boca Raton makes 60 percent of the CDs. The plants in Deland and Fort Myers each make 20 percent of the CDs.

An inspector checking for quality finds that over several months, each plant produces about 350 defective CDs per week. The inspector concludes that all three plants are producing work at the same standard of quality.

Should we agree with the inspector's conclusion? Explain your answer and include a pictorial explanation..