4th Grade Math
BENCHMARK

RELEASED ITEMS
COMPILED BY SKILL

2006-2007

COMPILED BY BARBARA BROWN

Grade 4
Math 2006-2007

NUMBER SENSE, PROPERTIES, AND OPERATIONS grade 4

CONTENT STANDARD	STUDENT LEARNING EXPECTATIONS
1. NUMBER SENSE: Students shall understand numbers, ways of representing numbers, relationships among numbers, and number systems.	1. Recognize equivalent representations for the same whole number and generate them by composing and decomposing numbers. Ex. 1,076=1,000+70+6; 500+500+25+25+25+1,etc. (1) 2. Use the place value structure of the base ten number system, and be able to represent and compare whole numbers to millions (using models, illustrations, symbols, expanded notation, and problem solving). Ex 1,246,477__1,244 (2) 3. Use mathematical language and symbols to compare and order any numbers, with and without appropriate technology. (<,>,=) (2) 4. Write a fraction to name part of a whole, part of a set, a location on a number line, and the division of whole numbers, using models up to 12/12. (3) 7. Write an equivalent decimal for a given fraction relating to money. Ex: 1/10=$0.10 (1)
2. PROPERTIES OF NUMBER OPERATIONS Students shall inderstand meanings of perations and how they elate to one another.	2. Apply number theory (1) • Determine if any number is even or odd. • Use the terms multiple, factor, and divisible by in an appropriate context. • Generate and use divisibility rules for 2, 5, and 10. • Demonstrate various multiplication and division relationships. 4. Represent and explain division as measurement and partitive division, including equal groups, related rates, price, rectangular arrays (area model), combinations and multiplicative comparison. (3) • Translate contextual situations involving division into conventional mathematical symbols. • Explain how a remainder may impact an answer in a real world situation.
. NUMBERICAL PERATIONS AND STIMATION: tudents shall compute uently and make asonable estimates.	3. Attain, with and without appropriate technology, computational fluency in multiplication and division, using contextual problems. (3) C, 2006 E, 2007 • Two-digit by two-digit multiplication (larger numbers with technology) • Up to three-digit by two-digit division (larger numbers with technology) • Strategies for multiplication and dividing numbers • Performance of operations in more than one way • Estimation of products and quotients in appropriate situations • Relationships between operations 4. Solve simple problems using operations involving addition, subtraction, and multiplication, using a variety of methods and tools. EX: objects, mental computation, paper and pencil with and without appropriate technology (1) 5. Use estimation strategies to solve problems and judge the reasonableness of the answer. (2)

ALGEBRA grade 4

CONTENT STANDARD	STUDENT LEARNING EXPECTATIONS
4. Patterns, Relations, and Functions: Students shall recognize, describe, and develop patterns, relations, and functions.	2. Use repeating and growing numeric and geometric patterns to make predictions and solve problems. (3) B, 2006 3. Determine the relationship between sets of numbers by selecting the rule (2-step rule in words) (7)
5. ALGEBRAIC REPRESENTATIONS: Students shall represent and analyze thematical situations and structures, Using algebraic symbols.	1. Select and/or write number sentences (equations) to find the unknown in problem-solving contexts involving two-digit by one-digit division, using appropriate labels. (1) 2. Express mathematical relationships using simple equations and inequalities (<,>,=). EX: 4x5____8x2+3 (1) 3. Use a variable to represent an unknown quantity in a number sentence involving contextual situations and fine the value. EX: Sue bought 48 pencils. If pencils came in packages of 12, how many packages did she buy. (2)
6. ALGEBRAIC MODELS: Students shall develop and apply mathematical models to represent and understand quantitative relationships.	1. Create a chart or table to organize given information and to understand relationships and explain the results. EX: Troy must read independently for 2 ours a week. If Troy reads 20 minutes a day, how long will it take him to read a total of 2 hours? (2) A, 2007
7. ANALYSIS OF CHANGE: Students shall analyze change in various contexts.	1. Identify, describe, and generalize relationships in which quantities change proportionally. Ex. If a car travels at a rate of 50 mph, how far will it travel in three hours? (1)

GEOMETRY GRADE 4

CONTENT STANDARD	STUDENT LEARNING EXPECTATIONS
8. GEOMETRIC PROPERTIES: Students shall analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.	1. Identify, describe, and classify three-dimensional solids by properties including the number of vertices, edges, and shapes of faces, using models. (2) 2. Identify regular and irregular polygons, including octagons. (3) B, 2007 3. Identify, draw and describe a line, a line segment, a ray, an angle, and intersecting, perpendicular, and parallel lines. (1) 4. Identify and describe intersecting, perpendicular, and parallel lines in problem-solving context. (1) 5. Classify angles relative to 90° as more than, less than or equal to. (2)
9.TRANSFORMATION OF SHAPES: Students shall apply transformations and the use of symmetry to analyze mathematical situations.	1. Determine the result of a transformation of a two-dimensional figure as a slide (translation), flip (reflection), or turn (rotation), and justify the answer. (1)
11. VISUALIZATION AND GEOMETRIC MODELS: Students shall use visualization, spatial reasoning, and geometric modeling.	1. Construct a three-dimensional model composed of cubes when given an illustration. (1) 2. Create new figures by combining and subdividing models of existing figures in multiple ways and record results in a table. (5) D, 2006

MEASUREMENT Grade 4

CONTENT STANDARD	STUDENT LEARNING EXPECTATIONS
12. PHYSICAL ATTRIBUTES: Students shall use measurement attributes to describe and compare mathematical and real-world objects.	3. Use the relationship among units of measurement. (3) Length: 12in = 1 ft 3ft = 1 yd 36 in = 1yd 100cm =1m Capacity: 2 cups = 1 pint 2 pints = 1 quart 4 quarts = 1 gallon Weight: 16 ounces = 1 lb
13. SYSTEMS OF MEASUREMENT: Students shall identify and use units, systems, and processes of measurement.	1. Use a calendar to determine elapsed time from month to month. (1) 2. Solve problems involving conversions between minutes and hours. (1) 4. Determine elapsed time in contextual situations to five-minute intervals with beginning time unknown. EX: Mary watched a movie for 1 hr. and 15 min. The movie ended at 8:15. When did the movie begin? (2) 5. Apply money concepts in contextual situations. EX: Determine the better buy, Determine change back with least amount of change, compare money (1) 7. Use appropriate customary and metric measurement tools for length, capacity, and mass. (1) 8. Estimate and measure length, capacity/volume, and mass, using appropriate customary and metric units. (2) • Length: ½ inch, 1 cm • Perimeter: inches, feet, centimeters, meters • Area: Square inches, square feet, square centimeters, square meters • Weight: pounds/ounces • Mass: Kilograms/grams • Capacity: Cups, pints, quarts, gallons • Volume: liters 9. Use strategies for finding the perimeter of a rectangle. (1) 10. Use strategies for finding the area of a rectangle. (4) A, 22006 D, 2007 11. Use Strategies to find the volume (cubic units) of rectangular prisms and cubes (2)

DATA ANALYSIS, STATISTICS AND PROBABILITY grade 4

CONTENT STANDARD	STUDENT LEARNING EXPECTATIONS
14. DATA REPRESENTATION: Students shall formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them	1. Create a data collection plan after being given a topic, and collect, organize, display, describe, and interpret simple data, using frequency tables or line plots, pictographs, and bar graphs. (2)
15. DATA ANALYSIS: Students shall select and use appropriate statistical methods to analyze data.	1. Represent and interpret data, using pictographs, bar graphs, and line graphs, in which symbols or intervals are greater than one. (2) E open response
17. PROBABILITY: Students shall understand and apply basic concepts of probability.	1. Use fractions to predict probability of an event. Ex. 5 blue tiles, 3 red tiles, and 2 green tiles- What is the probability of pulling out a green tile. (1) 2. Conduct simple probability experiments, record the data, and draw conclusions about the likelihood of possible outcomes (roll number cubes, pull tiles from a bag, spin a spinner, or determine the fairness of games). (4)

Recognize equivalent representations for the same whole number and generate them by composing and decomposing numbers. Ex. 1,076=1,000+70+6; 500+500+25+25+25+1,etc. (2007= # 13)

13. Which shows the expanded form of the number below?

656,094

A. 60,000 + 56,000 + 90 + 4

B. 600,000 + 56,000 + 90 + 4

C. 600,000 + 50,000 + 6,000 + 94

* D. 600,000 + 50,000 + 6,000 + 90 + 4

NUMBER AND OPERATIONS GRADE 4

Use the place value structure of the base ten number system, and be able to represent and compare whole numbers to millions (using models, illustrations, symbols, expanded notation, and problem solving). Ex 1,246,477__1,244 (2006=# 4,9,38)

4. What is the value of the underlined digit below?

218,0<u>3</u>6,097

A. three thousand

* B. thirty thousand

C. thirty-six thousand

D. three hundred thousand

9. Jean made the chart below to record the number of pencils sold at the school store for the last four months.

Pencil Sales

Month	# of Pencils Sold
September	1,543
October	1,867
November	1,290
December	1,789

Which of the following is a true statement about the number of pencils sold?

A. $1,789 < 1,543$

B. $1,290 > 1,867$

* C. $1,543 > 1,290$

D. $1,867 = 1,789$

38. The chart below shows the number of calories consumed by a group of students in one week.

Student Calorie Chart

Student	Number of Calories
Tony	15,285
James	14,768
Kendra	14,876
Sophia	15,852

Which student consumed the **least** number of calories?

A. Tony

* B. James

C. Kendra

D. Sophia

Use mathematical language and symbols to compare and order any numbers, with and without appropriate technology. (<,>,=) (2006=# 17,29)

17. Sean has 36 baseball cards. Tom has 25 baseball cards. Which of the following is a true statement about their baseball card collections?

A. $25 > 36$

B. 25×36

* C. $36 > 25$

D. $36 = 25$

29. What symbol can replace the ☐ in the number sentence below to make it true?

1,840 ☐ 1,804

* A. >

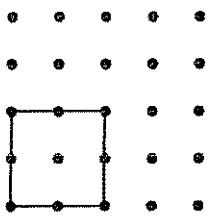
B. =

C. <

D. +

Write a fraction to name part of a whole, part of a set, a location on a number line, and the division of whole numbers, using models up to 12/12. (2006=# 40 2007= # 29, 33)

29. What fractional part is shown on the geoboard below?



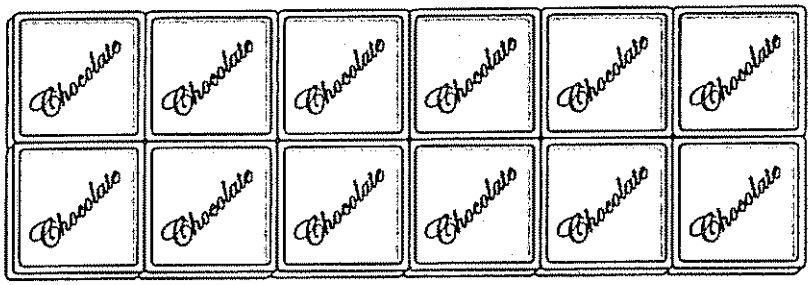
* A. $\frac{1}{4}$

B. $\frac{3}{4}$

C. 1

D. 4

33. Toby has a candy bar that is divided into 12 squares, as shown below.



He gave Shelly 2 pieces and Ron 3 pieces. What portion of the candy bar does Toby have left for himself?

A. $\frac{5}{12}$

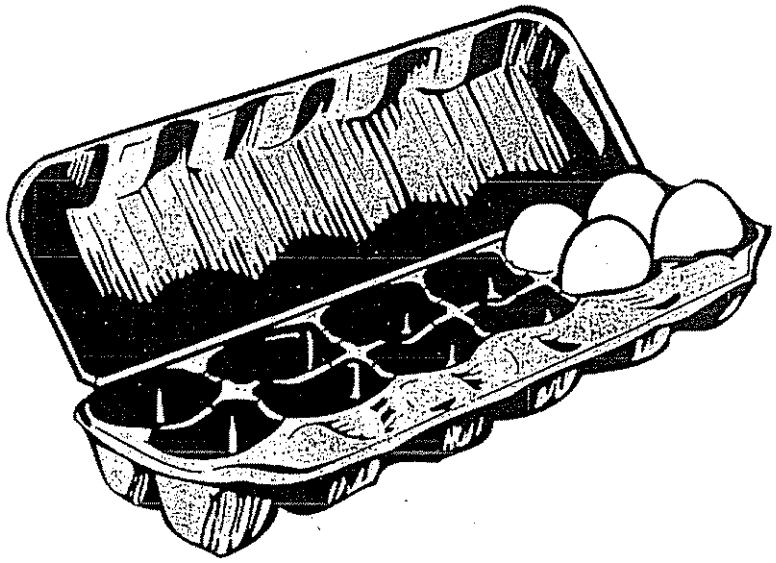
* B. $\frac{7}{12}$

C. $\frac{5}{7}$

D. $\frac{7}{5}$

Write a fraction to name part of a whole, part of a set, a location on a number line, and the division of whole numbers, using models up to 12/12. (2006=# 40)

40. Which of the following fractions identifies the part of the dozen eggs shown below that has been used?



A. $\frac{1}{8}$

B. $\frac{1}{4}$

C. $\frac{4}{12}$

* D. $\frac{8}{12}$

Write an equivalent decimal for a given fraction relating to money. Ex: 1/10=$0.10
(2007= # 18)

18. Which amount equals $\frac{1}{4}$ of $1.00?

A. $0.04

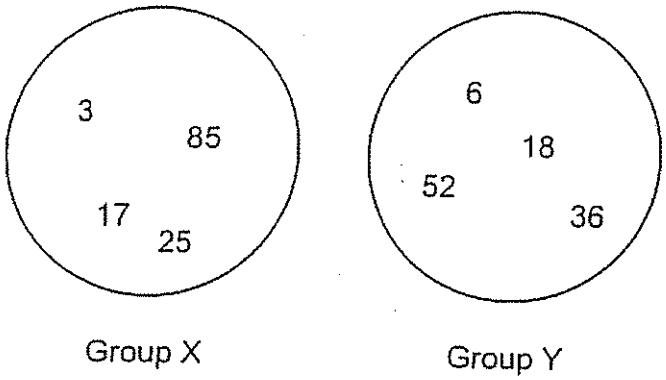
* B. $0.25

C. $0.40

D. $0.50

Apply number theory. Determine if any number is even or odd. Use the terms multiple, factor, and divisible by in an appropriate context. Generate and use divisibility rules for 2, 5, and 10. Demonstrate various multiplication and division relationships. (2006=# 35)

35. Mr. Booth put the two groups of numbers below on the board.



What is the rule he used when forming the two groups?

A. Group X: Multiples of 5
Group Y: Even Numbers

* B. Group X: Odd Numbers
Group Y: Even Numbers

C. Group X: Odd Numbers
Group Y: Multiples of 3

D. Group X: Odd Numbers
Group Y: Multiples of 6

Represent and explain division as measurement and partitive division, including equal groups, related rates, price, rectangular arrays (area model), combinations and multiplicative comparison. Translate contextual situations involving division into conventional mathematical symbols. Explain how a remainder may impact an answer in a real world situation. (2006=# 6,22 2007= # 20)

20. Ms. Summers has 41 pencils for 9 students. If they all receive the same number of pencils, what is the **greatest** number each student can receive?

* A. 4

B. 5

C. 32

D. 50

Represent and explain division as measurement and partitive division, including equal groups, related rates, price, rectangular arrays (area model), combinations and multiplicative comparison. Translate contextual situations involving division into conventional mathematical symbols. Explain how a remainder may impact an answer in a real world situation. (2006=# 6,22)

6. Mrs. Smith and Mr. Jones are taking their classes on a field trip. Each school van holds 8 people. If there are 48 people going on the trip, how many vans do they need?

A. 5

* B. 6

C. 40

D. 56

22. Sheila is making beaded necklaces that are 10 inches long. She has a piece of string that is 78 inches long. How many necklaces can she make from the string?

* A. 7

B. 8

C. 780

D. 800

Attain, with and without appropriate technology, computational fluency in multiplication and division, using contextual problems: Two-digit by two-digit multiplication (larger numbers with technology) Up to three-digit by two-digit division (larger numbers with technology) Strategies for multiplication and dividing numbers Performance of operations in more than one way Estimation of products and quotients in appropriate situations Relationships between operations. (2006=# 7, C open response 2007= # E)

E. Jansen is helping to prepare for a bicycle race. His job is to set up tables with cups of water along the course. There will be 10 tables with 24 paper cups of water on each table.

1. How many paper cups will Jansen need in all? Explain your answer using words and/or numbers.

2. The paper cups come in packages of 48. Based on your answer in Part 1, how many packages of cups will Jansen need? Explain your answer using words and/or numbers.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM E

SCORE	DESCRIPTION
4	The student earns 4 points. The response contains no incorrect work. Labels are not required for a score of 4.
3	The student earns 3 points.
2	The student earns 2 points.
1	The student earns 1 point, or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

Attain, with and without appropriate technology, computational fluency in multiplication and division, using contextual problems: Two-digit by two-digit multiplication (larger numbers with technology) Up to three-digit by two-digit division (larger numbers with technology) Strategies for multiplication and dividing numbers Performance of operations in more than one way Estimation of products and quotients in appropriate situations Relationships between operations. (2006=# 7, C open response)

7. Ashley has a 43-page sticker album. Each page will hold about 20 stickers. About how many stickers can she place in the album?

A. 2

B. 20

C. 60

* D. 800

MATHEMATICS OPEN-RESPONSE ITEM C

C. Mrs. Grey wrote the following two numbers on the board.

12 4

1. What is the sum of the two numbers that Mrs. Grey wrote on the board? Write a number sentence using Mrs. Grey's numbers and your sum.

2. If **12** is the dividend and **4** is the quotient, what is the divisor? Write a number sentence using Mrs. Grey's numbers and your divisor.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

Solve simple problems using operations involving addition, subtraction, and multiplication, using a variety of methods and tools. EX: objects, mental computation, paper and pencil with and without appropriate technology. (2007= # 7)

7. Beth had 9 groups of pencils with 4 in each group. She skip-counted by 4 to find the total number of pencils. What are the last 3 numbers she said?

A. 14 23 32

B. 20 24 28

* C. 28 32 36

D. 32 36 48

Use estimation strategies to solve problems and judge the reasonableness of the answer.
(2006=# 12, 2007= # 39)

39. Which state has a population that is about 2,000,000 greater than that of Arkansas?

Population of Arkansas and Its Border States

State	Population
Texas	22,118,509
Tennessee	5,841,748
Missouri	5,704,484
Louisiana	4,496,334
Oklahoma	3,511,532
Mississippi	2,881,281
Arkansas	2,725,714

A. Tennessee

B. Missouri

* C. Louisiana

D. Oklahoma

Use estimation strategies to solve problems and judge the reasonableness of the answer. (2006=# 12)

12. Randy has 3 bags of marbles. Each bag has 86 marbles. About how many marbles does Randy have in all?

A. 83

B. 89

C. 240

* D. 270

Use repeating and growing numeric and geometric patterns to make predictions and solve problems. (2006=# 5, B open response 2007= #19)

19. If the pattern below continues, how many squares will be in Figure 5?

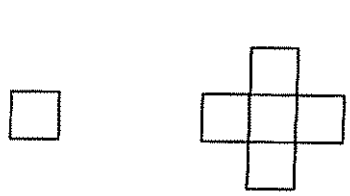


Figure 1

Figure 2

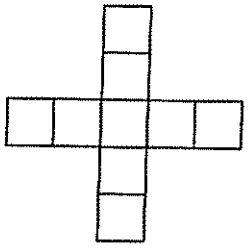


Figure 3

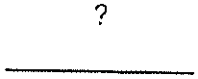


Figure 4

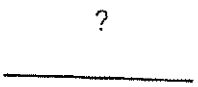


Figure 5

A. 4

B. 11

C. 13

* D. 17

ALGEBRA GRADE 4

Use repeating and growing numeric and geometric patterns to make predictions and solve problems. (2006=# 5, B open response)

5. Zach created the secret code below to write messages to his friends.

My Secret Code

1 = B 2 = C 3 = D 4 = E etc.

What numbers will Zach write to represent the word "HE"?

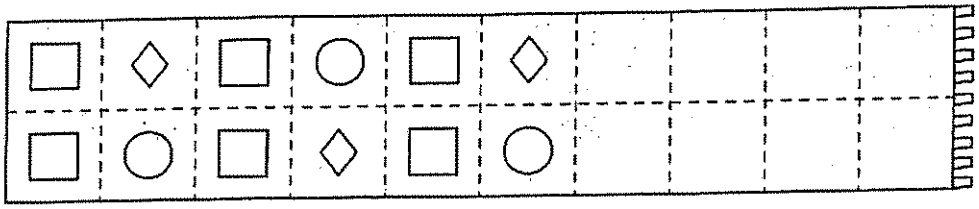
A. 4, 7

* B. 7, 4

C. 4, 8

D. 8, 4

MATHEMATICS OPEN-RESPONSE ITEM B



B. Karen wants to make a bookmark out of leather. She is planning the design above on paper before she starts cutting the leather.

1. Using Karen's pattern, complete the design for the bookmark.

2. How many of each shape will she need to cut out to make her bookmark?

3. Use the same number of squares, circles, and rhombuses to design a new bookmark that follows a regular pattern.

BE SURE TO LABEL YOUR RESPONSES 1, 2, AND 3.

Determine the relationship between sets of numbers by selecting the rule (2-step rule in words)
(2006=# 1,13,31 2007= # 9, 25, 30, 31)

9. Pam created the table below using a 2-step rule.

x	y
2	5
3	7
4	9
5	11

What did Pam do to create her set of numbers?

A. Add 4 to the x-value, and then subtract 1.

* B. Multiply the x-value by 2, and then add 1.

C. Add 2 to the x-value, and then add 1 more.

D. Multiply the x-value by 2, and then subtract 1.

25. Toby recorded the height of a plant for four weeks. He noticed a pattern.

Week	Height
1	2 inches
2	5 inches
3	11 inches
4	23 inches

What is the rule for the changes in height?

A. Add 3.

B. Add 12.

C. Double each number.

* D. Multiply each number by 2 and add 1.

30. Mr. Teck wrote the sets of numbers below on the board.

(5, 9) (6, 12) (7, 15) (8, 18)

What rule did Mr. Teck use to determine the value of the second number in each set?

A. Add 4 to the first number.

B. Multiply the first number by 2.

C. Multiply the first number by 2, and then add 1.

* D. Subtract 2 from the first number, and then multiply by 3.

31. What is the rule for the pattern below?

2 4 3 6 5 10 9 . . .

A. Add 2, and then subtract 1.

B. Divide by 2, and then add 1.

C. Multiply by 2, and then add 1.

* D. Multiply by 2, and then subtract 1.

Determine the relationship between sets of numbers by selecting the rule (2-step rule in words)
(2006=# 1,13,31)

1. What is the missing operation in the pattern below?

Input	n	10	11	12	13	14	15
Output	?	3	4	5	6	7	8

A. add 7
B. add 10
C. subtract 3
* D. subtract 7

13. What is the rule for the number pattern below?

1,125 225 45 9

A. add 900
B. divide by 2
* C. divide by 5
D. subtract 900

31. When Ashley says "13," the answer is 113. When she says "36," the answer is 136. When she says "94," the answer is 194. What is the rule for Ashley's pattern?

* A. add 100
B. add 117
C. divide by 100
D. divide by 117

Select and/or write number sentences (equations) to find the unknown in problem-solving contexts involving two-digit by one-digit division, using appropriate labels. (2006=# 10)

10. Mr. Carter's class has 30 students. Which mathematical sentence shows how many 5-player basketball teams the class will be able to make at recess?

* A. $30 \div 5 = n$

B. $30 \times 5 = n$

C. $30 - 5 = n$

D. $30 + 5 = n$

Express mathematical relationships using simple equations and inequalities. Ex: (<, >, =,).
4x5=_____ 8x2=3. (2007= # 12)

12. Kim wrote the following number sentence (inequality) on the board.

$$3 \times 6 - 4 < 6 \square 3$$

Which symbol will make the number sentence true?

A. +

B. −

* C. ×

D. ÷

Use a variable to represent an unknown quantity in a number sentence involving contextual situations and fine the value. EX: Sue bought 48 pencils. If pencils came in packages of 12, how many packages did she buy. 2007= # 21,24)

21. Eleven students paid a total of $55 to go on a field trip. Which equation (number sentence) shows how much money each student paid (n), if each student paid an equal amount?

* A. $55 \div 11 = n$

B. $11 \times 55 = n$

C. $55 - 11 = n$

D. $55 + 11 = n$

24. Marguerite needs 24 squares to make one patchwork quilt. She wants to make 6 quilts. Which mathematical sentence shows how many squares she needs?

A. $24 \div 6 = n$

B. $6 \div 24 = n$

* C. $24 \times 6 = n$

D. $4 \times 24 = n$

. Create a chart or table to organize given information and to understand relationships and explain the results. EX: Troy must read independently for 2 ours a week. If Troy reads 20 minutes a day, how long will it take him to read a total of 2 hours? 2007= # 36, A)

36. Lisa must walk the family dog for 30 minutes each day. The table below shows the total amount of time she has walked the dog so far this week.

Day	Total Time for the Week
1	$\frac{1}{2}$ hour
2	1 hour
3	$1\frac{1}{2}$ hours
4	?
5	?
6	?
7	?

According to the table, how much time will Lisa have spent walking the dog by the end of the 7th day?

A. 2 hours

B. $2\frac{1}{2}$ hours

C. 3 hours

* D. $3\frac{1}{2}$ hours

Continued on next page

. Create a chart or table to organize given information and to understand relationships and explain the results. EX: Troy must read independently for 2 ours a week. If Troy reads 20 minutes a day, how long will it take him to read a total of 2 hours? 2007= # 36, A)

A. Cheryl has a new 20-gallon fish tank. She only has a 1-quart pitcher that she will use to fill the tank. She started making the table below to help her find out how many times she would need to fill and pour with her quart pitcher.

Number of Gallons	1	2	3	4	5	6	7	8	9	10
Number of Quarts	4	8								

1. In your answer document, copy and complete Cheryl's table, showing the relationship between quarts and gallons.

2. How many times will Cheryl need to fill and pour her pitcher in order to fill her 20-gallon tank? Explain your answer using words and/or numbers.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM A

SCORE	DESCRIPTION
4	The student earns 4 points. The response contains no incorrect work. The chart in Part 1 contains 1 & 2 gallons and 4 & 8 Quarts. The chart contains "# of gallons" and "# of quarts" labels.
3	The student earns 3 points.
2	The student earns 2 points.
1	The student earns 1 point, or some minimal understanding is shown. Ex: At least 5 entries are correct or use correct procedures.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

Identify, describe, and generalize relationships in which quantities change proportionally. Ex. If a car travels at a rate of 50 mph, how far will it travel in three hours? (2006=# 26)

26. It is 150 miles between Little Rock and Ashdown. Driving at 50 miles per hour, how many hours will the trip take?

* A. 3

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

C. 2

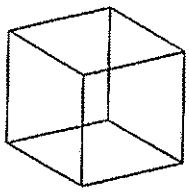
D. $3\frac{1}{2}$

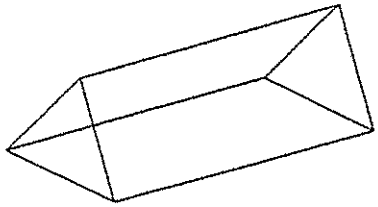
Geometry Grade 4
Identify, describe, and classify three-dimensional solids by properties including the number of vertices, edges, and shapes of faces, using models. (2006=# 20,24)

20. Which of the following is most like a cylinder?

* A. soda can
B. stop sign
C. cereal box
D. front door of a house

24. How many more vertices does a cube have than a triangular prism?

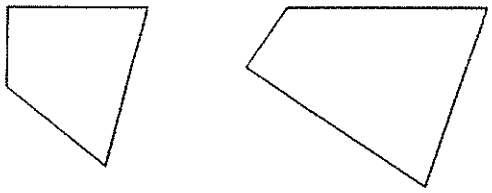




* A. 2
B. 6
C. 8
D. 14

Identify regular and irregular polygons, including octagons. (2006=# 37 2007= # 15, B)

15. Which statement best describes the polygons below?



A. Both are regular.

* B. Both are irregular.

C. Both are congruent.

D. Both are pentagons.

B. Susan wrote the clues below to describe a mystery shape.

- It is a quadrilateral.
- It has only one set of parallel sides.
- It has no right angles.
- It has only one line of symmetry.

You may use your pattern blocks to help answer Parts 1 and 2.

1. In your answer document, draw and name Susan's mystery shape.

2. Draw and label a rhombus, and give three "mystery shape" clues for it.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM B

SCORE	DESCRIPTION
4	The student earns 4 points. The response contains no incorrect work. The label "rhombus" is included in Part 2.
3	The student earns 3 points.
2	The student earns 2 points.
1	The student earns 1 point, or some minimal understanding is shown. Ex: A polygon other than a rhombus is drawn, but 3 clues that correctly describe it are listed in Part 2 (Ex: Drawing of a regular hexagon, 3 sets of parallel sides, 6 sides, and 6 lines of symmetry).
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

Identify regular and irregular polygons, including octagons. (2006=# 37)

37. I am a polygon. I have 6 sides. What is my name?

A. square

B. octagon

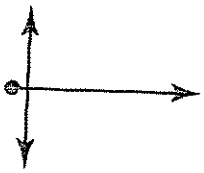
* C. hexagon

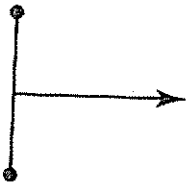
D. quadrilateral

Identify, draw and describe a line, a line segment, a ray, an angle, and intersecting, perpendicular, and parallel lines. (2007= # 34)

34. Mr. Thompson showed his class a line segment and a ray that are parallel to one another. Which figure did he show them?

A. 

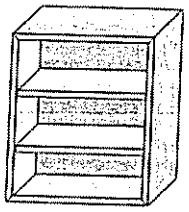
B. 

C. 

* D. 

Identify and describe intersecting, perpendicular, and parallel lines in problem-solving context. (2007= #1)

1. Which term describes the relationship of the bookcase shelves?



* A. parallel

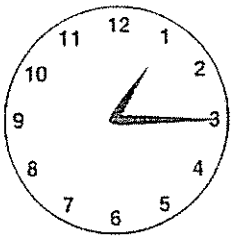
B. intersecting

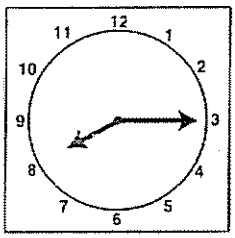
C. line segment

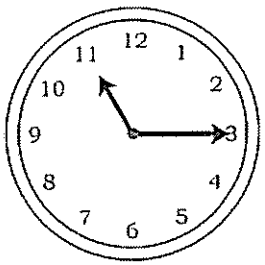
D. perpendicular

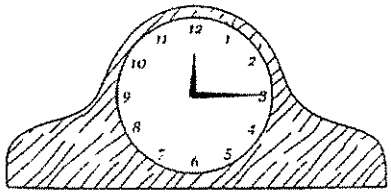
Classify angles relative to 90° as more than, less than or equal to. (2007= #8,27)

8. Which clock below has hands at an angle less than 90 degrees?

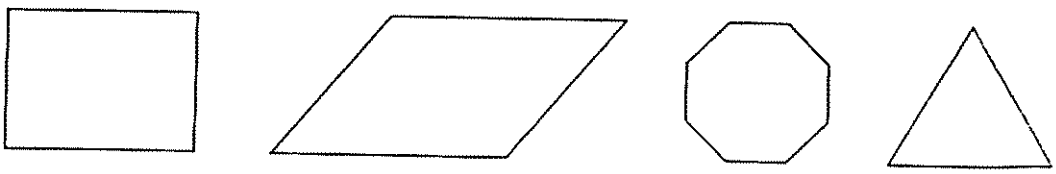
*A. 

B. 

C. 

D. 

27. Which two shapes have at **least** one angle that is greater than 90°?



A. E and H

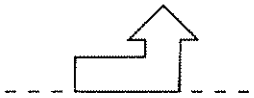
* B. F and G

C. G and H

D. E and F

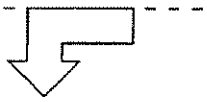
Determine the result of a transformation of a two-dimensional figure as a slide (translation), flip (reflection), or turn (rotation), and justify the answer. (2007= # 38)

38. Which shows the figure below after it has been flipped (reflected)?

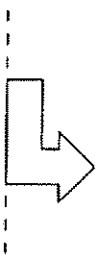


A.

B.



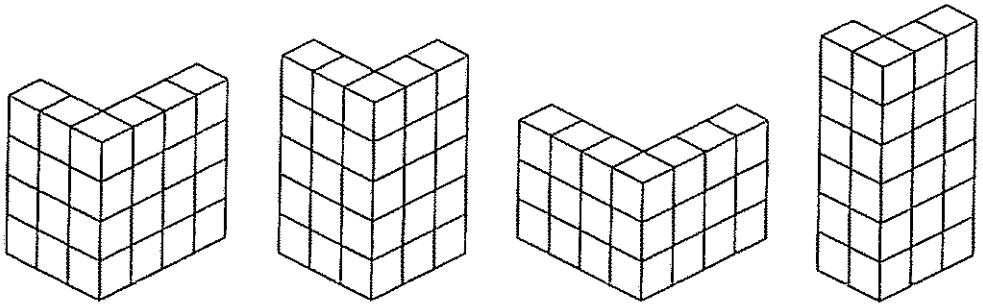
C.



* D.

Construct a three-dimensional model composed of cubes when given an illustration. (2007= # 37)

37. Abner is building a fort with his friends. If he uses at **least** 25 blocks, which figure could be a model of his fort? (There are no hidden blocks.)



I II III IV

A. I

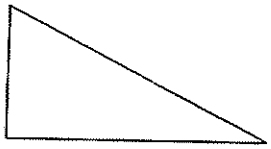
* B. II

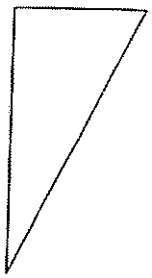
C. III

D. IV

Create new figures by combining and subdividing models of existing figures in multiple ways and record results in a table. (2006= # 14,15,25,D. 2007= # 4)

4. If Alan combines the two triangles below, what type of parallelogram could he make?





A. trapezoid

B. rhombus

* C. rectangle

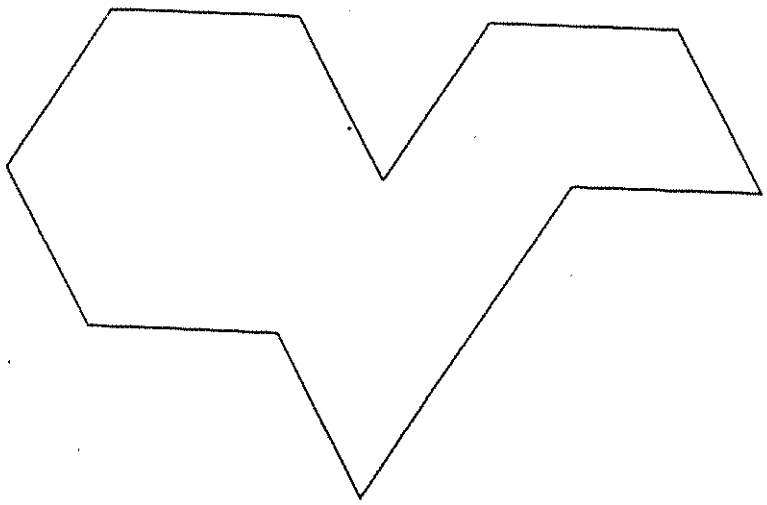
D. square

Create new figures by combining and subdividing models of existing figures in multiple ways and record results in a table. (2006=# 14,15,25,D open response)

14. Joey covered a hexagon pattern block using 3 triangles and 1 other shape. What is the other shape? You may use your pattern blocks to help you.

A. square
B. triangle
C. rhombus
* D. trapezoid

15. How many triangle pattern blocks are needed to cover the figure below? You may use your pattern blocks to help you.



A. 3
B. 4
* C. 12
D. 13

254 D on next page

Create new figures by combining and subdividing models of existing figures in multiple ways and record results in a table. (2006=# 14,15,25,D open response)

Use the shapes below to answer question 25.

25. When the shapes above are combined with no empty spaces left over, what new shape is formed? (You may use your pattern blocks to help you.)

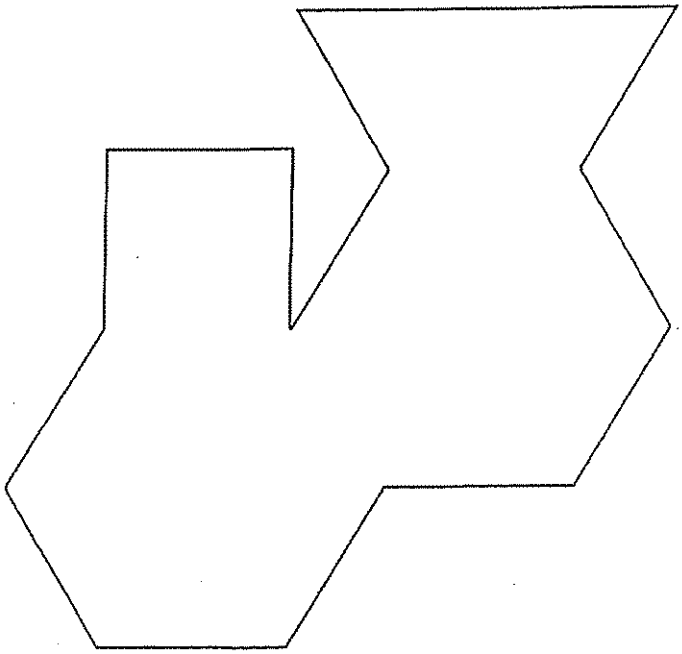
A. 

B. 

C. 

* D. 

D. Casey used four pattern blocks to create the design below.



1. Name the four pattern blocks Casey used. You may use your pattern blocks to help you find the answer.

2. What is another way that Casey's design could have been created if he had used more than four blocks? Explain your answer using words, numbers, and/or pictures.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

MEASUREMENT GRADE 4

Use the relationship among units of measurement. Length: 12in = 1 ft 3ft = 1 yd
36 in = 1yd 100cm =1m Capacity: 2 cups = 1 pint 2 pints = 1 quart 4 quarts = 1 gallon
Weight: 16 ounces = 1 lb (2006=# 36,11,39)

11. Felton weighed 8 apples and found that they weighed 2 pounds. **Approximately** how much does 1 apple weigh?

A. 2 oz
* B. 4 oz
C. 16 oz
D. 32 oz

36. Mrs. Berini used 18 yards of fabric to make her living room curtains and 16 yards to make her bedroom curtains. How much more fabric did she use in the living room than in the bedroom?

A. 2 feet
* B. 6 feet
C. 34 feet
D. 72 feet

39. Craig's little brother weighed 5 pounds and 8 ounces when he was born. How many ounces did he weigh?

A. 40
B. 44
C. 80
* D. 88

Use a calendar to determine elapsed time from month to month. (2007= #5)

5. José's school has a week-long spring break starting on March 28. On what date will the school reopen?

MARCH						
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

* A. April 4
B. April 5
C. April 11
D. March 12

Solve problems involving conversions between minutes and hours. (2007= # 10)

10. It took Sara 1 hour and 30 minutes to do her homework, and she practiced piano for 45 minutes. What was the total amount of time Sara spent doing homework and practicing piano?

A. 1 hour and 15 minutes

B. 1 hour and 30 minutes

* C. 2 hours and 15 minutes

D. 2 hours and 25 minutes

Determine elapsed time in contextual situations to five-minute intervals with beginning time unknown. EX: Mary watched a movie for 1 hr. and 15 min. The movie ended at 8:15. When did the movie begin? (2007= # 11, 16)

11. José attended a science program that lasted 1 hour and 10 minutes. The program ended at 3:20 P.M. What time did the program begin?

A. 4:30 P.M.

B. 4:20 P.M.

C. 2:20 P.M.

* D. 2:10 P.M.

16. On Saturday night, Roberto's family watched a movie that lasted 2 hours and 10 minutes. If the movie ended at 9:10 P.M., what time did the movie start?

* A. 7:00 P.M.

B. 7:10 P.M.

C. 11:00 P.M.

D. 11:20 P.M.

Apply money concepts in contextual situations. EX: Determine the better buy, Determine change back with least amount of change, compare money (2007= # 28)

28. Brian has $6.50 in quarters. How many quarters does Brian have?

A. 4

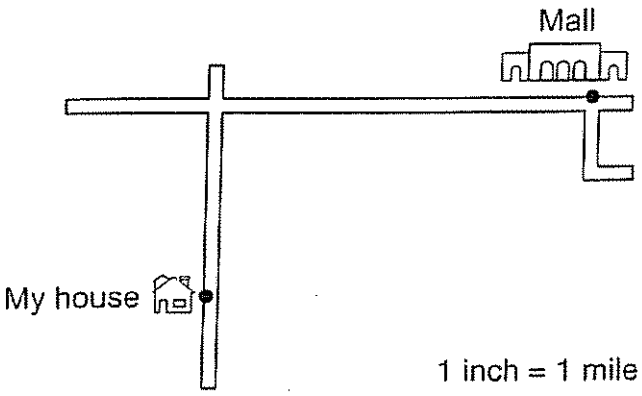
B. 12

C. 24

* D. 26

Use appropriate customary and metric measurement tools for length, capacity, and mass. (2006=# 32)

32. Jacob drew the map below to show the distance he drives from his house to the mall.



Based on Jacob's scale, what is the distance? Use your ruler to help you.

* A. 3 miles

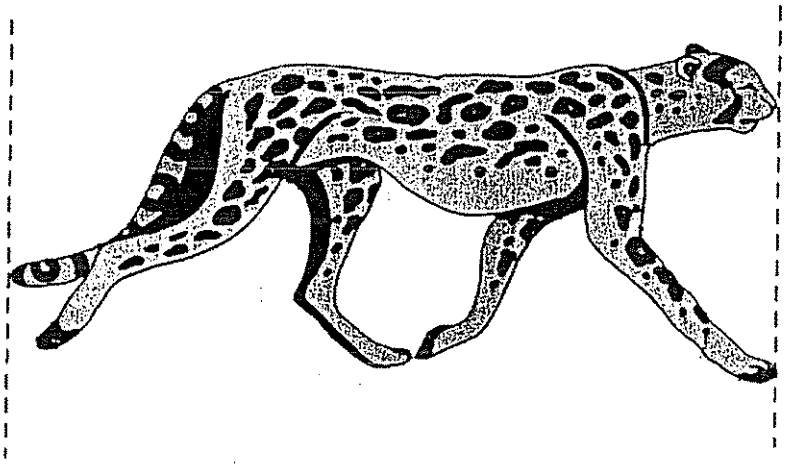
B. 4 miles

C. 7 miles

D. 8 miles

Estimate and measure length, capacity/volume, and mass, using appropriate customary and metric units: Length: ½ inch, 1 cm Perimeter: inches, feet, centimeters, meters Area: Square inches, square feet, square centimeters, square meters Weight: pounds/ounce Mass: Kilograms/grams Capacity: Cups, pints, quarts, gallons Volume: liters (2006=# 27,28)

27. Which length, rounded to the nearest $\frac{1}{2}$ inch, best describes the toy cheetah below? Use your ruler to help you.



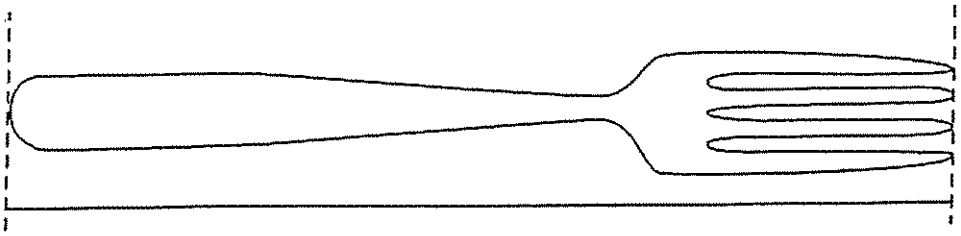
* A. 4 inches

B. $4\frac{1}{2}$ inches

C. 5 inches

D. $5\frac{1}{2}$ inches

28. What is the length, measured to the nearest $\frac{1}{2}$ inch, of the plastic fork below? Use your ruler to help you.



A. 4 inches

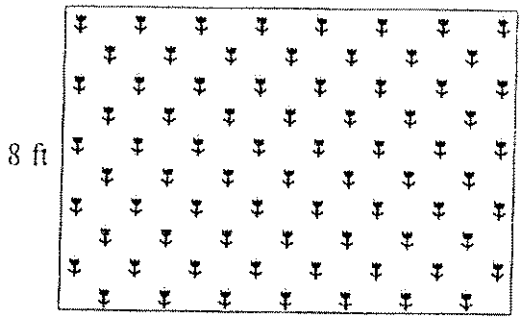
B. $4\frac{1}{2}$ inches

* C. 5 inches

D. $5\frac{1}{2}$ inches

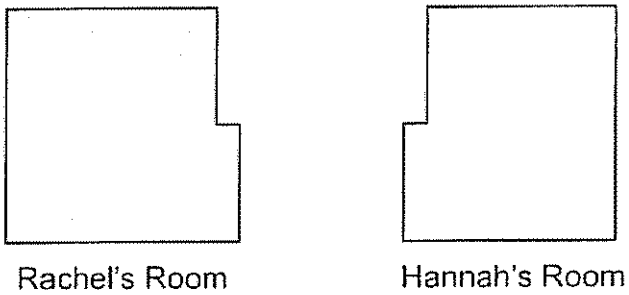
Use strategies for finding the area of a rectangle. (2006=# 19, A 2007=# 26, D)

26. Kara put wallpaper on one wall in her room, as shown below. How much wallpaper did she use?



A. 20 sq ft
B. 40 sq ft
* C. 96 sq ft
D. 98 sq ft

D. Rachel and Hannah are getting new desks for their rooms. Their parents said that the larger desk should go in the larger room. Below is a grid model of each girl's room and the two desks.



1. The area of Rachel's room is 95 square feet. What is the area of Hannah's room? Explain your answer using words, numbers, and/or pictures.

2. Which girl will get Desk A? Explain your answer using words, numbers, and/or pictures.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

Use strategies for finding the perimeter of a rectangle (2006=# 3)

3. How many yards of fencing would it take to surround a dog's play area that is a square measuring $4\frac{1}{2}$ yards per side?

A. 16 yards

B. $16\frac{1}{2}$ yards

* C. 18 yards

D. 25 yards

Use strategies for finding the area of a rectangle. (2006=# 19, A open response)

19. Mrs. Rodriguez will use 54 square feet of tile to cover her bathroom floor. What are the dimensions of her bathroom?

* A. 6 ft by 9 ft

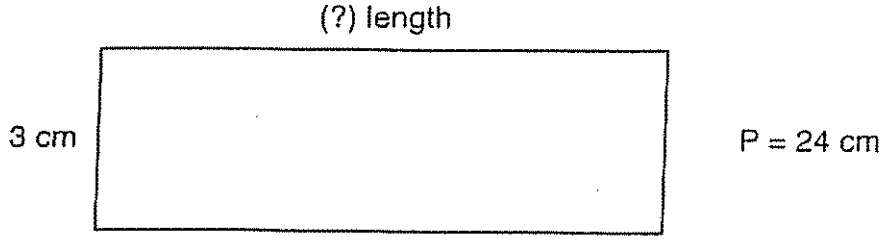
B. 7 ft by 8 ft

C. 5 ft by 4 ft

D. 8 ft by 8 ft

MATHEMATICS OPEN-RESPONSE ITEM A

A. Cameron drew the rectangle below.



The length of Cameron's rectangle is 3 times its width.

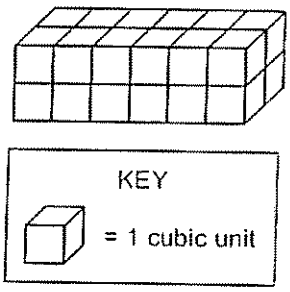
1. What is the length of Cameron's rectangle? Explain your answer using words, numbers, and/or pictures.

2. What is the area of Cameron's rectangle? Explain your answer using words, numbers, and/or pictures.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

Use Strategies to find the volume (cubic units) of rectangular prisms and cubes. (2006=# 2 2007=# 35)

35. Thomas built the structure below.



What is its volume?

A. 12 cubic units

B. 16 cubic units

* C. 24 cubic units

D. 28 cubic units

Use Strategies to find the volume (cubic units) of rectangular prisms and cubes. (2006=# 2)

2. Jamie built a block structure with a volume of 9 cubic units. Which of the structures below did he build?

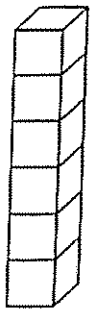


Figure 1

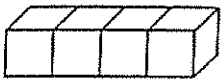


Figure 2

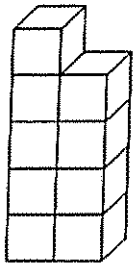


Figure 3

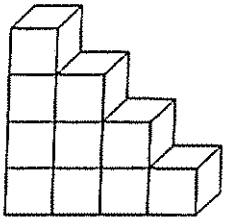


Figure 4

A. Figure 1
B. Figure 2
* C. Figure 3
D. Figure 4

Create a data collection plan after being given a topic, and collect, organize, display, describe, and interpret simple data, using frequency tables or line plots, pictographs, and bar graphs. (2006=# 8,33 2007= # 3, 14)

3. The frequency table below shows how students in Ms. Wheeler's class voted to name their class pet.

Votes for Our Hamster's Name

Spike	Fuzzy	Squirmy	Snowball	Happy
X				
X				
X				X
X				X
X	X		X	X
X	X		X	X
X	X	X	X	X

How many more students voted for Spike than for Fuzzy and Squirmy combined?

A. 1

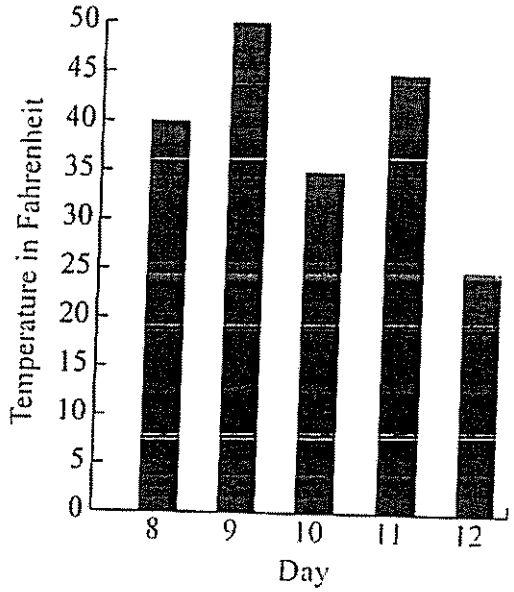
* B. 3

C. 4

D. 7

14. Ms. Judge's class recorded the daily high temperatures from January 8 through January 12 and made the bar graph below.

Some January High Temperatures



What was the difference in the high for January 9 and the high for January 10?

A. 10°F

* B. 15°F

C. 35°F

D. 50°F

DATA ANALYSIS AND PROBABILITY GRADE 4

Create a data collection plan after being given a topic, and collect, organize, display, describe, and interpret simple data, using frequency tables or line plots, pictographs, and bar graphs. (2006=# 8,33)

8. Based on the data collection below, how many more fourth-grade students preferred chocolate chip than preferred vanilla?

What is Your Favorite Ice Cream?

Flavor	Number
Vanilla	𝍸
Strawberry	𝍸 𝍸
Chocolate Chip	𝍸 𝍸 𝍸 𝍸 𝍸
Rocky Road	𝍸 𝍸 𝍸 𝍸
Cookies and Cream	𝍸 𝍸 𝍸 𝍸

A. 4

B. 5

* C. 19

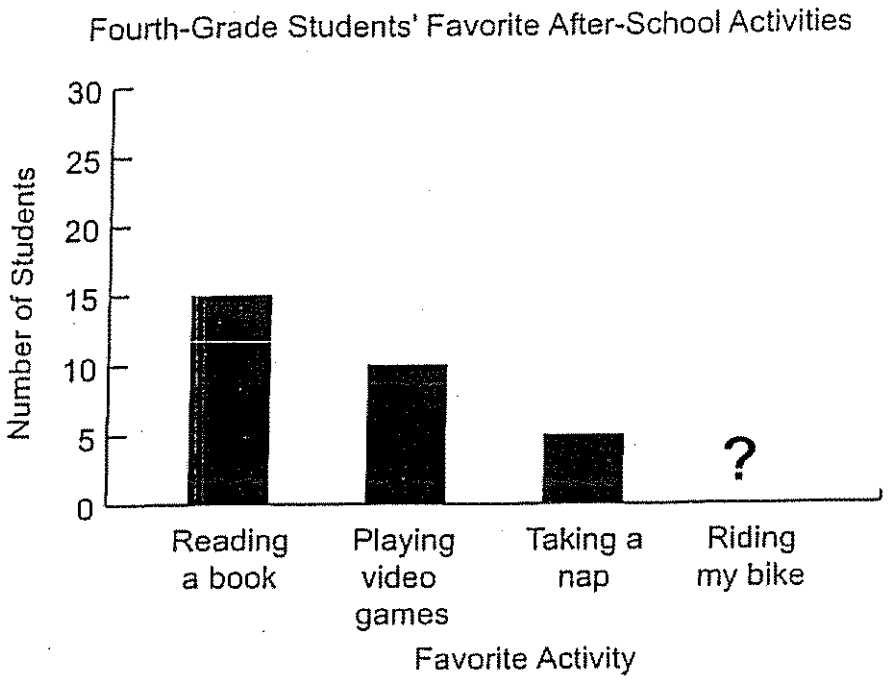
D. 27

33 on next page

DATA ANALYSIS AND PROBABILITY GRADE 4

Create a data collection plan after being given a topic, and collect, organize, display, describe, and interpret simple data, using frequency tables or line plots, pictographs, and bar graphs. (2006=# 8,33)

33. Toshio asked 55 fourth-grade students about their favorite after-school activity. He created the graph below to display the results of his survey.



How many students chose riding their bike as their favorite activity?

A. 15

* B. 25

C. 30

D. 55

epresent and interpret data, using pictographs, bar graphs, and line graphs, in which symbols or intervals are reater than one. (2006=# 21, E 2007= # 2, 32, C)

2. The pictograph below represents the number of pies each fourth-grade teacher made for the bake sale.

Teacher	Number of Pies Baked
Mrs. McLain	○ ○ ○ ◖
Ms. Rawls	○ ○ ○ ○
Mr. Levitt	○ ○
Mr. Tach	○ ○ ◖

Key
○ = 2 pies

How many pies did Mrs. McLain make for the bake sale?

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

B. $3\frac{1}{2}$

* C. 7

D. 12

32. The pictograph below shows the number of books read by each of the fourth-grade classes during a reading contest.

Books Read for the Reading Contest

Teacher	Number of Books Read
Mrs. Racine	📖 📖 📖 📖 📖
Ms. Kirby	📖 📖 📖 📖
Mr. Haywood	📖 📖 📖 📖 📖 📖
Mrs. Ramirez	📖 📖 📖 📖 📖

Key
📖 = 10 books

How many more books did Mr. Haywood's class read than did Ms. Kirby's?

A. 10

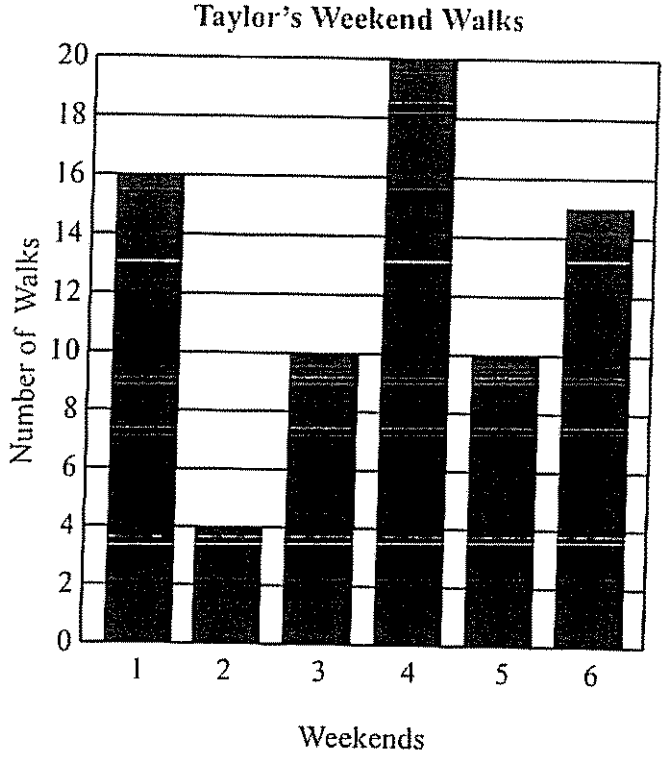
* B. 25

C. 35

D. 60

Represent and interpret data, using pictographs, bar graphs, and line graphs, in which symbols or intervals are greater than one. (2006=# 21, E 2007= # 2, 32, C)

C. Taylor walks dogs on the weekends to earn money. The graph below shows the number of times Taylor has walked dogs over the last 6 weekends.



1. How many more times did Taylor walk dogs during the last 3 weekends than during the first 3 weekends? Explain your answer using words and/or numbers.

2. Taylor charges the dog owners $2.00 per walk. How much money did Taylor earn over the 6 weekends? Explain your answer using words and/or numbers.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

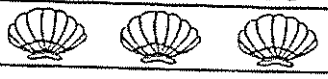
RUBRIC FOR MATHEMATICS OPEN-RESPONSE ITEM C

SCORE	DESCRIPTION
4	The student earns 4 points. The response contains no incorrect work. The correct label of "$" or "Dollars" is included in Part 2.
3	The student earns 3–3 ½ points.
2	The student earns 2–2 ½ points.
1	The student earns ½–1 ½ points, or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

Represent and interpret data, using pictographs, bar graphs, and line graphs, in which symbols or intervals are greater than one. (2006=# 21, E open response)

21. Jim and his friends made the table below to show how many seashells they have in their collections.

Our Seashell Collections

Students	Number of Seashells
Jim	
Faye	
Bob	
Harrison	

 = 4 seashells

How many seashells do they have in all?

A. $13\frac{1}{2}$

B. 14

C. $52\frac{1}{2}$

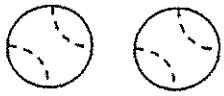
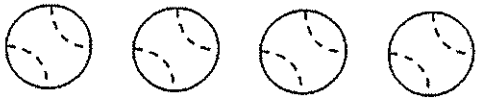
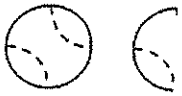
* D. 54

E on next page

Represent and interpret data, using pictographs, bar graphs, and line graphs, in which symbols or intervals are greater than one. (2006=# 21, E open response)

E. Joseph made the pictogram below to show the number of hits he had in his last four baseball games.

Joseph's Hits

Game	Number of Hits
1	
2	
3	
4	

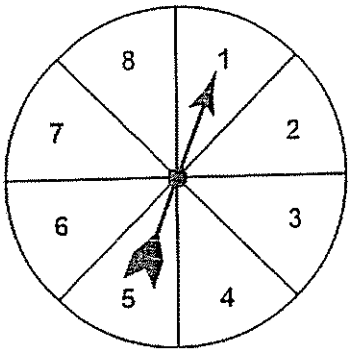
 = 2 hits

1. How many hits did Joseph have in Game 2? Explain your answer using words and/or numbers.
2. How many more hits did Joseph have in Game 4 than in Game 3? Explain your answer using words and/or numbers.

BE SURE TO LABEL YOUR RESPONSES 1 AND 2.

Use fractions to predict probability of an event. Ex. 5 blue tiles, 3 red tiles, and 2 green tiles- What is the probability of pulling out a green tile. (2006=# 30 2007= # 6, 17, 23)

6. What is the probability of spinning a number less than 4 on the spinner below?



* A. $\frac{3}{8}$

B. $\frac{4}{8}$

C. $\frac{8}{4}$

D. $\frac{8}{3}$

17. Lea has 12 crayons in a bag: 3 green, 5 blue, 2 yellow, 1 black, and 1 brown. What is the probability that Lea will pull out a yellow crayon if she pulls out one crayon without looking?

A. $\frac{1}{12}$

* B. $\frac{2}{12}$

C. $\frac{2}{10}$

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

23. At the school carnival, Sue played the "Pop-a-Balloon" game. Inside each of 8 inflated balloons was a slip of paper with the name of a prize written on it. The name of the prize and the number of balloons containing that prize is shown in the table below.

Prize	Number of Balloons
cupcake	2
brownie	3
ice cream	1
snow cone	2

What is the probability that Sue will win a brownie?

* A. $\frac{3}{8}$

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

C. $\frac{5}{8}$

D. $\frac{8}{3}$

Use fractions to predict probability of an event. Ex. 5 blue tiles, 3 red tiles, and 2 green tiles- What is the probability of pulling out a green tile. (2006=# 30)

30. There are 124 jelly beans in a bag. The table below lists the colors and number of jelly beans. Which fraction represents Katie's chances of picking out a pink jelly bean on her first try?

Jelly beans in the Bag

Color	Number
black	16
orange	17
pink	24
purple	12
red	14
yellow	24
white	17

A. $\frac{16}{124}$

B. $\frac{12}{124}$

* C. $\frac{24}{124}$

D. $\frac{124}{24}$

Conduct simple probability experiments, record the data, and draw conclusions about the likelihood of possible outcomes (roll number cubes, pull tiles from a bag, spin a spinner, or determine the fairness of games). (2006=# 16,18,23,34 2007=# 22)

22. Maria rolled a number cube 36 times and recorded the numbers she rolled below.

Number	Number of Times Rolled
1	3
2	6
3	8
4	10
5	4
6	5

If Maria rolls the cube another time, which number is she **most** likely to roll?

* A. 4

B. 6

C. 10

D. 36

Conduct simple probability experiments, record the data, and draw conclusions about the likelihood of possible outcomes (roll number cubes, pull tiles from a bag, spin a spinner, or determine the fairness of games). (2006=# 16,18,23,34)

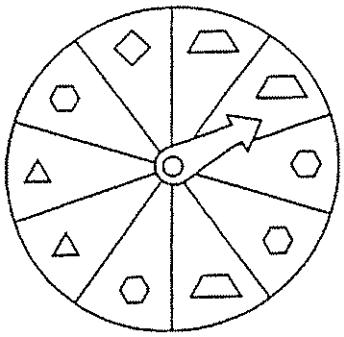
16. Carl has a bag of fruit-flavored candy that contains the following pieces:

- 3 grape
- 5 strawberry
- 1 cherry
- 2 watermelon

Carl pulls a piece of candy from the bag without looking. What is the probability that he picks a watermelon-flavored piece?

A. 1 out of 11
* B. 2 out of 11
C. 3 out of 11
D. 5 out of 11

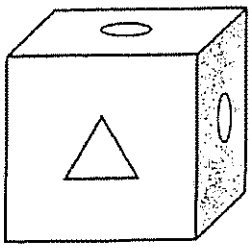
18. Patty is playing a shape game with the spinner below.



What is the probability that the pointer will land on a hexagon on her next spin?

A. 1 out of 10
B. 2 out of 10
C. 3 out of 10
* D. 4 out of 10

23. On the cube below, the shapes on the faces **not** showing are triangles.



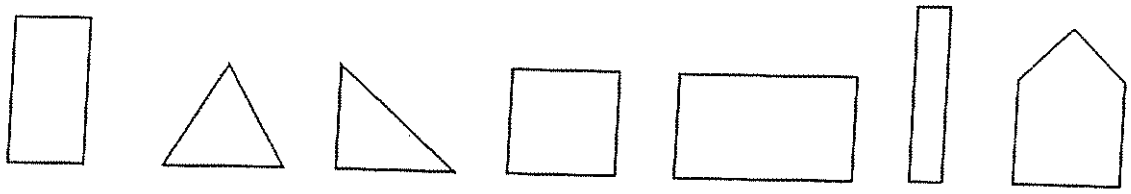
What are the chances the cube will land on a triangle when rolled?

A. 1 out of 3
B. 2 out of 6
* C. 4 out of 6
D. 6 out of 4

34 on next page

Conduct simple probability experiments, record the data, and draw conclusions about the likelihood of possible outcomes (roll number cubes, pull tiles from a bag, spin a spinner, or determine the fairness of games). (2006=# 16,18,23,34)

34. Brad has a bag containing the shapes below.



Which statement **best** describes the outcome if Brad chooses a shape from the bag without looking?

A. He is most likely to choose a triangle.

* B. He is most likely to choose a rectangle.

C. He is least likely to choose a rectangle.

D. He is equally likely to choose triangles and circles.

5th Grade Math
BENCHMARK

RELEASED ITEMS
COMPILED BY SKILL

2006-2007

COMPILED BY BARBARA BROWN