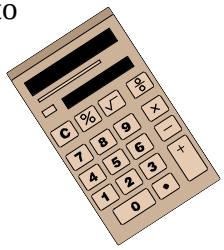
Math Trivia

In the metric system, units smaller than a meter have Latin prefixes: *deci* means 10; *centi* means 100; *milli* means 1,000. Units larger than a meter have Greek prefixes: *deka* means 10; *hecta* means 100; and *kilo* means 1,000.

Using Numbers in Powerful Ways

Calculators can be valuable problem solving tools. Use your calculator to complete this activity.



Multiply 11 by some two-digit numbers where the sum of their digits is less than 10. Record your results and make a conjecture.

Explore what happens when the sum of the digits is not less than 10. Make another conjecture.

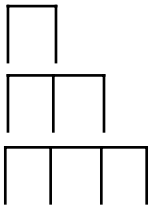
(1.03)

Investigations

(5.01)

The ability to recognize patterns is a part of mathematical power. Solve this first by modeling each term and then by making a chart to show the relationship of the number of the term with the total toothpicks.

Toothpick Fences



First Term

Second Term

Third Term

How many toothpicks in the fourth term? the tenth term? Use a chart (or build) to find how many in the 20th term. Predict for the 50th term. Explain how you determined the number of toothpicks for the 20th term. How many are needed for the 100th term? for the nth term?

Fraction Fun

(1.02b.c)

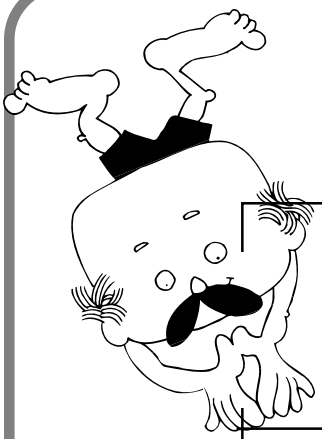
Without calculating, how can you prove these are <u>not</u> true statements?

$$\frac{2}{3}+\frac{4}{5}<\frac{7}{10} \qquad \frac{3}{8}-\frac{1}{6}=\frac{2}{2}$$

For Further Study

Use five 9's to make a <u>three digit</u> palindromic number.

(1.03)



Dive into Fraction Nim

2	**2**	**2**	**2**	**2**
1	**1**	**1**	**1**	**1**
$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
$\frac{2}{4}$	$\frac{2}{4}$	$\frac{2}{4}$	$\frac{2}{4}$	$\frac{2}{4}$
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$

Guidelines for play

1. Choose one target number greater than 6 and less than 20. Write the target number down.
2. Players take turns placing a counter on a number in the chart, adding that number to the running tally. (Mental Math - no pencil and paper!)
3. The winner is the player who reaches the target number.

Points to ponder

1. Are these successful strategies similar to the ones you used in Addition Nim?
2. Is the game more challenging if, when a player covers a number, the number can not be used again? Play the game using markers on the numbers used.

(1.02a)

Keeping Skills Sharp

1. 2008 ÷ 4

2. $14.28 - $8.09

3. 8 x 4 x 7

4. 27 x 8 = 8 x ___

5. Write this in standard form: 6 thousands
   4 tens
   7 ones
   8 hundreds

6. 5000 - 2064

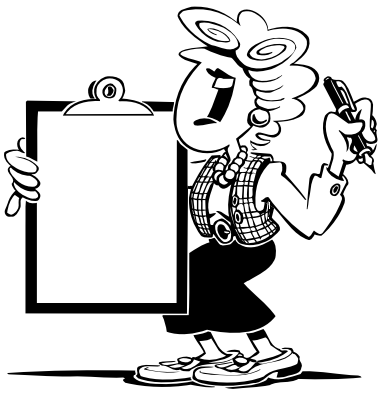
7. What number is missing? 63, 56, 49, ____, 35

8. Mike scored 16 points in the game. His team scored a total of 58 points. Their opponents lost the game by 6 points. How many points did the rest of Mike's team score?

Solve this!

(1.03, 5.01)

What number will be in the ones place of the product when one hundred 7's are multiplied?



To the Teacher

Grade 5
WEEK 13

Using Numbers in Powerful Ways: If the two-digit number chosen is AB, then multiplying by 11 will give a three-digit number with hundreds digit, A, tens digit, A + B, and ones digit B.

Example: 23 x 11 = 253 (2 = A and 3 = B)
In the product 253, the ones digit is the same as B (which is 3). The tens digit is the same as A + B (which is 5), and the hundred's place is the same as A (which is 2).

If a + b > 9, then the 1 carries over to be added to the hundreds column.
Example: 89 x 11 = 979
8 = A and 9 = B. In the product 979, the ones digit is the same as B (which is 9). When you add A + B you get 17. The 7 in the 17 becomes the tens place in the product and the 1 is added to A (which is 8) to become the digit in the hundreds place.

For Further Study: $\sqrt{9} \times 9 \times 9 - 9 \div 9 = 242$ Square roots are not in grade 5 but students will have explored the square root key on their caculators. If not, here's a chance to do so.

Solve This: 7
Hint: After only multiplying 7 by itself 8 times, the students should see a pattern. The ones place repeats 9, 3, 1, 7, 9, 3, 1, 7. Since four numbers repeat, and 4 goes into 100 twenty-five times, there will be 25 of each digit -- ending with the 7 in the ones place.
The solution is 7.

Mental Math

Directions to Students: Number your paper from 1 to 10. Write your answers as the questions are called out. Each question will be repeated only once.

1. (6 x 8 - 3)÷ 5 x 9
2. (15 - 8) x 5 + 10
3. Expanded form for 345,976
4. Estimate the difference: 728 - 460
5. Factors of 28
6. A polygon which could not have parallel sides
7. Grams in 1/2 kilogram
8. Yards in 9 feet
9. 5 quarters, 3 dimes = ? nickels
10. Area of a rug 3 ft. by 4 ft.

Keeping Skills Sharp

1. 502
2. $6.19
3. 224
4. 27
5. 6847
6. 2936
7. 42
8. 42 points

Math Trivia

In ancient Egypt, a carpenter could not misplace his ruler because it was attached to his body. The units of length he used were on his arm. The *cubit* was the distance from the tip of his elbow to the tip of his middle finger. The *digit* was the width of one finger. These units fit together like this: Four *digits* equal one *palm*. Seven *palms* equal one *cubit*.

The Roman *foot* was two-thirds of a *cubit*. It was divided into twelve thumbnail breadths, later called *inches*.

Using Numbers in Powerful Ways

Research geodesic domes and the man who first popularized them, R. Buckminster Fuller.

Build a geodesic dome that can cover your math book using light-weight materials such as straws, toothpicks, clay, mini-marshmallows or gumdrops. Experiment first with making small domes. Then plan your large design.

(3.01)

Investigations

The investigation on the following page builds on understandings explored in Week 10. The task, however, is not to find the sum of the angles of the pattern block pieces but to figure out the measure of each angle.

There are many different ways to approach this task - no one way is better than the others. Discuss (agree) until your group reaches consensus about the measures of the angles. Groups of 2 to 4 should work together, but each student must write a description of how they figured out the measurements.

(3.02)

Decimal Fraction Fun

Who am I?

I'm less than 0.9, greater than 0.7 and 0.05 from 0.87.

We're greater than 0.75, less than 1.2 and 0.04 from 0.92.

I'm less than 0.4, greater than 0.12 and 0.07 from 0.35.

(1.01c, 1.02)

For Further Study

Find patterns that exist in nature and report on your findings.

(5.01)

Pattern Block Measures

This team consists of:

_____

_____

_____

_____

Task: There are 6 blocks in a set of pattern blocks. Your job is to figure out the measure of each angle of each piece. Trace the pieces and write a brief description of how you figured out the measure of each angle. **You may not measure the angles with your protractor.** Your only tools are the pattern blocks themselves, pencil and paper, and your good thinking!

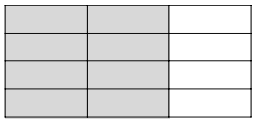
Be prepared to defend your answers.
You will probably need more paper for recording.

(3.02)

Keeping Skills Sharp

1. _____ ÷ 6 = 500

2. Write 2 fractions for the shaded parts:



3. Write the number thirty-five thousand, eight

4. Sandra bought four record albums. They cost $9.89 each. How much did she spend?

5. What is the total amount of money?
   3 quarters 4 dimes 8 pennies 3 nickels

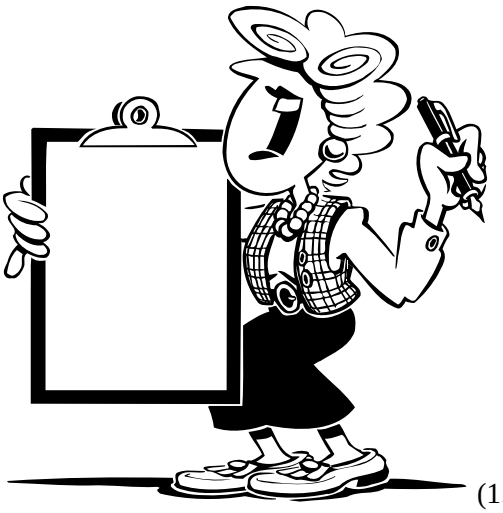
6. 2371 - 1465

7. The bus driver drove 49 miles this morning. His route is 123 miles long. How much further must he drive to finish his route?

8. 2401 = B x B x B x B B = ?

Solve this!

My bag contains 32 nuts - only pecans, walnuts, and peanuts. There are twice as many walnuts as pecans. There are 2 more peanuts than walnuts. Exactly what is in my bag?



(1.03)

To the Teacher

Grade 5
WEEK 14

Solve This: 6 pecans, 12 walnuts, and 14 peanuts

Mental Math

Directions to Students: Number your paper from 1 to 10. Write your answers as the questions are called out. Each question will be repeated only once.

1. 7 + 12 + 5 ÷ 3
2. 25 - 10 ÷ 3 x 9
3. Word form for 1/3
4. How many tens in 6,058
5. First four multiples of 7
6. Sides on a nonagon
7. Meters in 400 centimeters
8. Cups in 6 pints
9. 2 quarters, 3 dimes, 4 pennies
10. One minute less than quarter past 3

Keeping Skills Sharp

1. 3000
2. 8/12 4/6 2/3
3. 35,008
4. $39.56
5. $1.38
6. 906
7. 74
8. 7

Math Trivia

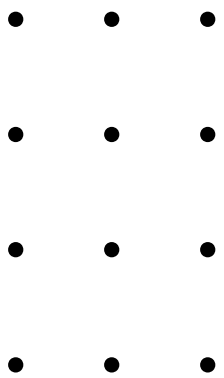
Under King Edward II of England, the *inch* was the length of three barleycorns placed end to end.

In 16th century England, the *rod* was the length of the left feet of sixteen men in line as they left church on Sunday morning.

King Henry I of England decreed that a *yard* was the distance from the tip of his nose to the end of his thumb.

Investigations

Draw 12 points in this arrangement:



How many rectangles can be drawn so that the vertices are <u>four</u> of these points?

(3.01)

Using Numbers in Powerful Ways

Michael fenced a square plot of land. He used 1000 fence posts on each side. How many fence posts did he use?

Write an explanation showing the strategy used to solve this problem. Score your solution using a rubric.

(1.03)

(1.01)

Decimal Fraction Fun

What number is half-way between 0.7 and 0.8?

What number is half-way between 0.07 and 0.08?

What number is half-way between 0.007 and 0.008?

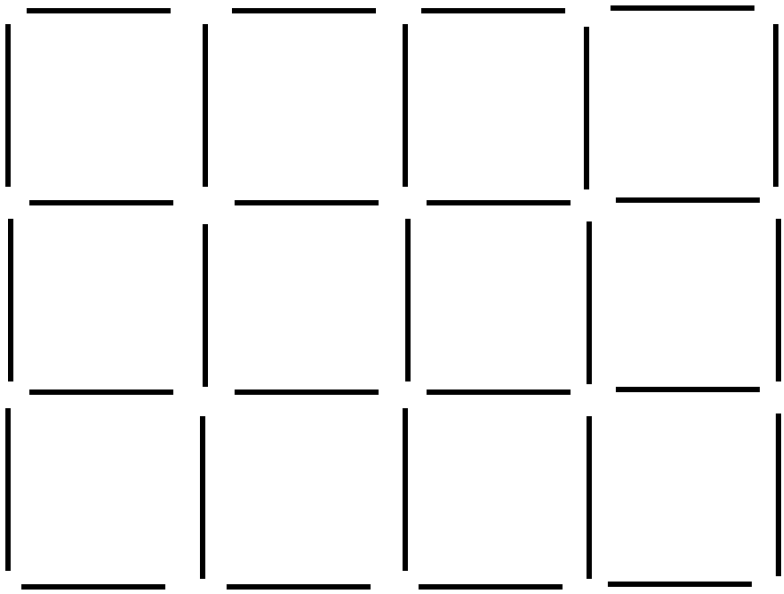
For Further Study

1. Enter 21 into a calculator
2. With a partner take turns subtracting 1, 2, or 3 each turn.
3. No skipping turns
4. The winner subtracts the last number to make the calculator display 0.

(1.03)

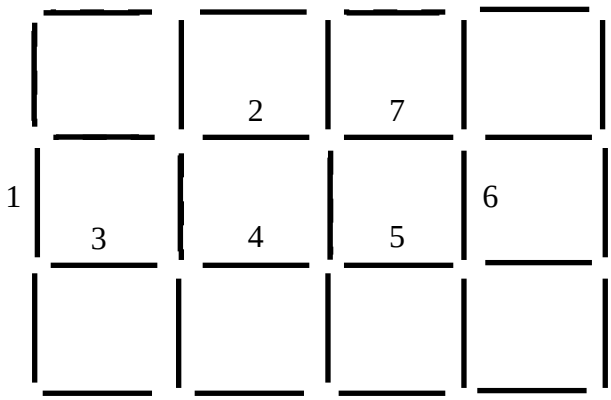
The Game of SQUAYLES

Arrange 31 toothpicks in this configuration. Take turns picking up sticks. The winner is the person taking the last toothpick.



Directions: Players may pick up as many toothpicks as he or she wants as long as they are adjacent to the last toothpick picked up.

Example: Toothpick 1 and 2 could not be picked up because they are not adjacent. But if you pick up 1, 3, 4, 5, 6, 7 then you could get toothpick 2.

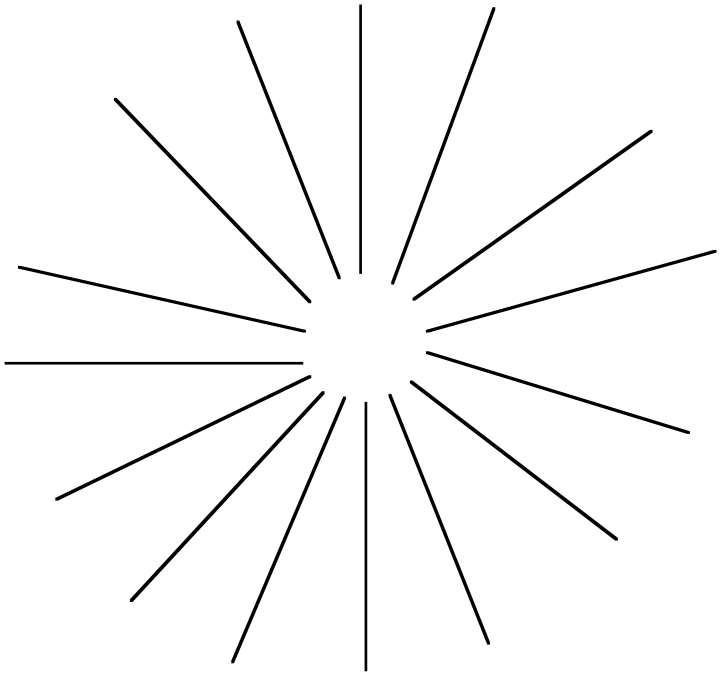


Idea from *More Joy of Mathematics* by Theoni Pappas.

Campfire Nim

Place 15 toothpicks in a campfire arrangement like the one pictured at the right.

Players take turns removing 1 or 2 sticks from the campfire at a turn. The object is to be the player who removes the last stick.



Special rule: When removing 2 sticks from the campfire (toothpicks), they must be adjacent.

Questions: Is there a strategy that could force a player to remove only one stick at a turn? When some sticks have been removed, the ones remaining on either side of an empty space are not considered adjacent. How does this rule affect the game?

Planning Ahead For A Mathematics Project

A mathematics project is the whole process of solving a problem, exploring an idea, or applying a mathematical principle.

The process begins with choosing and planning a topic of interest to the student, investigating (studying, experimenting, researching, . . .) the topic, exhibiting, and writing a report.

Choosing A Project

Many project ideas are generated from interesting classroom examples and problems. A student may enjoy extending the problem to his/her highest skill level.

Some examples of ideas which can be explored are:

- Original games, puzzles, number theory, . . .
- Arithmetic, algebraic, or geometric explorations and experiments
- Applications of mathematics in navigation, economics, music, hobbies, . . .
- Concrete or visual models

Project Evaluation

Judging is based upon:

1. Written documentation must include:
   a. Origin of idea
   b. An outline of the development of the project
   c. Discussion of mathematical concepts investigated
   d. References used including names of resource people
2. Oral presentation must include:
   a. Clear and well-organized discussion of the involved mathematical concepts
   b. Response to evaluator's questions
3. Demonstration of exploration beyond the student's regular class concepts
4. Attractiveness of presentation

Notes

1. Size of mathematics projects is restricted to a maximum display space of 122 cm wide (side to side), 76 cm deep (front to back), 198 cm in height (from table top), or 274 cm in height (from floor to top).
2. Keep a written record at every stage of the project.
3. Due date for project is _____.

Be as creative as you wish!

Keeping Skills Sharp

1. Use < or >: 0.17 ◯ 0.071

2. 298 x 56

3. 15 - 3 x 2

4. 16 + n = 43

5. How many tens in 1263?

6. 4.2 + 39.14 + 0.69 + 18

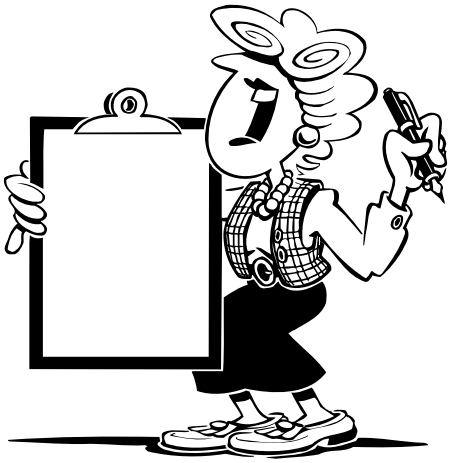
7. Which is a better buy? 4 for $8.04 or 5 for $10.25

8. In a half hour's worth of television programming there are about 7 minutes of commercials and 7 minutes of credits. How many minutes of regular programming would a viewer see in three hours of television?

Solve this!

How many gifts are given altogether in the song "The Twelve Days of Christmas"?

How many birds were given?



(1.03, 5.01)

To the Teacher

Grade 5
WEEK 15

Using Numbers in Powerful Ways: 3996 posts

Solve This:
The total number gifts given by the 12th day is (364). Complete the table to discover how many gifts were given on each of the 12 days of Christmas. 184 of these gifts are birds!

Day	Total Gifts
1	1
2	3
3	6
4	10
5	15
6	21
7	28
8	36
9	45
10	55
11	66
12	78

Extra Challenge:
Can the students discover the rule to determine how many gifts were given for any day (nth).

$$\left(\frac{n\,(n+1)}{2}\right)$$

Mental Math

Directions to Students: Number your paper from 1 to 10. Write your answers as the questions are called out. Each question will be repeated only once.

1. (52 + 12) ÷ 8 x 5
2. (39 + 6 + 4) ÷ 7
3. Word form for 1/2
4. Round to nearest hundred: 7,429
5. Prime numbers between 20 and 30
6. The name of the common point in an angle
7. Milliliters in one liter
8. Ounces in one pound
9. Quarts in 6 pints
10. A quarter and 2 dimes less than $1.00

Keeping Skills Sharp

1. >
2. 16688
3. 9
4. 27
5. 126
6. 62.03
7. 4 for $8.04
8. 96 minutes