Math Trivia

On April 25, 1990, the space shuttle *Discovery* launched the Hubble Space Telescope. Because scientists subtracted instead of adding to correct an error, the telescope's aim was thrown off by trillions of miles. *Challenge:* Find out what has happened to the Hubble Space Telescope since 1990.

Using Numbers in Powerful Ways

Mark Stephens has designed a mental math/algebra activity called calculator conservation challenge. You will need the "Challenge" sheets to participate in the activity. Complete games 1 and 2 on Monday, then 1 each day to conclude on Friday. Here are the rules:

1. Students begin with $90. At game 5, they are awarded $30 more for perseverance. The object of the game is to complete all 6 pages owing the teacher as little money as possible.
2. Students are <u>not</u> allowed to compute on paper nor write anything except their answers and the explanation of the process they used. When variables are used, students would show operations ($x + y$).
3. During <u>each</u> game, students may use their calculators for the following fees: **First, second, and third uses cost $5 each; fourth use costs $10; fifth use costs $15; sixth use costs $20.** Mental math is free. (Enter 0 for cost of mental math.)
4. Correct papers, add costs based on calculator use, and add a $5 penalty for each incorrect answer.

(1.03)

Investigations

Do all seeds sprout in the same number of days? What factors influence the growth of plants? How long from the time plants sprout until they bloom? What do you know about plant growth?
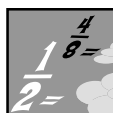
What would you like to learn? With your partner, design a botany investigation that will extend for 8 weeks.

Botanists use classification all the time. Investigate the taxonomies they use.

As you carry out this project, keep a list of all of the mathematics that you use.

(4.03)

Decimal Fraction Fun

Find numbers, M and N, to make these statements true:

1) $2M > 4.5 > 3N$
2) $.004 < 2M < 1.35$
3) $2N > 5 > 4$

(1.01c, 5.02)

For Further Study

Use each of the digits (0-9) once and only once to form an addition problem with the sum of twenty-five and one-half .

(1.02)

The $90 Calculator Conservation Challenge
(the "C.C.C.")

GAME #2

Starting total = _____ (from game 1)

	Answer	Cost
Question 1: 357 x 842	_____	_____
How: _____		
Question 2: 42 x 357	_____	_____
How: _____		
Question 3: 800 x 357	_____	_____
How: _____		
Question 4: 358 x 842	_____	_____
How: _____		
Question 5: 357 x 800	_____	_____
How: _____		
Question 6: 357 x 42	_____	_____
How: _____		
Costs of calculators _____		

Penalties for incorrect answers _____   Ending Total = $ _____

The $90 Calculator Conservation Challenge
(the "C.C.C.")

GAME #1

Starting total = $90

	Answer	Cost
Question 1: 328 times 684 is	_____	_____
How: _____		
Question 2: The product of 849 and 0 is	_____	_____
How: _____		
Question 3: Multiply 815 and 9774.	_____	_____
How: _____		
Question 4: 684 x 328 = ?	_____	_____
How: _____		
Question 5: 9774 x 815 = ?	_____	_____
How: _____		
Question 6: One times 3 million is	_____	_____
How: _____		
Starting amount less costs _____		

Penalties for incorrect answers _____   Ending Total = $ _____

The $90 Calculator Conservation Challenge
(the "C.C.C.")

GAME #3

Starting total = $____ (from game 2)

	Answer	Cost
Question 1: M plus N	____	
How:		
Question 2: M times N	____	
How:		
Question 3: N plus M	____	
How:		
Question 4: Zero plus N	____	
How:		
Question 5: (900 + 72) times M	____	
How:		
Question 6: (8400 + 73) times (900 + 72)	____	
How:		

Costs of calculators ____

Penalties for incorrect answers ____   Ending Total = $ ____

The $90 Calculator Conservation Challenge
(the "C.C.C.")

GAME #4

Starting total = $____ (Need a loan yet?)

	Answer	Cost
Question 1: 6675 times A	____	
How:		
Question 2: (B + C) times 6675	____	
How:		
Question 3: A minus C	____	
How:		
Question 4: 6675 divided by B	____	
How:		
Question 5: (6675 x B) + (6675 x C)	____	
How:		
Question 6: (599 x 681) - (681 - 599)	____	
How:		

Costs of calculators ____

Penalties for incorrect answers ____   Ending Total = $ ____

The $90 Calculator Conservation Challenge

(the "C.C.C.")

GAME #6

Starting total = $ _____ *My collector weighs 350 pounds and his nickname is Crusher. He'll be visiting you soon.*

	Answer	Cost
Question 1: N divided by M	——	——
How: _____		
Question 2: M times N	——	——
How: _____		
Question 3: Zero divided by M	——	——
How: _____		
Question 4: One x M x N	——	——
How: _____		
Question 5: Ten times M	——	——
How: _____		
Question 6: One hundred times N	——	——
How: _____		
Cost of Calculator		_____
Penalties for incorrect answers _____		Total = $ _____

The $90 Calculator Conservation Challenge

(the "C.C.C.")

GAME #5

Starting total = $ _____ + $30 *(I offer low monthly payments if you need more money!)*

|	Answer	Cost
Question 1: A + B	——	——
How: _____		
Question 2: A x B	——	——
How: _____		
Question 3: B - A	——	——
How: _____		
Question 4: B x A	——	——
How: _____		
Question 5: 100 times A	——	——
How: _____		
Question 6: A x 100 + A	——	——
How: _____		
Costs of calculator		_____
Penalties for incorrect answers _____		Total = $ _____

1. $6 \times \dfrac{1}{3} =$

2. $\dfrac{7}{8} + \dfrac{2}{8} =$

3.   Write eight thousand twelve in standard form.

4.   26,815 + 27,940 is about how many thousands?

5.   Mrs. Parker bought 2 gallons of milk for $2.17 each. Her change from $10.00 would be how much?

6.   60 x 75

7. $\dfrac{576}{6}$ means: 6 x 576 or 576 ÷ 6?

8.   Tammy bowled 6 games. Her scores were 124, 100, 113,138, 135, and 134. What was her median score?

Solve this!

The Titanic hit an iceberg at 11:59 a.m., April 15, 1912. The ship sank 7,260 seconds later. What time did the Titanic sink?

(1.03)
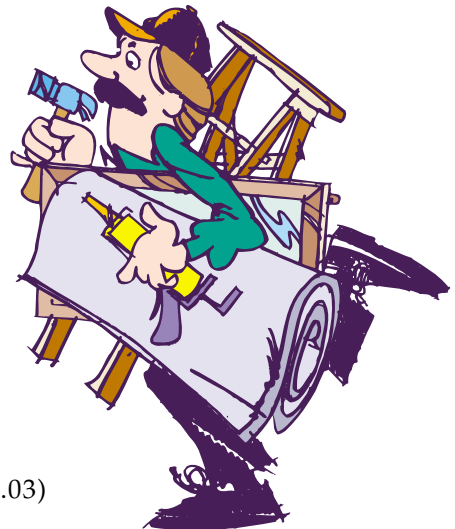
To the Teacher

This week's focus is algebra readiness and equations.

For Further Study: 9 + 8 + 7 + 5/10 + 3/6 + 2/4. Hint to give students: Fractions will need to be used and two digits can be put together to form a larger number.

The **Investigations** activity may be used during science class.

Solve This: 2 a.m.

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. (9 x 4 + 6) ÷ 7
2. (7 x 5 - 3) ÷ 4 x 7
3. Write as a fraction and a decimal: thirty-three hundredths
4. Round to nearest whole number: 2.8
5. First 4 square numbers
6. A quadrilateral with only one set of parallel lines
7. Term for 1,000 liters
8. Pounds in one ton
9. Minutes in 5 1/2 hours
10. Number of stars on 3 American flags

Keeping Skills Sharp

1. 2
2. 1 1/8
3. 8,012
4. 55
5. $5.66
6. 4,500
7. 576 ÷ 6
8. 129

Math Trivia

Archimedes lived over 2200 years ago. He discovered that if you fill a glass of water to the very top and put a small boat on the water, the water that spills over the side of the glass will weigh what the boat weighs. Archimedes called the spilled water *displacement*. Today, ships are weighed by their displacement of water.

Using Numbers in Powerful Ways

Do you see a pattern developing in the buildings below? Use your findings to predict the number of blocks needed for the 50th and nth building.

Building #1	Building #2	Building #3	Building #4
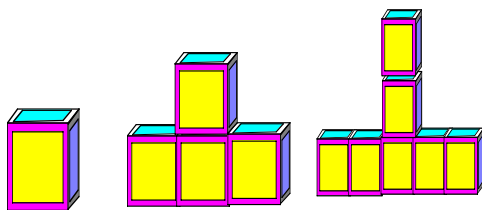
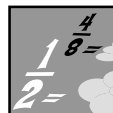| Build	Blocks
1	1
2	4
3	7
4	
5	
6	
50	
n	

(5.01)

Investigations

Complete the newspaper scavenger hunt. Bring to class on Friday with items pasted on plain paper and clearly labeled.

Take a page of any newspaper (front page, sports page, advertisements, etc.).

Cut out all math used on that paper. Bring in the page so everyone can see what happened to the page after your cutting.

Fraction Fun

$$\frac{4}{5} < \frac{7}{10} < B$$

$$\frac{14}{2} > C > \frac{12}{5}$$

What are some possible values for B and C?

For Further Study

Find out how Archimedes discovered that the king's crown was not solid gold.

Modeling Large Numbers

Calling

"A Quarter of a Million"

We live in a world of numbers, but do we really have a concept of what big numbers mean?

For example, *a quarter of a million* is 250,000. In one part of the city of Cairo, Egypt, 250,000 people live in one square mile. Compare this to the Raleigh area where approximately 250,000 people live in 94 square miles. Some houses cost $250,000. If you travel around the earth at the equator 10 times and you travel about 250,000 miles.

In the next few weeks we are going to focus on finding ways to model and demonstrate how many 250,000 is. The task for you and your partner will be to create some type of display to help our class understand how much *a quarter of a million* is. We will begin with a class discussion to create guidelines for our project and to brainstorm ideas.

(1.01)

Keeping Skills Sharp

1. What is the smallest 3-digit odd number you can make with 2, 3, and 4?

2. (3 x 4) x 2 = _____ x (4 x 2)

3. What is the product of 4 and 18 ?

4. Wilson makes $32.25 a day. How much does he receive in a 5-day week if $8.29 with taxes is deducted for this week.

5. Think of a whole number. Multiply it by 2. Is the answer and odd or an even number?

6. 4560 ÷ 6

7. 5 pounds = _____ ounces

8. What are all the factors of 30?

Solve this!

Logic problems are fun to solve and to create. Here is one to get you started: *Four married couples are eating together at Hardees. The husbands are: Dwight, Fred, Michael, and Tomas. The wives are: Anna, Belinda, Cara, and Pamela. Anna is married to Michael. Cara is Fred's older sister. Tomas and Cara were once engaged but they did not marry. Pamela has four brothers, but her husband is an only child. Who is married to Belinda?*

What are you trying to find out? List what you know from the story. What is told to you and what have you inferred? Try a chart or a diagram if you have trouble finding a solution.

(1.03)

Investigations: On Monday pass out copies of the "Nose for News" scavenger hunt found in the Blackline Masters section. Tell students that both sections of **Making Connections** will be due on Friday.

Students may need to use blocks to help with completing the table for **Using Numbers in Powerful Ways**. The pattern of 3N-2 should be discovered by some of your students. Chart is:

Solve This: Fred

Build	Blocks
1	1
2	4
3	7
4	10
5	13
6	16
•	•
•	•
50	148
•	•
•	•
n	3n-2

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. 5 x 5 + 42 ÷ 7
2. 4 x 4 + 5 - 8
3. In words: sum of 1/2 and 1/4
4. Nearest dollar: $235.89
5. Is 2/3 closer to 0 or 1?
6. Type of angle found in a square
7. Centimeters in 3 1/2 meters
8. Quarts in 5 gallons
9. 12 quarters, 2 dimes, 1 nickel
10. Change for $2.50 from $10.00

Keeping Skills Sharp

1. 243
2. 3
3. 72
4. $152.96
5. even
6. 760
7. 80 ounces
8. 1, 2, 3, 5, 6, 10, 15, 30

Math Trivia

The abacus was invented about 3,000 B.C. In 1642 adding machines were invented and in 1888 ball point pens were developed. The first airplane flight was in 1903 and in 1946 electronic computers were developed. Disk storage for computers was developed in 1963, floppy disks developed in 1970, and pocket calculators in 1971. In 1981, personal computers came on the market. What came next?

Using Numbers in Powerful Ways

Alice's Adventures In Wonderland is filled with mathematics. . . .

1. Suppose you were to shrink as Alice did and suddenly found yourself only 10 inches tall.
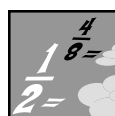
   In groups, create a room with appropriate size furnishings for you and your friends. Create your room using construction paper, cans, and other scraps.

2. Suppose the Cheshire Cat's grin was 10 inches wide. Design a paper cat in proportion to his grin. What do you have to know to do this?

3. Read *Alice In Wonderland* and design a mathematical investigation for another group.

Research the circumstances around which the books were written.

(1.03)

Investigations

Use a 3 x 3 grid and numbers 1 - 9 to make a Magic Square 19!

Remember use the digits 1-9 only once! Each row, column and diagonal equals 19.

(1.03)

Fraction Fun

Use estimation to find the whole number is closest to each sum.

$$\frac{7}{5} + 3\frac{1}{3} \quad ; \quad \frac{3}{4} + 1\frac{5}{8} \quad ; \quad \frac{1}{4} + 2\frac{3}{8}$$

(1.02b)

For Further Study

Explain why each number in this set is different from the rest.

{25, 51, 53, 55, 65, 93, 135}

(1.03)

Magic Square Investigations

Name _____

1. To the right is a magic square developed by Benjamin Franklin. What is the sum of his magic square? _____

52	61	4	13	20	29	36	45
14	3	62	51	46	35	30	19
53	60	5	12	21	28	37	44
11	6	59	54	43	38	27	22
55	58	7	10	23	26	39	42
9	8	57	56	41	40	25	24
50	63	2	15	18	31	34	47
16	1	64	49	48	33	32	17

2. Claude Bragdon, an architect, discovered that magic squares could create pleasing patterns. If you connect the center of each square in the magic square in numerical order, a symmetrical design is created. Try this. Place a dot in the center of each of the 64 squares. Then connect the dots starting with 1. **Use a straightedge for accuracy.**

3. If you look at the numbers in Franklin's magic square in 4 groups (1-16, 17-32, 33-48, 49-64), what do you notice about the arrangement of these?

4. Create your own 3 x 3 magic square counting by 0.2 and using numbers 0.2 through 1.8.

5. *Challenge:* Create a 4 x 4 magic square using numbers 1 - 16. (Research the artist Albrecht Durer. He included a magic square in his engraving entitled "Melancholy.")

(1.03, 3.03)

Keeping Skills Sharp

1. $638.19 + $29.50 + $8.75

2. 45,002 - 6,957

3. What is 36 hundreds?

4. From April 1 to November 1 is how many months?

5. Alan was born on May 15. Georgia was born 3 weeks earlier.
   What is Georgia's birthday?

6. What is the product of 3 and 5 multiplied by the product of 4 and 2?

7. $\frac{28}{3} = ?$

8. Which is a better buy: 3 pounds for $3.87 or 5 pounds for $6.65?

Solve this!

Terrell gave half his marbles to Lee. Then he gave two-thirds of the remaining ones to Tom. If Terrell ended up with 10 marbles, how many did he have when he started?
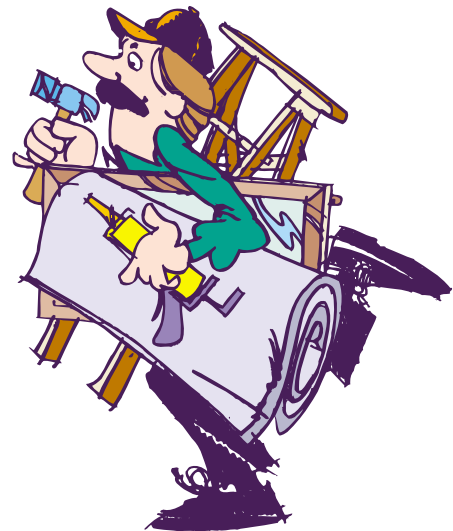
For Further Study:

Possible answers:

25 is the only perfect square

51 is divisible by 17

53 sum of the digits is 8

55 is the only number with repeated digits

65 contains 2 consecutive digits; 65 is a multiple of 13

93 is the only number that does not contain a 5; the ones digit squared equals the tens digit

135 is the only three digit number listed in the group.

As an extension, ask students to come up with their own challenge similar to this.

Solve This : 60 marbles

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. $24 \div 8 \times 9 + 40$
2. $8 - 1 \div 9$
3. Write in mixed number and improper form seven sixths
4. Round to nearest dollar: $609.99
5. Smallest multiple of 4 and 8
6. Figure with 2 sets of parallel lines, no right angles
7. Grams in 2 kilograms
8. Ounces in 1 1/2 pounds
9. 24 quarters
10. Length of side if perimeter of square is 24

Keeping Skills Sharp

1. $676.44
2. 38,045
3. 3,600
4. 7 months
5. April 24
6. 120
7. 9 1/3
8. 3 for $3.87