Math Trivia

Anno's Hat Tricks by Akihiro Nozaki and Mitsumnno Anno is at first glance an entertaining children's book. But don't be fooled! It is an introduction to binary logic. Read the book, study the notes at the end, and then read the book again!

Investigations

Cut your own tangrams using steps given to you by your teacher. Discuss the relationships of the tangram pieces with your group or partner. Try to create puzzles for your classmates using your pieces.

Try the **Tangram Triffles** sheet on the relationship of the tangram pieces.
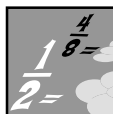
(1.02b, 3.01)

Using Numbers in Powerful Ways

What is the greatest 3-digit number that contains **no** even digits and is **not** divisible by 3?

(1.01b, 1.03)

Decimal Fraction Fun

Curly, Moe, and Larry are planting a garden. Curly planted 0.432 of the garden, Larry planted 0.209 of the garden, and Moe planted the rest. How much of the garden was planted by Moe?

(1.02)

For Further Study

How can you arrange four 6's to make 42?
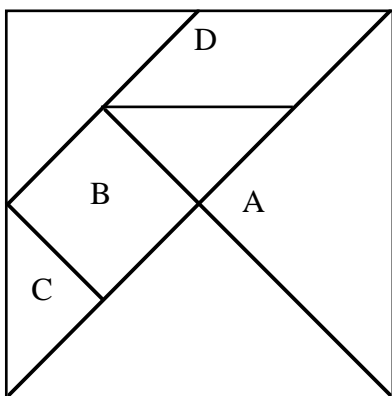
6   6   6   6

(1.03)

Tangram Triffles

Names: _____

(1.02b, 3.01)

_____

Complete these charts. Be certain both partners agree with the answers placed in the charts.

If the entire tangram = 1, then . . .

Piece	Fraction Name	Decimal Name
A		
B		
C		
D		
Entire Figure	1	1

If part D is equal to 5/10, then. . .

Bonus: Suppose the value of the entire tangram is $32.00. What would be the value of the middle-sized triangle?

_____

How did you know this?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
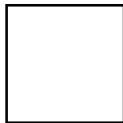
Piece	Fraction	Decimal
A		
B		
C		
D	$\frac{5}{10}$	0.5
Entire Figure		

If part B is equal to 1, then . . .

Piece	Fraction	Decimal
A		
B	1 or $\frac{1}{1}$	1 or 1.0
C		
D		
Entire Figure		

Keeping Skills Sharp

1. Which is a better buy? 4 for $6.40 or 6 for $9.00

2. $70.37 - $18.19

3. $(13 + 12) \div 5 + 4$

4. Find the perimeter of this square ☐ 6

5. Use < or >:   5/8 _____ 5/12

6. Cara can get a driver's license at 16. She is 11 now. How long must she wait?

7. What numbers must replace each dot?
```
    8 • •  6
  - • 2 4  1
  ─────────
    3 1 9  •
```

8. Measure this sheet. What are the dimensions in inches and in centimeters?

Solve this!

Kelsea has 6 coins. One-third of her coins are dimes. The value of the dimes is one-fourth the value of the coins. How much money does Kelsea have?
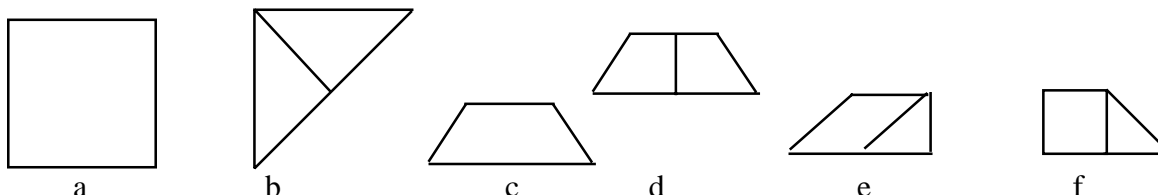
(1.03)

To the Teacher

Investigations:

If students have never cut their own tangrams, use the following steps to guide them through the process.

Provide various size pieces of paper for students to create their own tangram sets through paper-folding. Cut and fold as instructed below:

a.   Fold square into 2 large congruent triangles. Cut apart on the fold.

b.   Fold both large triangles into two right triangles. Cut one of them on the fold and set these two pieces aside.

c.   Fold the second large triangle so that the right angle corner touches the midpoint of the base. Unfold and cut the triangle from the trapezoid. Set the triangle aside.

d.   Cut the trapezoid in half (on the fold).

e.   Fold one of the quadrilaterals into a parallelogram and a right triangle. Cut along the fold.

f.   Fold the second quadrilateral to create asquare and small right triangle to complete the set.

You may wish to read *Grandfather Tang* and have students work with partners to reproduce the figures from the story.

Using Numbers: 997

For Further Study: (6 + 6÷6) x 6

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.   (55 + 9) ÷ 8 x 3
2.   (27 + 8) ÷ 7 x 4
3.   Write twenty-seven fifths as a mixed number
4.   Round to nearest thousand: 5,801
5.   What number is a factor of every number?
6.   Number of lines of symmetry in the letter H
7.   Kilometers in 3,000 meters
8.   Freezing point - Fahrenheit
9.   Number in a dozen and a half
10.   Perimeter of pentagon 6 ft. on each side

Keeping Skills Sharp

1.   6 for $9.00
2. $52.18
3.   9
4.   24
5.   >
6.   5 years
7.   5, 4, 3, 5
8.   5 by 7 in.; 12.5 by 17.5 cm
or other depending on the paper used.

Math Trivia

Charles Lutwidge Dodgson (1832 - 1898), better known as Lewis Carroll, author of *Alice's Adventures in Wonderland* and *Through The Looking Glass*, was a mathematician who developed many puzzles.

Did you know that the symbol **0** first appeared in Hindu writings around 870 A.D.? The original Hindu word *sunya* meant empty or void.

Investigations

You will need a centimeter ruler, and a dime, a nickel , and a quarter. With a partner or in groups of four, answer the following questions. *Groups need to share and come to consensus about answers.*

1. Which would be more valuable: a line of quarters 1 km long or a line of dimes 2 km long?

2. What would be the value of a stack of quarters the height of your teacher?

3. How long would the lines need to be to have the same value of dimes as nickels? Is there more than one possible answer?
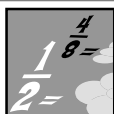
(1.03, 2.01)

Using Numbers in Powerful Ways

To encourage Bobby to work his math problems correctly, his dad said he would pay him 10¢ for each correct answer and fine him 5¢ for each incorrect answer. If he received a dime after doing 25 problems, how many did Bobby get right?

(1.03)

Fraction Fun

Write two numbers that are equivalent to each of the following:

$$\frac{5}{4} \qquad \frac{7}{3} \qquad \frac{9}{2}$$

(1.01)

For Further Study

Is the diameter of a penny closer to 2 m, 20 cm, or 2cm?

(2.01)

Exploring the Mobius Strip

For these explorations, if it is possible, use paper that is darker on one side than the other. If craft paper is not available, place sheets of construction paper in the sunlight and allow one side to fade. Then cut strips that are 2 1/2" to 3" wide by 12" to 18" long. You may also use adding machine tape.

1.   Mark a line 1/3 of the distance from the edge of one of your strips. Twist and tape. Cut the strip along the line, continuing one-third from the edge until completely around. What happens?
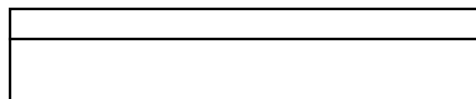
2.   What happens if you make a Mobius strip with 2 twists? Cut along the center to see. What will happen with 3 twists?
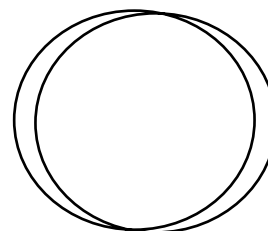
3.   Attach 2 Mobius strips together to make a figure 8. Cut through the centers of both strips.
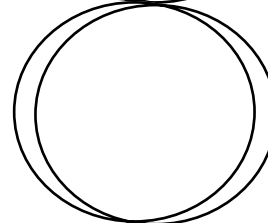
4.   What happens if you attach the Mobius strips with the open rings in opposite directions? Tape these together carefully, then cut down the center of the strips.

5.   Does it matter whether you twist to the right or to the left? Experiment with task #3. What if one strip is twisted left and one right?
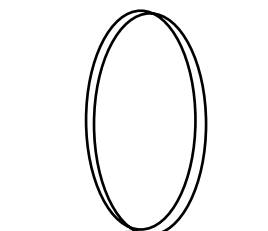
6.   Design another investigation to focus on the surface and edges of the Mobius strip.
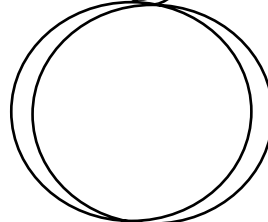
Fun Fact: Are you a *Star Trek – The Next Generation* fan? In the episode "Time Squared" the Enterprise entered a time zone shaped like a Mobius strip.

Keeping Skills Sharp

1.   1900 - 865

2.   2/5 x 2

3.   Write thirteen thousand seventy six in standard form.

4.   Organize in a stem and leaf plot: 58, 79, 46, 62, 59, 48,
     62, 63, 78, 62, 50.

5.   Which is the most sensible weight for a baby?
     8 ounces   8 pounds   8 grams

6. $384 = n + 56$

7.   Replace each dot with a number:
     $$\begin{array}{r} \bullet\,6\,2\,\bullet \\ -\,2\,\bullet\,1\,6 \\ \hline 6\,4\,\bullet\,0 \end{array}$$

8.   List from largest to smallest: 0.09 ,0.08, 0.15, 0.2

Solve this!

The diameter of a quarter is close to 25 millimeters. What is the length of a row of quarters whose total value is $10.00?

(1.03, 2.01)

Investigations Hint: You may need to give the students the hint to solve a simpler problem by discovering how many quarters in a line equal a meter? Do the same with each coin type.

Using Numbers In Powerful Ways:
Guess and check, with a chart or table is a method most students will probably use.

Example: 10 right 15 wrong = $0.25

9 right 16 wrong = $0.10

Solve This:
1,000 mm or 1 meter

Mental Math

1. $(7 + 20) \div 9 \times 7$
2. $(5 + 16) \div 7 \times 8$
3. Expanded form for 1,009,541
4. Round to nearest dollar: $8.29
5. Prime numbers between 30 and 40
6. A triangle with 3 equal sides
7. Freezing point of water - Celsius
8. Quarts in 1/2 gallon
9. Faces on a pair of dice
10. Years in 1/2 century

Keeping Skills Sharp

1. 1035
2. 4/5
3. 13,076
4.

Tens	Ones
4	6,8
5	0, 8, 9
6	2, 2, 2, 3
7	8, 9

5. 8 pounds
6. 328
7. 8, 2, 1, 6
8. 0.2, 0.15, 0.09, 0.08

Math Trivia

Snowflakes are one of the most exciting examples of hexagonal symmetry in nature. Nancy C. Knight of the National Center for Atmospheric Research in Boulder, Colorado, may have discovered the first set of identical snowflakes. They were collected on November 1, 1986.

Investigations

Create a "I have... Who has?" review of mathematical information. Make enough clues so that everyone in the class can play. Two clues are given to help you get started:

• I have a pentagon. Who has the number of inches in a yard?

• I have 36 inches. Who has 7 x 6?

Remember to make the question on your last clue be "Who has a polygon with 5 sides?"
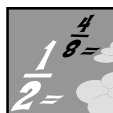
(review)

Using Numbers in Powerful Ways

If three number cubes are thrown, in how many ways can we obtain a sum of 15?

(A toss of 6, 6, 3 is different from a toss of 6, 3, 6).

How many possible sum outcomes are there when you roll three number cubes?

(5.01)

Fraction Fun

Huey had two and a half pizzas left from his party. Dewey ate half the leftovers and then Louie ate half a pizza. How much pizza is there for a snack now?
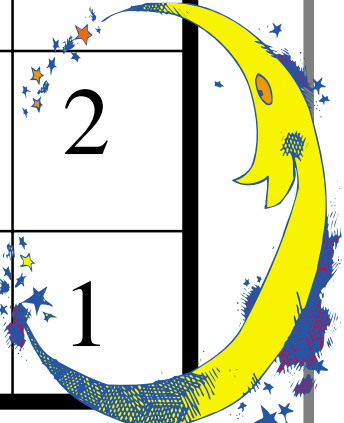
(1.02)

For Further Study

How many laps must a person run around a quarter mile track to run 4.75 miles?

(1.03)

Addition Nim

5	5	5	5	5	5
4	4	4	4	4	4
3	3	3	3	3	3
2	2	2	2	2	2
1	1	1	1	1	1

Guidelines for play:
1.   One gameboard and a marker (markers) for each pair of students.
2.   Players choose one target number greater than 10 and less than 80. Write the target number down. Each round must have a different target number.
3.   Players take turns placing a counter on a number and adding that number to the running talley. (Mental math - no pencil or paper!) Mark off the number once it has been used or cover numbers with markers as they are used.
4.   The winner is the student who reaches the target number.

Points to Ponder:
1.   Are there any patterns you can identify related to reaching the target number?
2.   What strategies might you use to try to win?
3.   How would your strategies vary if the gameboard had only numbers 1 to 3 and a target number less than 35?

Keeping Skills Sharp

1.   ☐ ÷ 6 = 200   ☐ = ____

2. $6.00 - $2.91 =

3.   Calculate the area of this square.   ☐   4

4.   Each of Sam's five friends has 34 records in his collection.
      If they store their records together in albums that hold 9 records
      each, how many albums do they need?

5.   Create a line plot with these numbers: 46, 52, 50, 48, 46, 53, 47,
      52, 47, 47, 52, 47

6.   6 x 8 x 10

7.   (7 x 7 x 7) + (3 x 3 x 3 x 3) =

8. $1 = \dfrac{?}{4}$

Solve this!

Bobby, Ted, Ronnie, Sammy, Manuel, Otis, Greg, and Fred reached the final round
of the state amateur boxing championships. They are the finalists in the 118 pound,
126 pound, 145 pound, and heavyweight classes.
   • Bobby weighed in at 117 pounds, while Ted was the heaviest winner of
     them all.
   • Greg defeated Manuel, and Sammy won by a knockout.
   • Otis lost in the 145 pound final by a knockout, and Fred defaulted in the
     Bantamweight final.
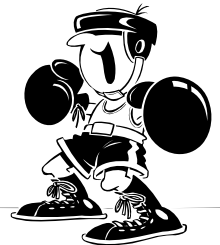
Who was the champion, and who was the runner-up in each weight division?

(1.05)

Investigations: This week is concentrating on geometry and measurement. Before students do the **Investigations**, be sure to model the "I Have... Who Has" game with the class.

For Further Study: 19

Solve This: 118 pound   Bobby defeated Fred
126 pound   Greg defeated Manuel
145 pound   Sammy defeated Otis
heavyweight Ted defeated Ronnie

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. (100 - 75 + 3) ÷ 7
2. (75 - 40) ÷ 5 x 7
3. Standard form for 79,314,099
4. Round to nearest hundred dollars: $247
5. How many factors in a prime number?
6. What line passes through the center of a circle?
7. Meters in 150 centimeters
8. Quarts in 3 gallons
9. Sides on 4 stop signs
10. Days in a leap year

Keeping Skills Sharp

1. 1,200
2. $3.09
3. 16
4. 19 albums
6. 480
7. 424
8. 4

5.
```
              x
       x                    x
   x   x                    x
   x   x   x        x   x   x
  46  47  48  49  50  51  52  53
```