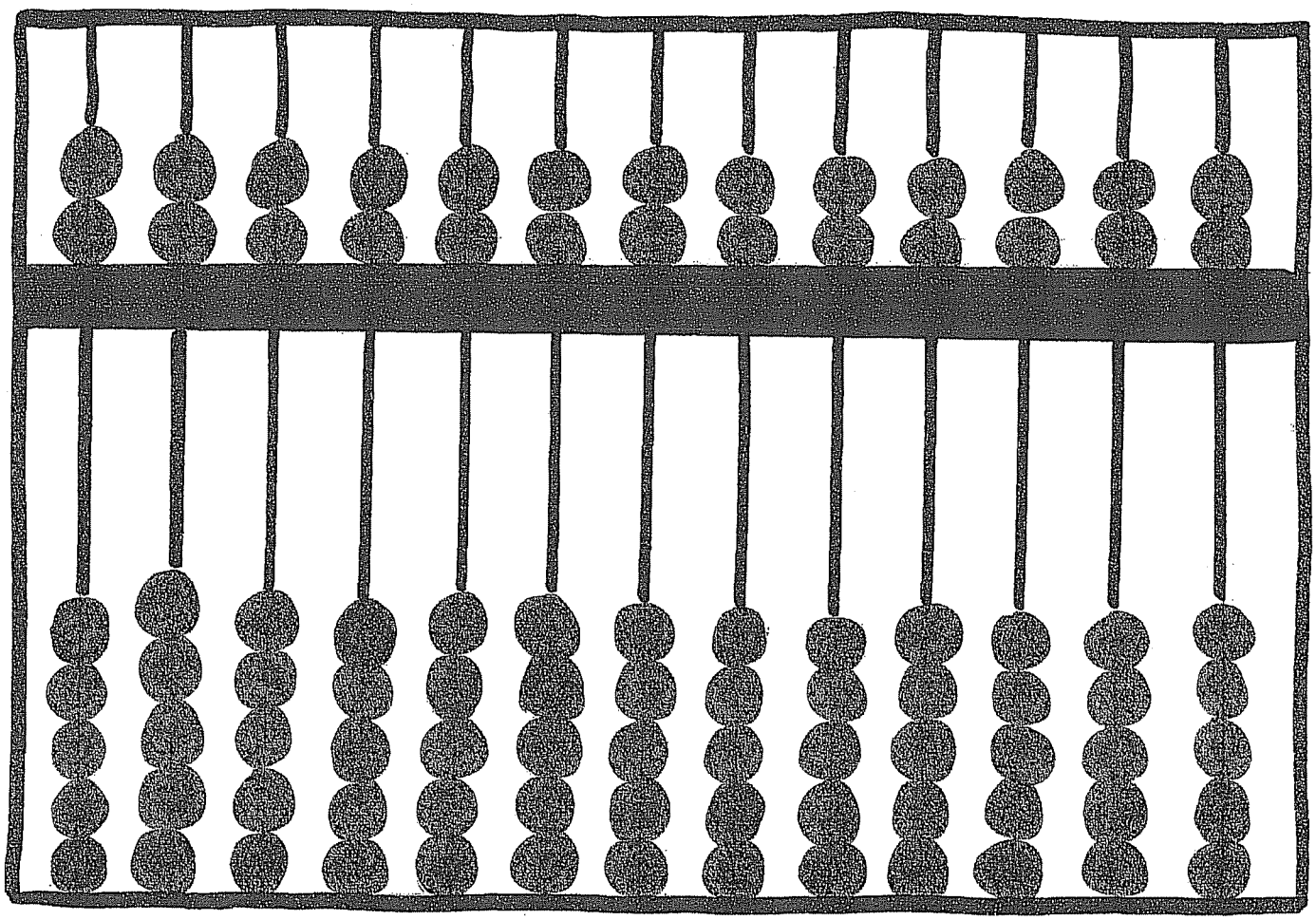
Abacus

An abacus is an instrument used to calculate math problems. It uses bead (numbers represented by beads) arithmetic. The use of the abacus is called the "art of reckoning". The abacus pictured below is one type, called the Chinese abacus.



Shoshanah Waxman
The Linden School
Toronto, Ontario

A Publication of the OAME/AOEM • Volume 36 Number 2 • December 1997
Edited by Frances Schatz

What better time of year than now to use some games and practice for the Ontario Mathematics Olympics 1998. This activity addresses the problem solving strand in a fun way. A special thank you to Bill Morrison for providing some challenging problems to develop various skills.

Peter Banks, Dickson Public School, Cambridge,continues to inspire his grade 5 students with **Multiple Math Games**. Carolyn Hill and Ilse Nel, London, have their students going to the Pizza Parlour for Fraction Pals.

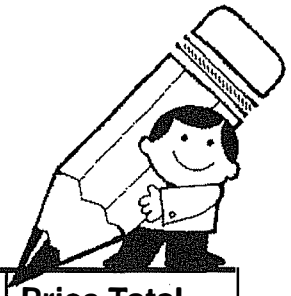
Thank you to the contributors who have made this issue special.

Don't forget the title page contest -entries due by December 31, l997.

Recently I have read about the open-ended approach for the teaching of problem solving. I have formulated a problem which has multiple correct answers. I encourage grade 5-8 students to send me their solutions for a little prize. Use the form below to show your solution to **Best Buy in MatteMatticle Bookland**.

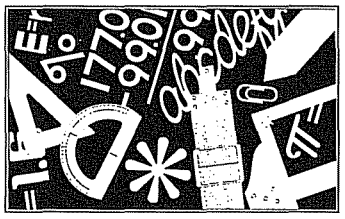
Frances Schatz

MATTEMATICLE BOOKS



Special Order Form

Quantity	Title	Unit Price Total	Price Total



Add 12. 5% Canadian handling fee	
Total in US dollars	
Total in Canadian dollars	

Note: The 12.5% handling fee covers shipping, GST and duty.
The Total in Canadian dollars must not exceed $20. 00

Name _____ **Date** _____

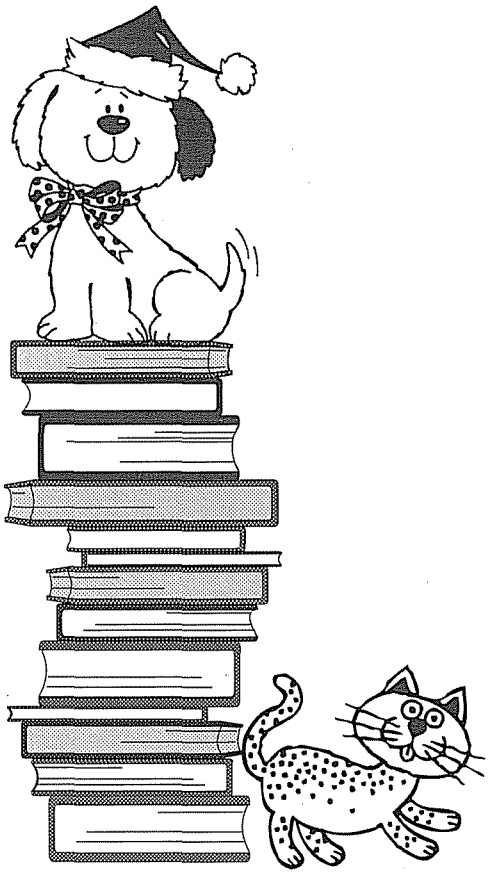
Address _____

School _____ **Grade** _____

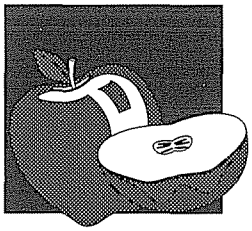
BEST BUY IN MATTEMATTICLE BOOKLAND

by Frances Schatz

Mr. Yarg and Mrs. Tromp teach mathematics at Kateside Public School in Ayrton. The children in their classes did a fund raising project and gave each teacher $20 in Canadian funds to buy new math books for the grade 5-8 library. MatteMatticle Books is a company that strives to put the fun into math books for ages 10-14 years. The best resources are listed below. At the moment $1 Canadian purchases $0. 72 US dollars.



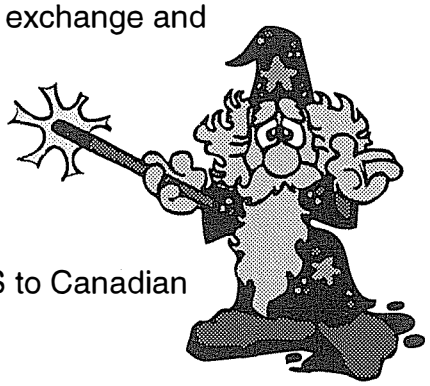
ALL PRICES ARE IN US DOLLARS



Appleseed Geometry	**$8. 50**
Arithmetic with Doggy Bones	**7. 00**
Button Times Fantasy	**5. 00**
Catnap Division	**2. 00**
Cooking with Ratios	**6. 00**
Count the Icicles	**1. 50**
No Batteries for my Calculator	**4. 50**
Odd Numbers aren't Even	**3. 00**
Phaylem's Math Wizard	**4. 00**
Zeus meets Zero	**3. 50**



Determine the list of books that each teacher could buy without spending over $20. The total in Canadian must not exceed $20 and it must include the exchange and special handling fee. Who can get the closest to $20 without going over?Please send me your solution - I would like to see how many answers are possible for this problem.



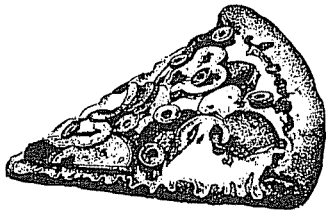
Extra Challenge:

What decimal number could be used as a multiplier to calculate US to Canadian exchange rate and add in the 12.5% handling fee too?

PIZZA PARLOUR FRACTION PALS

by Carolyn Hill and Ilse Nel

Concepts: Naming part of a whole/part of a set as a fraction
Comparing sizes: fractions are equal sized parts
"How Many"
"What Part"



Directions: Preparation for the Game Form the class into groups of three to six. Use the 12 piece pie black line master (next page) to make a pizza and another to make the pizza plate. Cut the pizza pieces apart and place the pieces on the plate. Label the plate and use a different colour for the 'one-half', 'one-quarter' and 'one-quarter'. Put the following list of questions onto cards which are shuffled and placed face down in a pile beside the pizza.

You have already eaten and you don't want any pizza. Give the pizza in equal shares to four friends. How many pieces does each friend have? What part of the pizza does each friend have?	**You don't like pepperoni. You only want 3 pieces of pizza. Share the rest equally with 3 friends. What part of the pizza did you have?**
You are really hungry. You want to eat a whole pizza. How many pieces of the pizza do you want?	**One half of the pizza is missing. How many pieces are left? What part of the pizza is left?**
You see two very hungry pizza loving friends. Help them share the pizza equally. How many pieces does each friend get? What part of the pizza is that?	**You had a half a pizza. One half is left. Share the part that is left between your two friends equally. How many pieces do each of your friends get?**
Your dog ate one quarter of the pizza. How many pieces is that?	**One friend has 4 pieces of pizza. One friend has half a pizza. Do the friends have the same amount of pizza?**
You give six pieces of pizza to your dog. The other half of the pizza is for you. How many pieces do you have for yourself?	**You give 6 pieces of pizza to your friend. What part of the pizza is left for you?**
One quarter of the pizza is left on the plate. How many pieces are left on the plate? How many pieces were eaten?	**Your friends each had half a pizza. How many friends shared the pizza?**

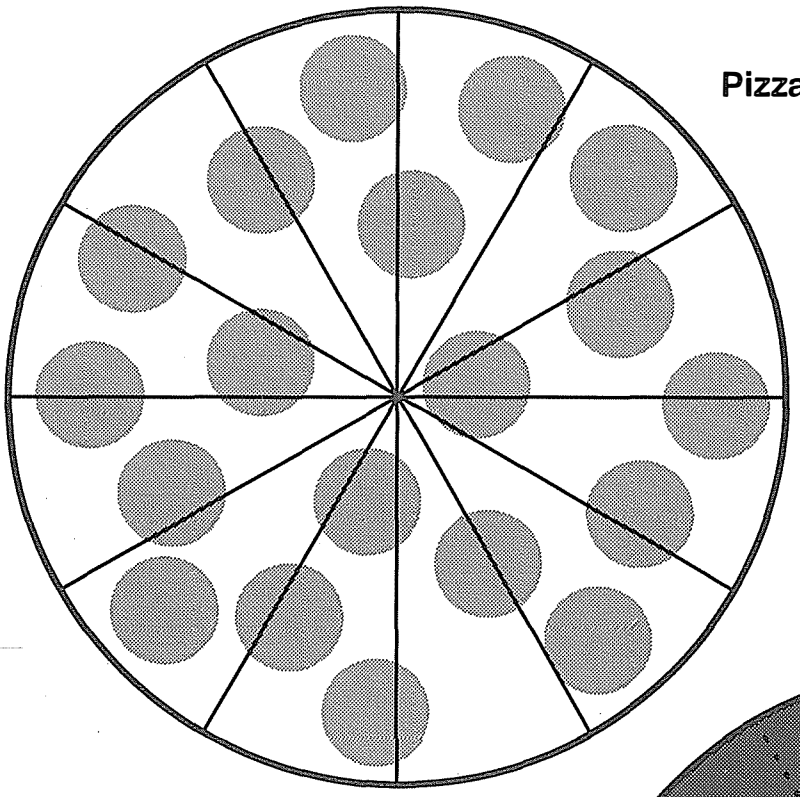
Object and Rules of Play

Follow the directions on the card, seeking help from your "pizza pals" if necessary. The youngest player goes first and the play passes to the left until all the cards have been used.

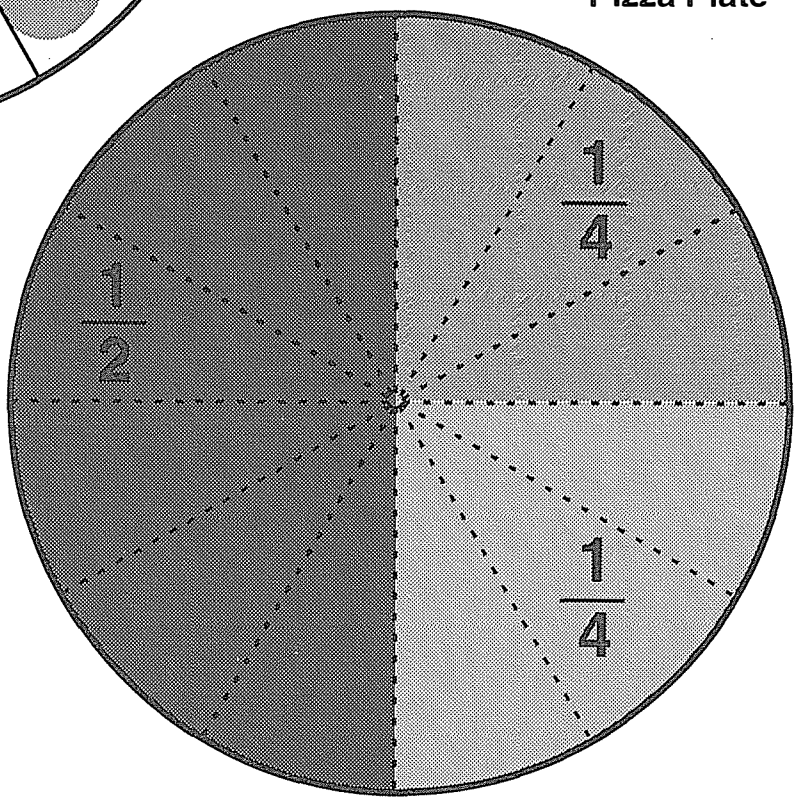
Extension: Have students make up questions for their pals to figure out. Have a spokesperson from each group share their invented question(s) with the entire class.



Pizza Slices



Pizza Plate



ONTARIO MATHEMATICS OLYMPICS 1997

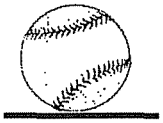


A Selection of Problems

Editor's Note: *On these two pages you will find a sample of problems from OMO' 97 held on June 7, 1997 at the Kempenfelt Centre in Barrie. This is an annual competition for 4-member teams which consist of 2 girls, 2 boys, 2 in grade 7 and 2 in grade 8. This activity provides an exciting opportunity for students across Ontario to get to know each other. The events involve each of the strands of mathematics and should require collaboration. For more information about OMO '98 contact your local chapter of OAME or ABACUS editor.*

Hurdles

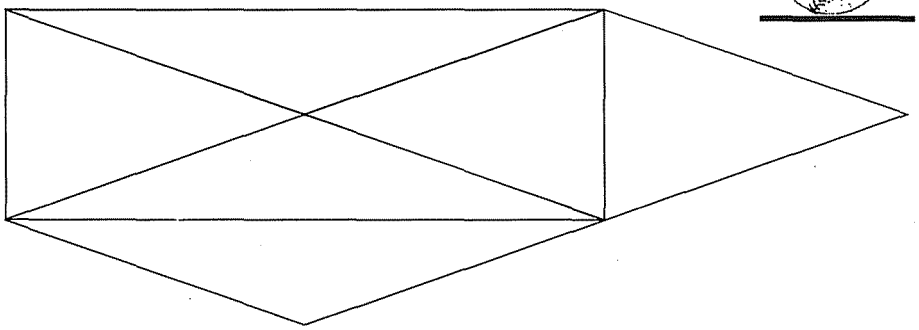
1. A ball bounces $\frac{1}{3}$ of the height from which it is dropped. If it reaches a height of 3 units on the third bounce, from what height was it originally dropped?



2. Determine three whole numbers whose sum is equal to their product.

Hurdles Activity

Use the piece of string (any suitable length) to form the figure shown without cutting the string, or retracing any line.



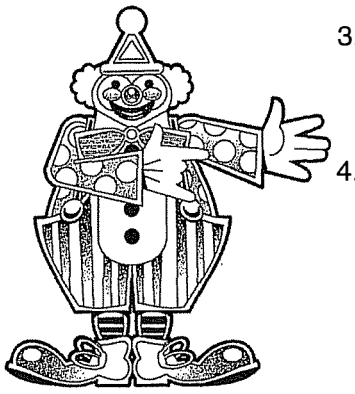
Team Problem Solving: A Timed Event.





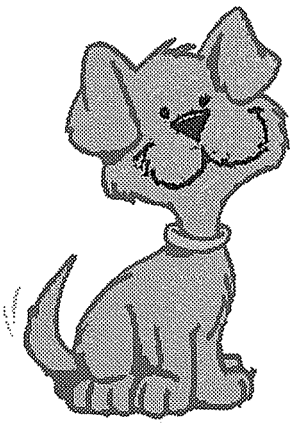
1. You have a bowl that contains 75 red candies and 60 blue candies. If 20 blue candies are added to the bowl, determine the number of red candies that must be added to make the ratio of red to blue equal to 3:2.

2. There are 24 vertical fence posts enclosing a rectangular field. The posts are evenly spaced and 2 metres apart. There are 8 posts along the length. Determine the number of square metres in the area of the field.



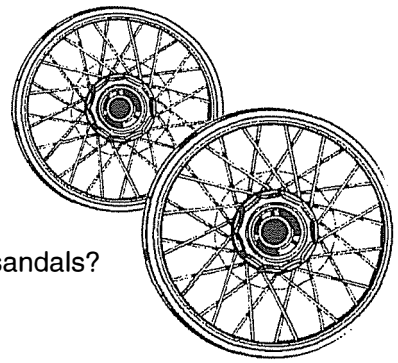
3. A circus clown buys balloons at \$1. 44 per dozen and sells them for \$0. 25 each. Determine his profit on the day 40 dozen balloons are sold.

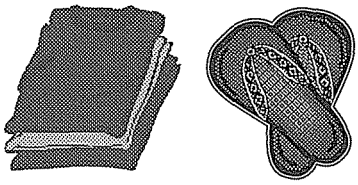
4. A dog is tied to the corner of a house that is 10 metres long and 5 metres wide. His leash is 7 metres long. Determine, in square metres the largest area over which the dog may roam. (Answer to 2 significant digits)



5. A city has a large reservoir which stores water for emergency use. The reservoir is a rectangular prism 50 metres long, 30 metres wide and 10 metres high. During an emergency the full reservoir is emptied in 9 hours. Assuming the water flows out at a constant rate, determine the rate of flow of the water in litres per second. One litre of water occupies 1000 cm^3.

6. How many more complete turns will a wheel of radius 12 centimetres make than a wheel of radius 15 centimetres in travelling I kilometre?

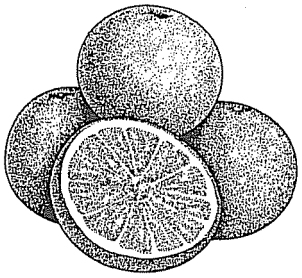




7. Frances has 4 different tops, 3 different pairs of shorts, and 2 different pairs of sandals. How many different outfits can Frances make, assuming that an outfit consists of a top, a pair of shorts and a pair of sandals?

The RELAY EVENT Problem Set

1. A merchant buys some oranges at 3 for \$0. 58 and twice as many at 5 for \$1. 17. At what price per dozen (to nearest cent) must the merchant sell all the oranges to just cover the cost?

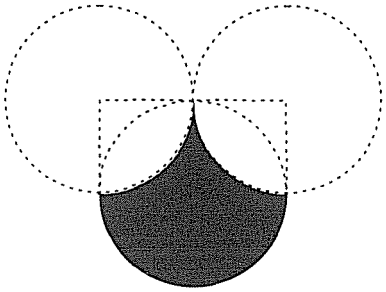




2. A ball player has had 322 "at bats" this season and has an average of 0.289. (The batting average is calculated by dividing the number of hits by the number of "at bats" and rounding the answer to 3 decimal places.) She has 53 more "at bats" to complete the season. What batting average must she attain in the remaining games, in order to achieve a 0.300 batting average for the entire season?

3. How many different combinations of stamps can you use for an exact postage on a package of \$4.95 if you only have \$0.45 and \$0.20 stamps?

4. An area is enclosed by 4 quarter circle arcs with radius 10, two of which are inverted, as shown. Calculate the number of square units in the solid area. (If you wish, you may use $\pi = 3.14$)



Answer Keys:

Hurdles: 1. 81 units 2. 1, 2, 3

Team Problems: 1. 45 **2.** 140 **3.** \$62. 40 **4.** 120 **5.** 463L/s **6.** 265 **7.** 24

Relay: 1. \$2. 65 **2.** 0.367 **3.** 3 **4.** 200

MULTIPLE MATH GAMES

by Peter Banks

Mathematics can be very intimidating for students. I have played Math Games with my Grade 5 students to give a view of basic mathematical skills in a fun environment. Once students have played the games a few times they are given the opportunity to lead the games.

Stand-Up Math

The whole class stands up and one by one students list the multiplication facts in order (eg John says "9 x 0 = 0" then Betty follows with "9 x 1 = 9"). The game continues to rotate throughout the class until all of the tables have been covered from 0x0 to 10x10 or 12x12. If a student does not know the "next one", give the student the choice of a pass to last one or elimination from the round.

Magic Number

This game reviews "greater than" and "less than" using both listening and mathematical skills. Start with the game leader providing a clue; for example,

> ***I am thinking of a number that is greater than 12 but less than 21.***
>
> ***Students take turns in giving the magic number.***
>
> ***The student with the correct answer is the next leader.***

Team Long Division

Students work as a team (2 or 3) to complete long division questions either on the blackboard or on paper. The team leader provides a suitable problem and each member takes a turn with each step. This game helps students to see the order of operations involved in long division and to work cooperatively.

