

# September Problems

## Number Theory

*Start out simple...*



1. List 10 possible combinations you could get with 4 darts. The numbers on the targets are 7-5-3-1. Try to establish some logical method of doing this.



2. Compare different pay scales. Decide if it is better to receive \$300 a week or to be paid hourly at a rate of \$7.50 per hour. What factors could affect your decision?

*Now try to work this out...*



3. Three watermelons and two cantaloupes weigh 32 pounds. Four watermelons and three cantaloupes weigh 44 pounds. All watermelons weigh the same and all cantaloupes weigh the same. What is the weight of two watermelons and one cantaloupe?



4. Sylvester measured his pulse and found that his heart beat at a rate of 80 beats a minute at rest. At this rate, how many days will it take his heart to beat 1,000,000 times? Show your work and be sure you explain each step.

*This will really challenge you...*



5. Conrad's Taxi Service charges \$1.50 for the first mile and \$.90 for each additional mile. How far could Mr. Kulp go for \$20 if he gives the driver a \$2 tip?

## Measurement

*Start out simple...*

## Rabbit's Run (taken from MATH FORUM)



6. Regina has received a pet rabbit from her neighbor Rodney who is about to move to an apartment that does not allow pets. Her father is going to help her build a run for the rabbit in their back yard, but he wants Regina to design it. Regina sits down to think about the possibilities. Her father says that the run must be rectangular with whole number dimensions. If they want to enclose 48 square feet, how many options do they have?

*Now try to work this out...*

### Area And Perimeter



7. If you fold a square paper vertically, the new rectangle has a perimeter of 39 inches. What is the area of the original square? What is the perimeter of the original square? What is the area of the resulting rectangle? Make a ratio of areas and perimeters. What do you notice?

*This will really challenge you...*

### Better Buy



8. Mr. and Mrs. Simpleton are shopping for carpet for their living room and dining room. Their living room is 21 feet by 15 feet and their dining room is 12 feet by 9 feet. They have looked at two different priced carpets. One for \$14.95 a square yard installed and another for \$19.99 a square yard installed. How much would they save by choosing the cheaper carpet? What are some other things besides money that they should consider before making their choice? After you find out how much carpet they need, figure out the savings in one calculation. Explain.

## Geometry

*Start out simple...*

### Where Am I?



9. Tom Terrific has a garden in the shape of a rectangle. He wanted to plant a tree in a specific spot. He wanted it to be in the exact center of the garden. What would be a way that he could find the center without using any measurement?

*Now try to work this out...*

### Reflections

10. Find 2 polygons other than a square and rectangle whose reflections are identical to the original. Draw them.  
Show how the reflection of a triangle can be the same as the original.

*This will really challenge you...*

### Symmetry



11. What is the largest three digit number that has both vertical and horizontal symmetry? Think of a three letter word with horizontal symmetry.

## Patterns, Algebra, And Functions

*Start out simple...*

### Going Camping



12. Groups of campers were going to an island. On the first day 10 went over and 2 came back. On the second day, 12 went over and 3 came back. If this pattern continues, how many would be

on the island at the end of a week? How many would be left?

*Now try to work this out...*

#### A Batty Diet



13. A bat ate 1050 dragon flies on four consecutive nights. Each night she ate 25 more than on the night before. How many did she eat each night? Solve this algebraically.

*This will really challenge you...*

#### Windemere Castle (From The Problem Solver)



14. Evelyn is reading about Windemere Castle in Scotland. Many years ago, when prisoners were held in various cells in the dungeon area, they began to dig passages connecting each cell to each of the other cells in the dungeon. If there were 20 cells in all, what is the fewest number of passages that had to be tunneled out over the years?

#### Data, Statistics, And Probability

*Start out simple...*

#### Bouncing Babies (Taken from MATH FORUM)



15. At a baby shower, we started discussing baby statistics. One of the women told us she had heard a report that for every 100 babies born, there were 6 more boys than girls. If we were to randomly pick a child from a representative group, what is the probability of picking a girl?

*Now try to work this out...*

#### Trees



16. A team of scientists found that there were 4 oak trees for every 10 pine trees. How many oak trees were there if they counted 36 more pine than oak?

*This will really challenge you...*

### Cookies!



17. Four friends buy 36 cookies for \$12. Each person contributes the following amount of money:

Tom--\$2  
Jake--\$3  
Ted--\$4  
Sam--\$3

Each person gets the number of cookies proportional to the money paid. Draw a circle graph to represent the amount of cookies each got.

Draw another circle graph to show how many each would have if Ted gives half of his cookies to Tom.

### Grab Bag

#### Up You Go!



18. In the old days there were elevator operators to transport passengers. Don Downs always started his day in the basement. He went up 20 floors to take his boss some coffee. Then he went down 8 floors to take a Danish to his friend. He went up 7 floors to check things out. This was the halfway point in the building. How many floors are in this building? Draw a diagram to show how you would figure this out.

