

**NCTM 2009  
Annual Meeting**

**Bit by Bit–Day by Day:  
Number Sense Grows  
Grades 3–5**

**Amy Mayfield**



**Math Solutions®**

3 pineapples

1 serving =  $\frac{1}{2}$  pineapple

**Given the information above,  
write a mathematics word  
problem for which  $3 \div \frac{1}{2}$  would  
be the method of solution.**

**“Students with good number sense can think and reason flexibly with numbers, use numbers to solve problems, spot unreasonable answers, understand how numbers can be taken apart and put together in different ways, see connections among operations, figure mentally, and make reasonable estimates.”**

**Marilyn Burns**

*Teaching Number Sense*  
By Hilde Howden

Ms. Howden asked the children to tell the first thing that came to their minds when she said “twenty-four.”

Class #1

“two dimes and four pennies”

“two tens rods and four ones cubes”  
(from a set of base-ten blocks)

“two dozen eggs”

“four nickels and four pennies”

“take a penny away from a quarter”

“take six pennies from three dimes”

**“My uncle had a birthday on Saturday and he’s twenty-four.”**

**“My mother was twenty-four last year.”**

**“I’ll be twenty-four in nineteen years.”**

**“the day before Christmas”**

**“Twenty-four is when the hand is almost in the middle of twenty and thirty.” (looking at an old-fashioned grocery scale hanging in the corner of the classroom)**

**“My big brother got a cut this long and it took seventeen stitches to sew it up. That’s almost twenty-four.”**

## Class #2

Several children traced the number 24 in the air and others nodded in agreement.

With a little prodding, one pupil found 24 on the calendar.

“24 appears on my digital watch once every hour.”

## *Principles and Standards*

recommends that instructional programs from prekindergarten through grade 12 enable all students to—

- understand numbers, ways of representing numbers, relationships among numbers, and number systems;
- understand meanings of operations and how they relate to one another;
- compute fluently and make reasonable estimates.

## **Strategies to Build Students' Number Sense:**

- **Model different methods for computing.**
- **Ask students regularly to calculate mentally.**
- **Have class discussions about strategies for computing.**
- **Make estimation an integral part of computing.**
- **Question students about how they reason numerically.**
- **Pose numerical problems that have more than one possible answer.**



# Amy's Numbers

9.5

76, 242

1

13

4,324

## Amy's Numbers

9.5	13	1
4,324	76,242	

- Length of time in education
- TVs in house
- Odometer mileage
- Shoe size
- Length of time married

5 miles

30 inches

31 yards

10 feet

11 inch

Jake is a seventh grade basketball player. He practices his shots at the park on a hoop that is \_\_\_\_\_ high. To improve his endurance he runs from his house to the park. The total distance is \_\_\_\_\_. At practice though, his coach has the players run on the basketball court. Each length is about \_\_\_\_\_.

One day when he was bored Jake measured the circumference of his basketball. He was surprised it was \_\_\_\_\_. That is more than double the length of his \_\_\_\_\_ foot.

## How Far Away?

1. Roll three dice. Roll a die again if any numbers are repeated.
2. Record the results of the roll on the board or overhead.
3. Students make all possible two-digit numbers with the rolls and record them on the board.
4. Create a 1–100 number line and have students help you locate the benchmark numbers of 25, 50, and 75 on it.
5. In partners, students decide where to place the two-digit numbers. Volunteers share reasoning.
6. Students use number line to compute how close and how far away each of the numbers is from 100. Share thinking and record strategies.

## NAEP 2003

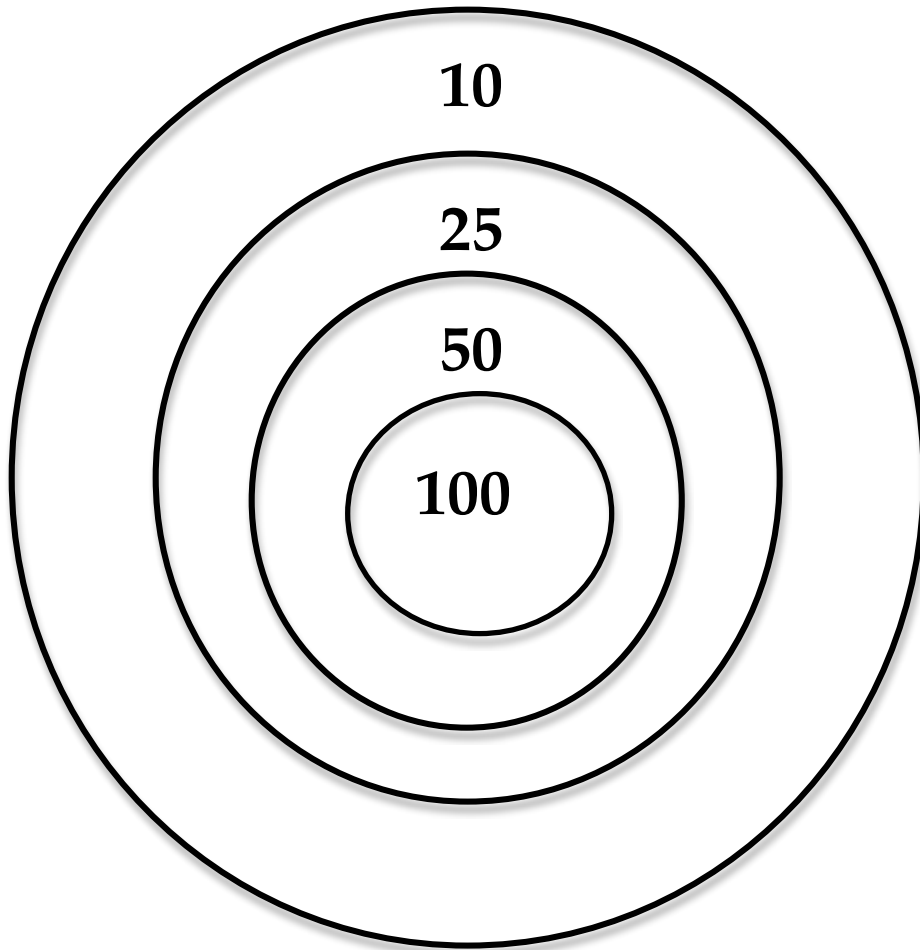
Estela wants to buy 2 notebooks that cost \$2.79 each, including tax. If she has one-dollar bills and no coins, how many one-dollar bills does she need?

A) 3

B) 4

C) 5

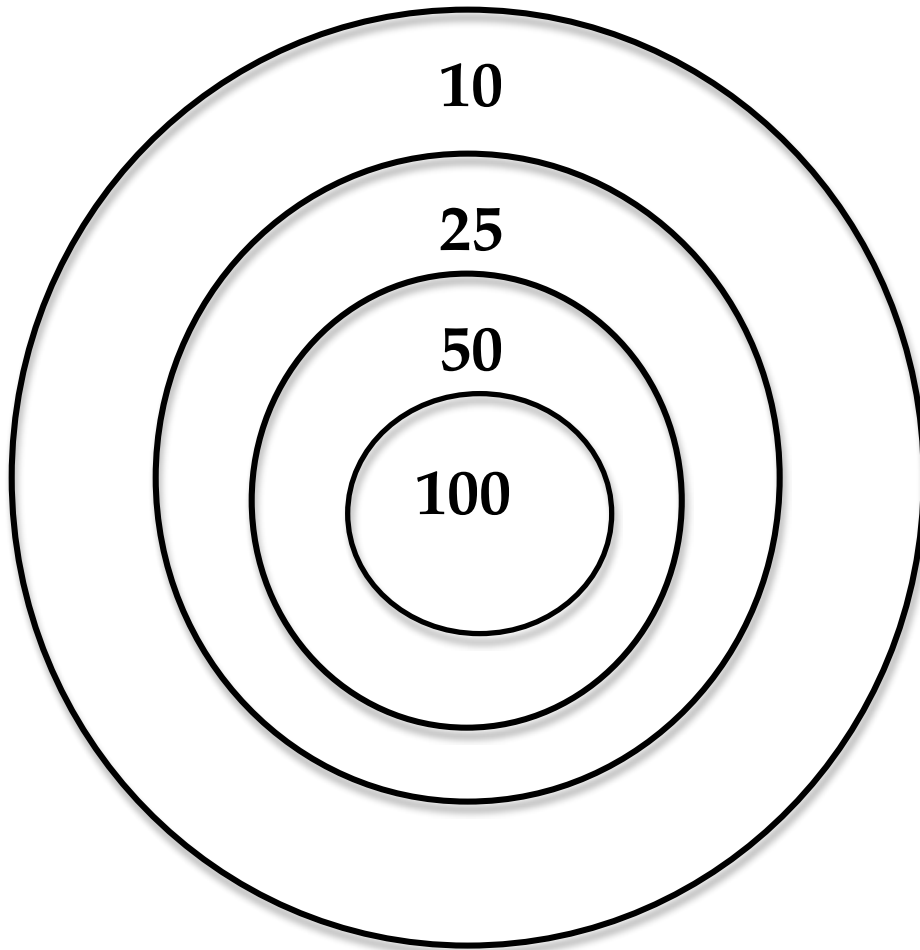
D) 6



**Betty throws 3 darts in the outermost ring, one in the next ring, and two in the ring next to the center. What is her score?**

*Solve the problem individually, then share your strategies and solutions with your group. List the strategies that your group used.*

*Using a mathematical argument, justify your strategies and solutions. Think about any patterns or relationships that you found. Share those with your group members*

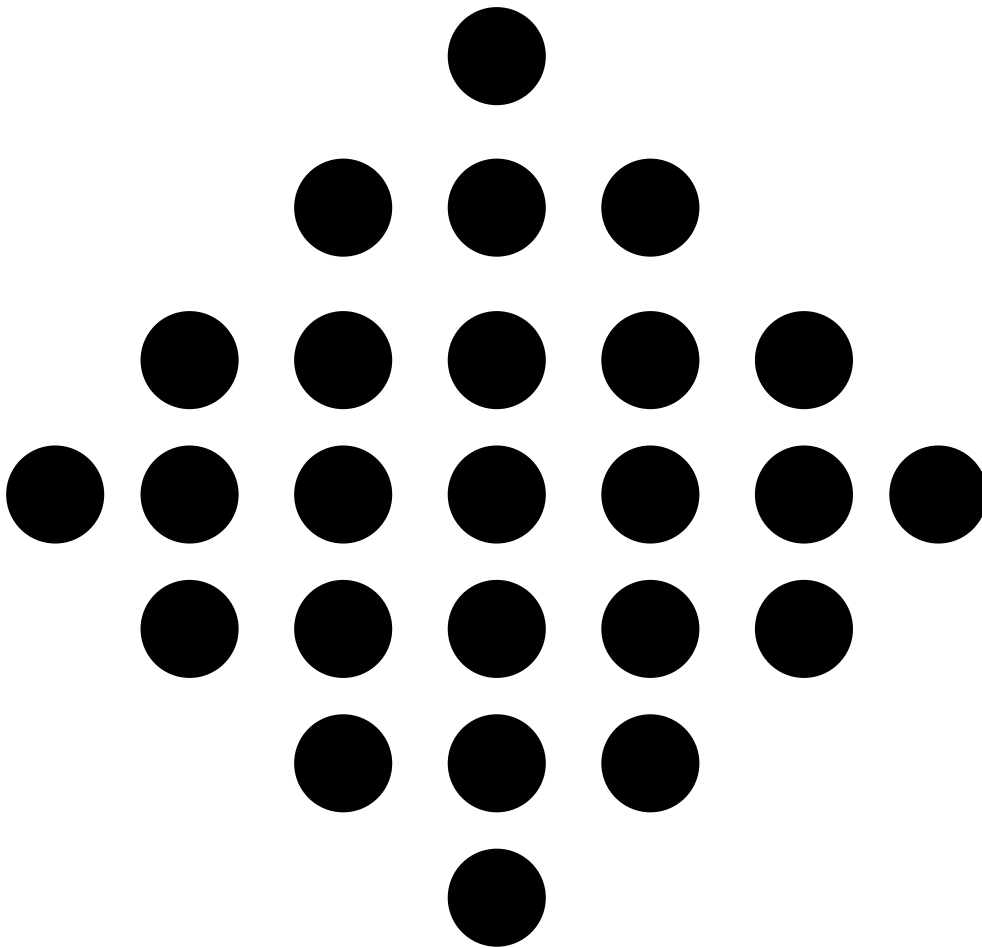


**Betty throws 6 darts and earns a score of 150. Where might her darts have landed?**

*Solve the problem individually, then share your strategies and solutions with your group. List the strategies that your group used.*

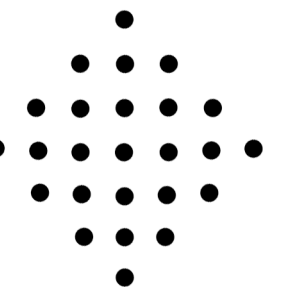
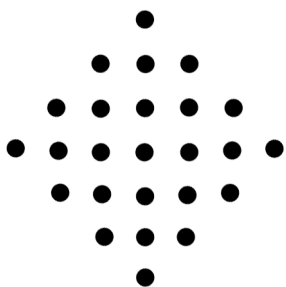
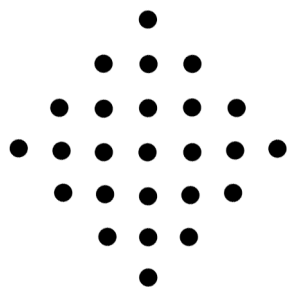
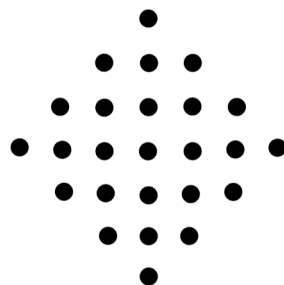
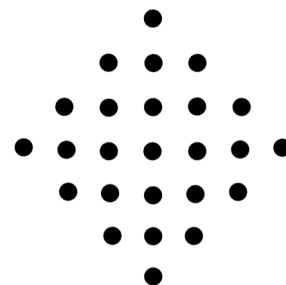
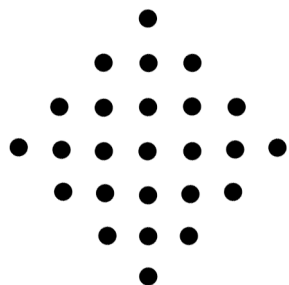
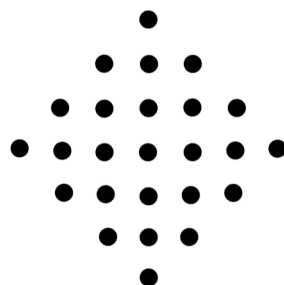
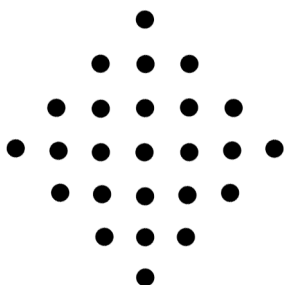
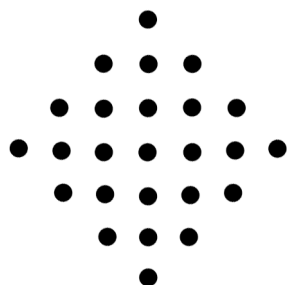
*Using a mathematical argument, justify your strategies and solutions. Think about any patterns or relationships that you found. Share those with your group members*

*Dot Pattern—Square Shape*





# Dot Pattern—Multiple Square Shapes



# NAEP 2003

Pat has 3 fish bowls. There are 4 plants and 5 fish in each bowl. Which gives the total number of fish?

A)  $3 + 5$

B)  $3 \times 4$

C)  $3 \times 5$

D)  $3 + 4 + 5$

# Search NAEP Items

<http://nces.ed.gov/nationsreportcard/itmrls/startsearch.asp>



Math Solutions®

mathsolutions.com

(800) 868-9092

[info@mathsolutions.com](mailto:info@mathsolutions.com)

To download selections from this  
presentation, visit  
**[mathsolutions.com/presentation](http://mathsolutions.com/presentation)**