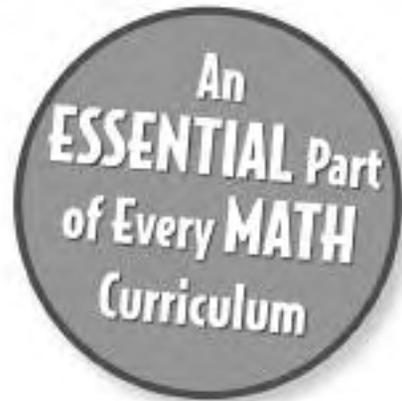


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Algebra Readiness Made Easy

Grade 4



CAROLE GREENES, CAROL FINDELL & MARY CAVANAGH

NEW YORK • TORONTO • LONDON • AUCKLAND • SYDNEY
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**Teaching
Resources**

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Introduction

Welcome to *Algebra Readiness Made Easy*! This book is designed to help you introduce students to problem-solving strategies and algebraic-reasoning techniques, to give them practice with major number concepts and skills, and to motivate them to write and talk about big ideas in mathematics. It also sets the stage for the formal study of algebra in the upper grades.

Algebra Standards

The National Council of Teachers of Mathematics identifies algebra as one of the five major content areas of the mathematics curriculum to be studied by students in *all* grades (NCTM, 2000). The council emphasizes that early and regular experience with the key ideas of algebra helps students make the transition into the more formal study of algebra in late middle school or high school. This view is consistent with the general theory of learning—that understanding is enhanced when connections are made between what is new and what was previously studied. The key algebraic concepts developed in this book are:

- representing quantitative relationships with symbols
- writing and solving equations
- solving equations with one variable
- replacing unknowns with their values
- solving for the values of unknowns
- solving two or three equations with two or three unknowns
- exploring equality
- exploring variables as representing varying quantities
- describing the functional relationship between two numbers

Building Key Math Skills

NCTM also identifies problem solving as a key process skill and the teaching of strategies and methods of reasoning to solve problems as a major part of the mathematics curriculum for students of all ages. The problem-solving model first described in 1957 by renowned mathematician George Polya has been adopted by teachers and instructional developers nationwide and provides the framework for the problem-solving focus of this book. All the problems contained here require students to interpret data displays—such as text, charts,

diagrams, graphs, pictures, and tables—and answer questions about them. As they work on the problems, students learn and practice the following problem-solving strategies:

- making lists or cases of possible solutions and testing those solutions
- identifying, describing, and generalizing patterns
- working backward
- reasoning logically
- reasoning proportionally

The development of problem-solving strategies and algebraic concepts is linked to the development of number concepts and skills. As students solve the problems in this book, they'll practice counting, computing, applying concepts of place value and number theory, and reasoning about the magnitudes of numbers.

Throughout this book, we emphasize the language of mathematics. This language includes terminology (e.g., *odd number*, *variable*) as well as symbols (e.g., $>$, $<$). Students will see the language in the problems and illustrations and use the language in their discussions and written descriptions of their solution processes.

How to Use This Book

Inside this book you'll find six problem sets—each composed of nine problems featuring the same type of data display (e.g., diagrams, scales, and arrays of numbers)—that focus on one or more problem-solving strategies and algebraic concepts.

Each set opens with an overview of the type of problems/tasks in the set, the algebra and problem-solving focus, the number concepts or skills needed to solve the problems, the math language that is emphasized in the problems, and guiding questions to be used with the first two problems of the set to help students grasp the key concepts and strategies.

The first two problems in each set are designed to be discussed and solved in a whole-class setting. The first, “Solve the Problem,” introduces students to the type of display and problem they will encounter in the rest of the set. We suggest that you have students work on this first problem individually or in pairs before you engage in any formal instruction. Encourage students to wrestle with the problem and come up with some strategies they

Name _____ Date _____

SOLVE THE PROBLEM
DOG DATA

How old are the dogs?
Use the facts to figure out each dog's age.



Popeye



Ms. Clean



Holly Wood

FACTS:

- Ⓐ Popeye is 3 years older than Ms. Clean.
- Ⓑ Ms. Clean is twice as old as Holly Wood.
- Ⓒ Holly Wood is 6 years old.

I'll start with the fact that gives one dog's age.



Ima Thinker

1. Which fact did Ima use first? _____
2. How old is Ms. Clean? _____
3. How old is Popeye? _____
4. How did you figure out Popeye's age? _____

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might use to solve it. Then gather students together and use the guiding questions provided to help them discover key mathematical relationships and understand the special vocabulary used in the problem. This whole-class discussion will enhance student understanding and success with the problem-solving strategies and algebraic concepts in each problem set.

The second problem, “Make the Case,” comes as an overhead transparency and uses a multiple-choice format. Three different characters offer possible solutions to the problem. Students have to determine which character—Wally Walrus, Marlee Marlin, Ralph Rhino—has the correct answer. Before they can identify the correct solution, students have to solve the problem themselves and analyze each of the responses. Invite them to speculate about why the other two characters got the wrong answers. (Note: Although we offer a rationale for each wrong answer, other explanations are possible.) As students justify their choices in the “Make the Case” problems, they gain greater experience using math language.

While working on these first two problems it is important to encourage students to talk about their observations and hypotheses. This talk provides a window into what students do and do not understand. Working on “Solve the Problem” and “Make the Case” should take approximately one math period.

The rest of the problems in each set are sequenced by difficulty. All problems feature a series of questions that involve analyses of the data display. In the first three or four problems of each set, problem-solving “guru” Ima Thinker provides hints about how to begin solving the problems. No hints are provided for the rest of the problems. If students have difficulty solving these latter problems, you might want to write “Ima” hints for each of them or ask students to develop hints before beginning to solve the problems. An answer key is provided at the back of the book.

The problem sets are independent of one another and may be used in any order and incorporated into the regular mathematics curriculum at whatever point makes sense. We recommend that you work with each problem set in its entirety before moving on to the next one. Once you and your students work through the first two problems, you can assign problems 1 through 7 for students to do on their own or in pairs. You may wish to have them complete the problems during class or for homework.

Name _____ Date _____

MAKE THE CASE **DOG DATA**

How old are the dogs?

Use the facts to figure out each dog's age.



Dandy Madam Peppy Windy Day

FACTS:

(A) Dandy's age is twice Madam Peppy's age.
 (B) Madam Peppy is 2 years older than Windy Day.
 (C) Windy Day is 4 years old.

Clearly, Dandy is 6 years old, Madam Peppy is 2 years old, and Windy Day is 4 years old.

Without a doubt, Dandy is 12 years old, Madam Peppy is 6 years old, and Windy Day is 4 years old.

Marlee Marlin
 I'm sure that Dandy is 8 years old, Madam Peppy is 6 years old, and Windy Day is 4 years old.

Wally Walrus **Ralph Rhino**

12 **Who is sharp as a tack?**

Using the Transparencies

In addition to the reproducible problem sets, you'll find ten overhead transparencies at the back of this book. (Black-line masters of all transparencies also appear in the book.) The first six transparencies are reproductions of the "Make the Case" problems, to help you in leading a whole-class discussion of each problem.

The remaining four transparencies are designed to be used together. Three of these transparencies feature six problems, one from each of the problem sets. Cut these three transparencies in half and overlay each problem on the Problem-Solving Transparency. Then invite students to apply our three-step problem-solving process:

- 1) **Look:** What is the problem? What information do you have? What information do you need?
- 2) **Plan and Do:** How will you solve the problem? What strategies will you use? What will you do first? What's the next step? What comes after that?
- 3) **Answer and Check:** What is the answer? How can you be sure that your answer is correct?

These problem-solving transparencies encourage writing about mathematics and may be used at any time. They are particularly effective when used as culminating activities for the set of problems.

PROBLEM-SOLVING TRANSPARENCY

SOLVE IT **How much is each dog's doctor bill?**







Use the facts to figure out the doctor's bill for each dog.

FACTS:

- Ⓐ Spot's bill was twice as much as Windy Day's bill.
- Ⓑ Windy Day's bill was \$50 more than DeVine's bill.
- Ⓒ DeVine's bill was $\frac{2}{3}$ of Holly Wood's bill.
- Ⓓ Holly Wood's bill was \$30.

1. Look What is the problem?

2. Plan and Do What will you do first? How will you solve the problem?

3. Answer and Check How can you be sure your answer is correct?

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Dog Data

Overview

Students use clues to interpret mathematical relationships and work backward through the clues to answer questions.

Algebra Focus

Represent quantitative relationships with symbols • Write and solve equations

Problem-Solving Strategies

Work backward • Use logical reasoning

Related Math Skills

Compute with whole numbers • Find fractional parts of groups ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$,)

Math Language

Older than • Younger than • Twice • Sum •
One-half • One-third • One-fourth

Introducing the Problem Set

Make photocopies of “Solve the Problem: Dog Data” (page 11) and distribute to students. Have students work in pairs, encouraging them to discuss strategies they might use to solve the problem. You may want to walk around and listen in on some of their discussions. After a few minutes, display the problem on the board (or on the overhead if you made a transparency) and use the following questions to guide a whole-class discussion on how to solve the problem:

- What did Ima do first to figure out the ages? (*She used Fact C, which gives the only known age. Holly Wood is 6 years old.*)
- Whose age can you figure out next? (*Ms. Clean*)
- Why can't you figure out Popeye's age before figuring out Ms. Clean's age? (*Fact A states that Popeye is 3 years older than Ms. Clean, so we have to figure out Ms. Clean's age before figuring out Popeye's age.*)

- How old is Ms. Clean? (2×6 , or 12 years old)
- How old is Popeye? ($12 + 3$, or 15 years old)

Work together as a class to answer the questions in “Solve the Problem: Dog Data.”

Math Chat With the Transparency

Display the “Make the Case: Dog Data” transparency on the overhead. Before students can decide which character is “sharp as a tack,” they need to figure out the answer to the problem. Encourage students to work in pairs to solve the problem. Then bring the class together for another whole-class discussion. Ask:

- Who has the right answer? (*Marlee Marlin*)
- How did Marlee Marlin begin to solve the problem? (*She started with Fact C—Windy Day is 4 years old.*)
- What did Marlee Marlin do next? (*She used Fact B—Madam Peppy is 2 years older than Windy Day. Madam Peppy is $4 + 2$, or 6 years old.*)
- What did Marlee Marlin do to find Dandy’s age? (*She used Fact A and found that Dandy’s age is twice Madam Peppy’s age. So Dandy is 2×6 , or 12 years old.*)
- How do you think Wally Walrus got his answer? (*He probably used the numbers in Facts B and C for Madam Peppy and Windy Day’s ages and added those two numbers to get Dandy’s age.*)
- How do you think Ralph Rhino got his answer? (*He probably found Windy Day’s and Madam Peppy’s ages the same way that Marlee Marlin did. But then he found Dandy’s age by doubling Windy Day’s age instead of doubling Madam Peppy’s age.*)

Name _____ Date _____

DOG DATA

SOLVE THE PROBLEM

How old are the dogs?

Use the facts to figure out each dog’s age.



Popeye



Ms. Clean



Holly Wood

FACTS:

- (A) Popeye is 3 years older than Ms. Clean.
- (B) Ms. Clean is twice as old as Holly Wood.
- (C) Holly Wood is 6 years old.

I’ll start with the fact that gives one dog’s age.



Ima Thinker

1. Which fact did Ima use first? _____
2. How old is Ms. Clean? _____
3. How old is Popeye? _____
4. How did you figure out Popeye’s age? _____

11

Name _____ Date _____

DOG DATA

MAKE THE CASE

How old are the dogs?

Use the facts to figure out each dog’s age.



Dandy



Madam Peppy



Windy Day

FACTS:

- (A) Dandy’s age is twice Madam Peppy’s age.
- (B) Madam Peppy is 2 years older than Windy Day.
- (C) Windy Day is 4 years old.

Clearly, Dandy is 6 years old, Madam Peppy is 2 years old, and Windy Day is 4 years old.



Wally Walrus



Marlee Marlin

I’m sure that Dandy is 8 years old, Madam Peppy is 6 years old, and Windy Day is 4 years old.

Without a doubt, Dandy is 12 years old, Madam Peppy is 6 years old, and Windy Day is 4 years old.



Ralph Rhino

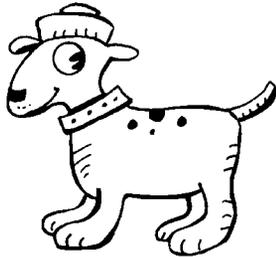
Who is sharp as a tack?

12

**SOLVE
THE
PROBLEM**

How old are the dogs?

Use the facts to figure out each dog's age.



Popeye



Ms. Clean



Holly Wood

FACTS:

- (A) Popeye is 3 years older than Ms. Clean.
- (B) Ms. Clean is twice as old as Holly Wood.
- (C) Holly Wood is 6 years old.

I'll start with the fact that gives one dog's age.



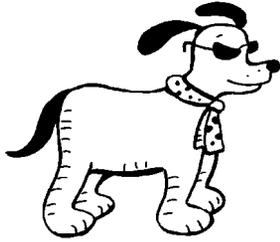
Ima Thinker

1. Which fact did Ima use first? _____
2. How old is Ms. Clean? _____
3. How old is Popeye? _____
4. How did you figure out Popeye's age? _____

**MAKE
THE
CASE**

How old are the dogs?

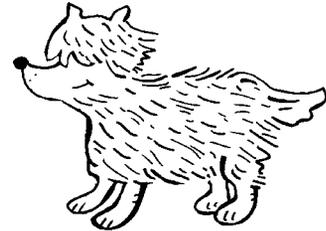
Use the facts to figure out each dog's age.



Dandy



Madam Peppy



Windy Day

FACTS:

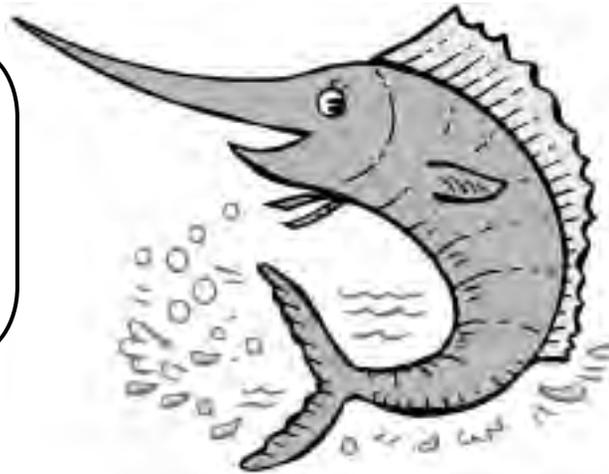
- (A) Dandy's age is twice Madam Peppy's age.
- (B) Madam Peppy is 2 years older than Windy Day.
- (C) Windy Day is 4 years old.

Clearly, Dandy is 6 years old, Madam Peppy is 2 years old, and Windy Day is 4 years old.

Without a doubt, Dandy is 12 years old, Madam Peppy is 6 years old, and Windy Day is 4 years old.

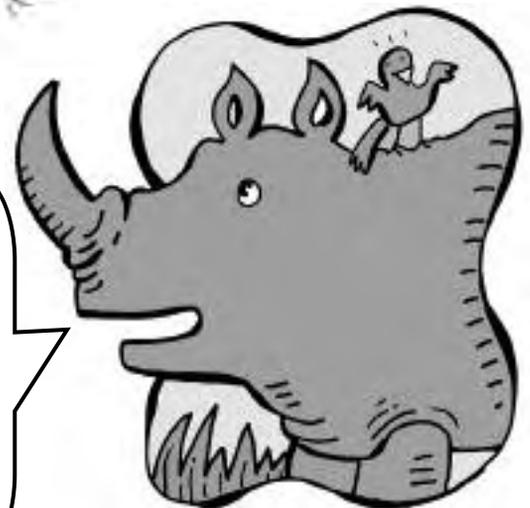


Wally Walrus



Marlee Marlin

I'm sure that Dandy is 8 years old, Madam Peppy is 6 years old, and Windy Day is 4 years old.



Ralph Rhino

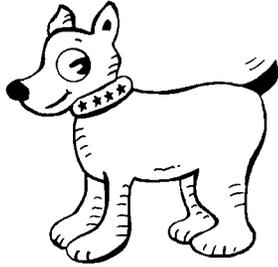
Who is sharp as a tack?

PROBLEM

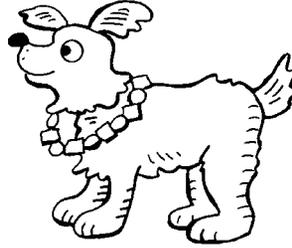
1

How old are the dogs?

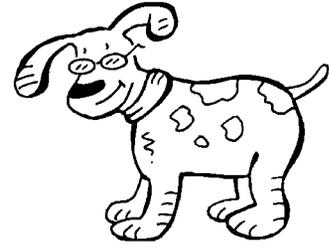
Use the facts to figure out each dog's age.



Howdy



DeVine



Bubba

FACTS:

- (A) Howdy is 5 years younger than DeVine.
- (B) DeVine's age is half Bubba's age.
- (C) Bubba is 14 years old.

I'll start with the fact that gives one dog's age.



Ima Thinker

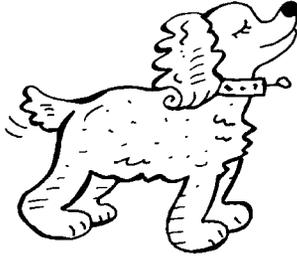
1. Which fact did Ima use first? _____
2. How old is DeVine? _____
3. How old is Howdy? _____
4. How did you figure out Howdy's age? _____

PROBLEM

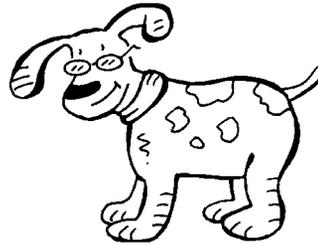
2

How much do the dogs weigh?

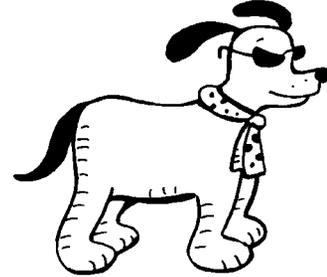
Use the facts to figure out each dog's weight.



Melody



Bubba



Dandy



Windy Day

FACTS:

- (A) Melody weighs 4 pounds less than Bubba.
- (B) Bubba weighs 10 pounds less than Dandy.
- (C) Dandy weighs twice as much as Windy Day.
- (D) Windy Day weighs 24 pounds.

I'll start with the fact that gives one dog's weight.



Ima Thinker

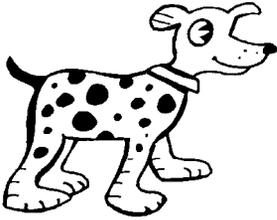
1. Which fact did Ima use first? _____
2. How much does Dandy weigh? _____
3. How much does Bubba weigh? _____
4. How did you figure out Melody's weight? _____

PROBLEM

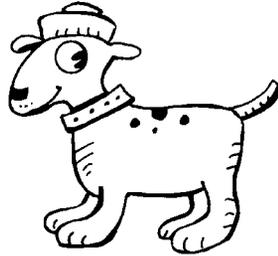
3

How much do the dogs weigh?

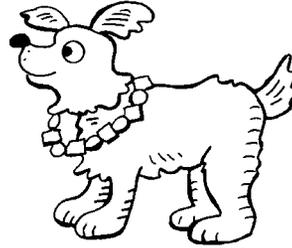
Use the facts to figure out each dog's weight.



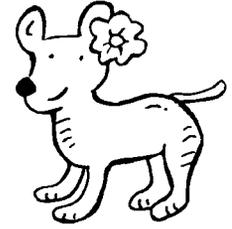
Spot



Popeye



DeVine



Madam Peppy

FACTS:

- (A) Spot weighs 4 pounds less than DeVine.
- (B) Popeye weighs half as much as DeVine.
- (C) DeVine's weight is ten times Madam Peppy's weight.
- (D) Madam Peppy weighs 5 pounds.

I'll start with the fact that gives one dog's weight.



Ima Thinker

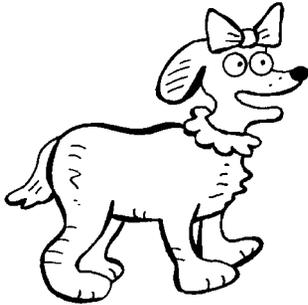
1. Which fact did Ima use first? _____
2. How much does DeVine weigh? _____
3. How much does Popeye weigh? _____
4. How did you figure out Spot's weight? _____

PROBLEM

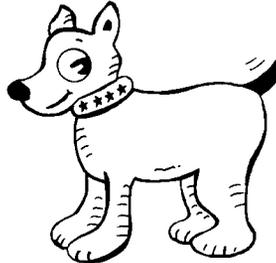
4

How much do the dogs weigh?

Use the facts to figure out each dog's weight.



Betsy



Howdy



Holly Wood



Ms. Clean

FACTS:

- (A) Betsy weighs 10 pounds less than Howdy.
- (B) Howdy's weight is 17 pounds more than Holly Wood's weight.
- (C) Holly Wood's weight is twice Ms. Clean's weight.
- (D) Ms. Clean weighs 19 pounds.

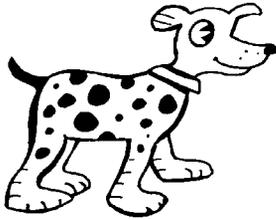
1. Which fact did you use first? _____
2. How much does Holly Wood weigh? _____
3. How much does Howdy weigh? _____
4. How did you figure out Betsy's weight? _____

PROBLEM

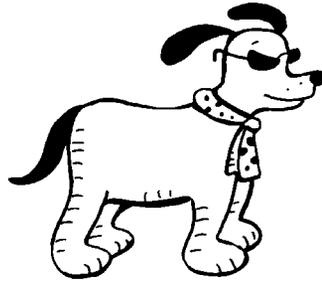
5

How many ounces of dog food does each dog eat in one day?

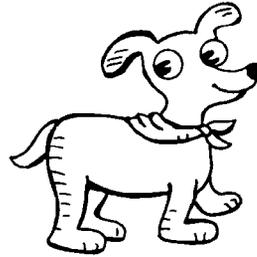
Use the facts to figure out how much food each dog eats.



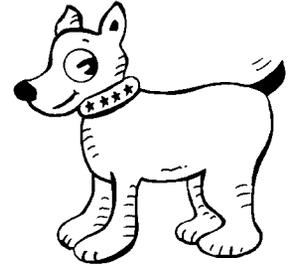
Spot



Dandy



Ms. Clean



Howdy

FACTS:

- (A) Spot eats 2 ounces less food than Dandy.
- (B) Dandy eats 8 ounces more food than Ms. Clean.
- (C) Ms. Clean eats half as much food as Howdy.
- (D) Howdy eats 18 ounces of food each day.

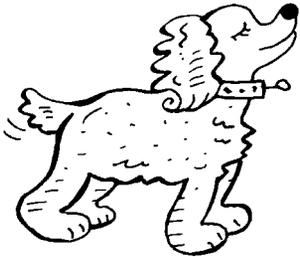
1. Which fact did you use first? _____
2. How many ounces of food does Ms. Clean eat each day? _____
3. How many ounces of food does Dandy eat each day? _____
4. How did you figure out how many ounces of food Spot eats?

PROBLEM

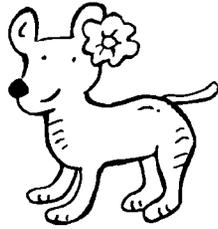
6

How many ounces of dog food does each dog eat in one day?

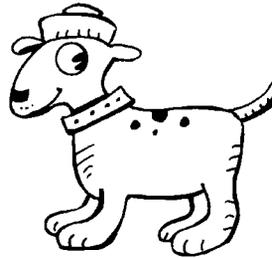
Use the facts to figure out how much food each dog eats.



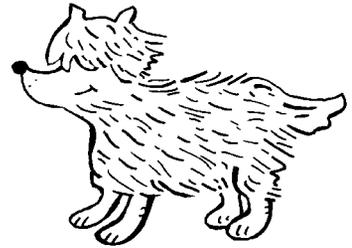
Melody



Madam Peppy



Popeye



Windy Day

FACTS:

- (A) Melody eats 6 ounces more food each day than Madam Peppy.
- (B) Madam Peppy eats $\frac{1}{4}$ as much dog food as Popeye.
- (C) The weight of Popeye's food and Windy Day's food is 20 ounces.
- (D) Windy Day eats 8 ounces of dog food each day.

1. Which fact did you use first? _____
2. How many ounces of food does Popeye eat each day? _____
3. How many ounces of food does Madam Peppy eat each day?

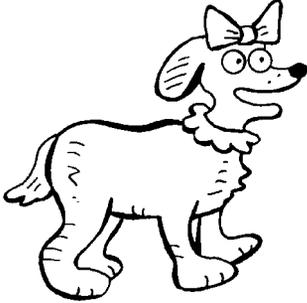
4. How did you figure out how many ounces of food Melody eats each day? _____

PROBLEM

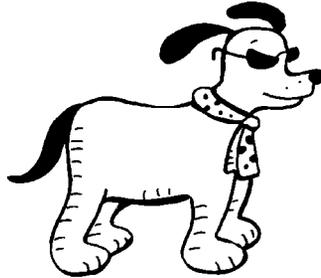
7

How much is the doctor's bill for each dog?

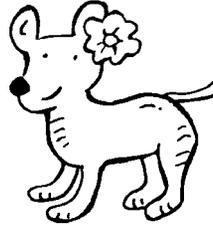
Use the facts to figure out the doctor's bill for each dog.



Betsy



Dandy



Madam Peppy



Ms. Clean

FACTS:

- (A) Betsy's bill and Dandy's bill together totaled \$150.
- (B) Dandy's bill was \$10 more than Madam Peppy's bill.
- (C) Madam Peppy's bill was twice as much as Ms. Clean's bill.
- (D) Ms. Clean's bill was \$40.

1. Which fact did you use first? _____
 2. How much was Madam Peppy's bill? _____
 3. How much was Dandy's bill? _____
 4. How did you figure out how much Betsy's bill was? _____
-

Stamp Stumpers

Overview

Presented with a set of stamps—some with geometric shapes and others with prices—and its total cost, students figure out the price of each shape stamp.

Algebra Focus

Solve equations with one variable • Replace symbols with their values •
Recognize that the same pictures have the same value • Understand that taking away an addend changes the sum by the same amount

Problem-Solving Strategies

Reason deductively

Related Math Skills

Compute with whole numbers • Recognize chevrons, hexagons, octagons, pentagons, squares, trapezoids, and triangles • Recognize cones, cubes, and cylinders

Math Language

Total cost • Geometric shapes: chevron, hexagon, octagon, pentagon, square, trapezoid, triangle, cone, cube, cylinder

Introducing the Problem Set

Make photocopies of “Solve the Problem: Stamp Stumpers” (page 22) and distribute to students. Have students work in pairs, encouraging them to discuss strategies they might use to solve the problem. You may want to walk around and listen in on some of their discussions. After a few minutes, display the problem on the board (or on the overhead if you made a transparency) and use the following questions to guide a whole-class discussion on how to solve the problem:

- What do you see? (*4 chevron stamps, one 5¢ stamp, and a receipt showing a total cost of 13¢*)

- What do you need to figure out in this problem? (*The cost of one chevron stamp*)
- What will you do first? (*Take away the 5¢ stamp and change the total cost.*)
- What is the new cost? (*13¢ – 5¢, or 8¢*)
- What does this new sum represent? (*The cost of the 4 chevron stamps*)
- How can you figure out the cost of each chevron stamp? (*If 4 chevron stamps are 8¢, then one chevron is $8¢ \div 4$, or 2¢.*)

Work together as a class to answer the questions in “Solve the Problem: Stamp Stumpers.”

Math Chat With the Transparency

Display the “Make the Case: Stamp Stumpers” transparency on the overhead. Before students can decide which character is “sharp as a tack,” they need to figure out the answer to the problem. Encourage students to work in pairs to solve the problem. Then bring the class together for another whole-class discussion. Ask:

- Who has the right answer? (*Ralph Rhino*)
- How did you figure it out? (*$21¢ - 3¢ - 6¢ = 12¢$; and $12¢ \div 3 = 4¢$*)
- How do you think Wally Walrus got the answer 5¢? (*He probably subtracted the 6¢ from 21¢ and got 15¢. $15¢ \div 3 = 5¢$. He forgot to subtract both the 6¢ and the 3¢ from 21¢.*)
- How do you think Marlee Marlin got the answer 6¢? (*She probably subtracted the 3¢ from 21¢ and got 18¢, then $18¢ \div 3 = 6¢$. She forgot to subtract both the 3¢ and the 6¢ from 21¢.*)

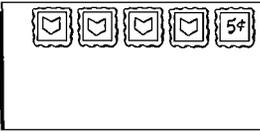
Name _____ Date _____

STAMP STUMPERS

SOLVE THE PROBLEM

How much is one chevron stamp?

The total cost of the five stamps on the envelope is 13¢.




The chevron stamps cost the same.

First, I'll pretend to take the 5¢ stamp off the envelope. Then I'll change the total cost.

1. Why did Ima pretend to take the 5¢ stamp off the envelope? _____

2. How did Ima change the total cost? _____

3. How much is one chevron stamp? _____

4. How did you figure out the answer to #3? _____

Ima Thinker

22

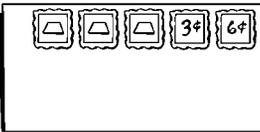
Name _____ Date _____

STAMP STUMPERS

MAKE THE CASE

How much is one trapezoid stamp?

The total cost of the five stamps on the envelope is 21¢.




The trapezoid stamps cost the same.

That's easy. One trapezoid stamp costs 5¢.

I'm sure it costs 6¢.

Wally Walrus

Marlee Marlin

You're both wrong. It has to be 4¢.

Ralph Rhino

Who is sharp as a tack?

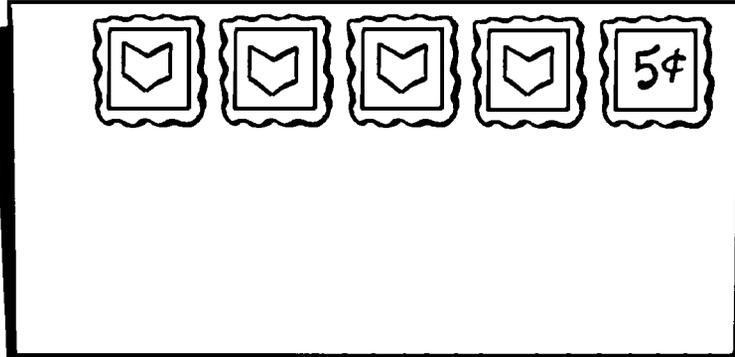
23

STAMP STUMPERS

**SOLVE
THE
PROBLEM**

How much is one chevron stamp?

The total cost of the five stamps on the envelope is 13¢.



The chevron stamps cost the same.

First, I'll pretend to take the 5¢ stamp off the envelope. Then I'll change the total cost.



Ima Thinker

1. Why did Ima pretend to take the 5¢ stamp off the envelope? _____

2. How did Ima change the total cost?

3. How much is one chevron stamp? _____

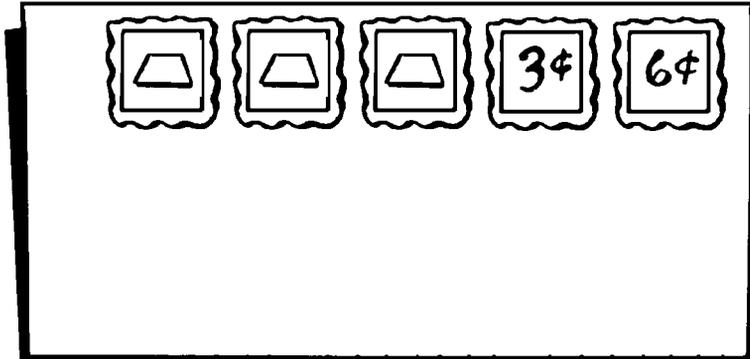
4. How did you figure out the answer to #3? _____

STAMP STUMPERS

**MAKE
THE
CASE**

How much is one trapezoid stamp?

The total cost of the five stamps on the envelope is 21¢.

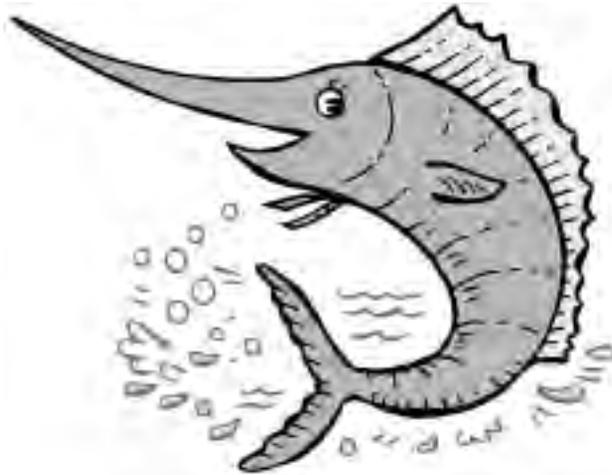


The trapezoid stamps cost the same.

That's easy.
One trapezoid
stamp costs
5¢.



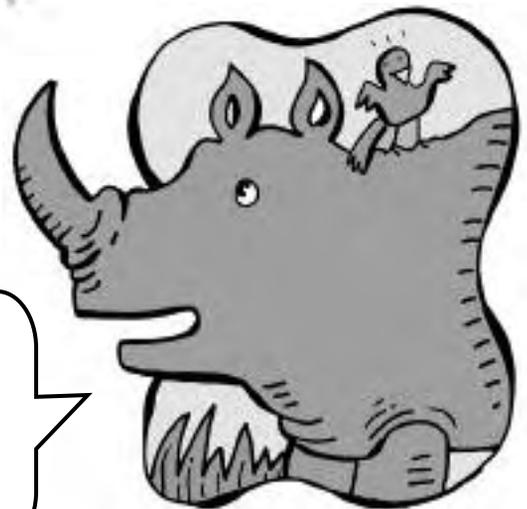
Wally Walrus



Marlee Marlin

I'm sure
it costs 6¢.

You're both
wrong. It has
to be 4¢.



Ralph Rhino

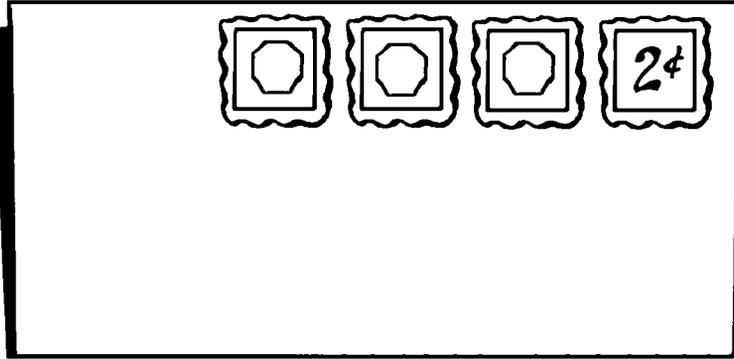
Who is sharp as a tack?

PROBLEM

1

How much is one octagon stamp?

The total cost of the four stamps on the envelope is 17¢.



The octagon stamps cost the same.

First, I'll pretend to take the 2¢ stamp off the envelope. Then I'll change the total cost.



Ima Thinker

1. Why did Ima pretend to take the 2¢ stamp off of the envelope? _____

2. How did Ima change the total cost?

3. How much is one octagon stamp? _____

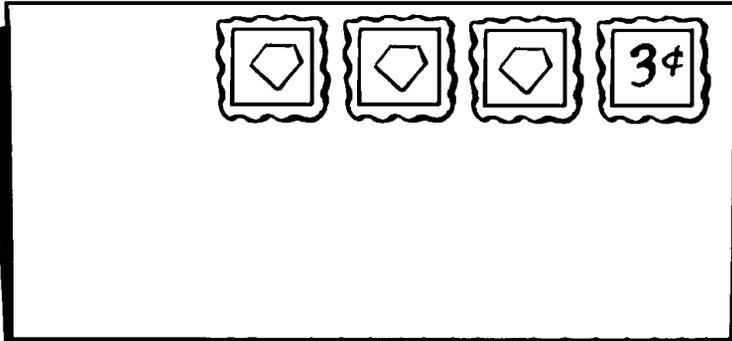
4. How did you figure out the answer to #3?

STAMP STUMPERS

**PROBLEM
2**

How much is one pentagon stamp?

The total cost of the four stamps on the envelope is 33¢.



The pentagon stamps cost the same.

First, I'll pretend to take the 3¢ stamp off the envelope. Then, I'll change the total cost.

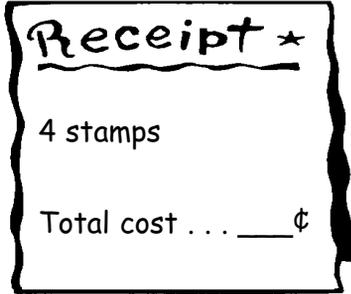
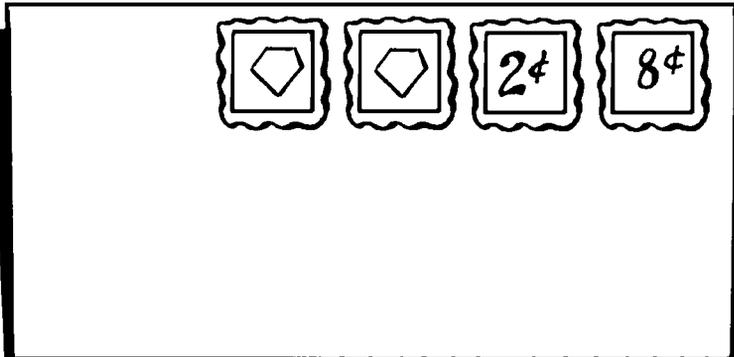


Ima Thinker

1. How did Ima change the total cost?

2. How much is one pentagon stamp? _____
3. How did you figure out the answer to #2?

4. Write the cost on each pentagon stamp below. Find the total cost.



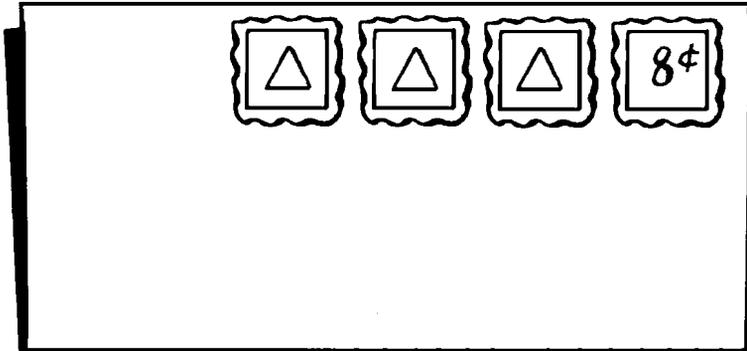
STAMP STUMPERS

PROBLEM

3

How much is one triangle stamp?

The total cost of the four stamps on the envelope is 29¢.



The triangle stamps cost the same.



First, I'll pretend to take the 8¢ stamp off the envelope. Then, I'll change the total cost.



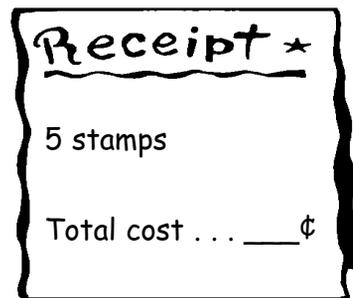
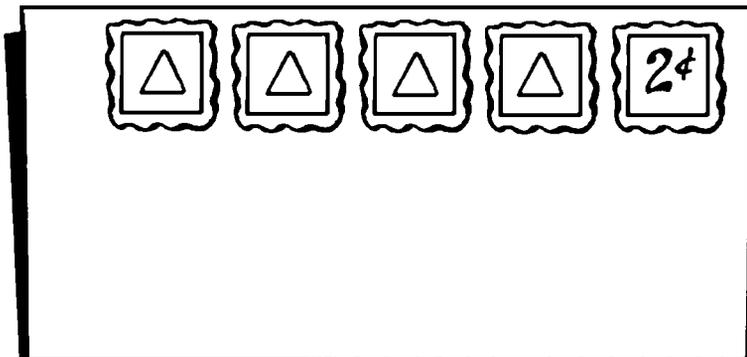
Ima Thinker

1. How did Ima change the total cost?

2. How much is one triangle stamp? _____

3. How did you figure out the answer to #2?

4. Write the cost on each triangle stamp below. Find the total cost.

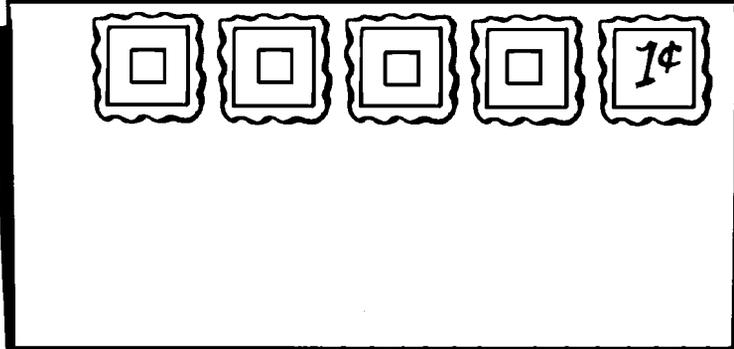


STAMP STUMPERS

PROBLEM 4

How much is one square stamp?

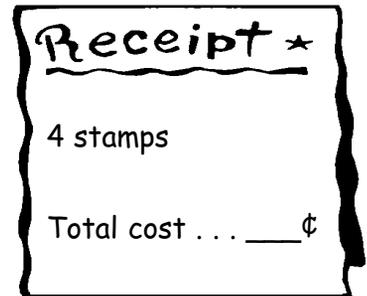
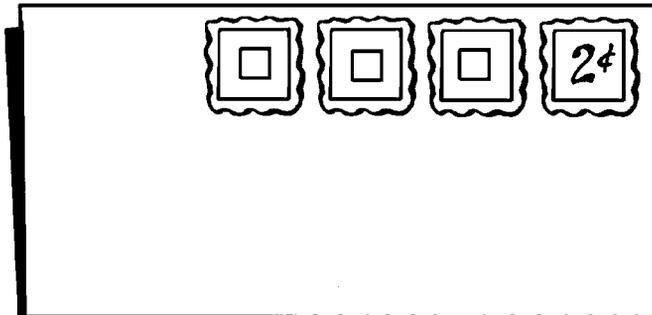
The total cost of the five stamps on the envelope is 25¢.



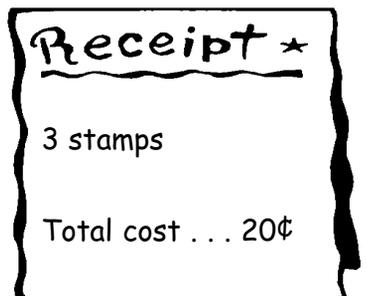
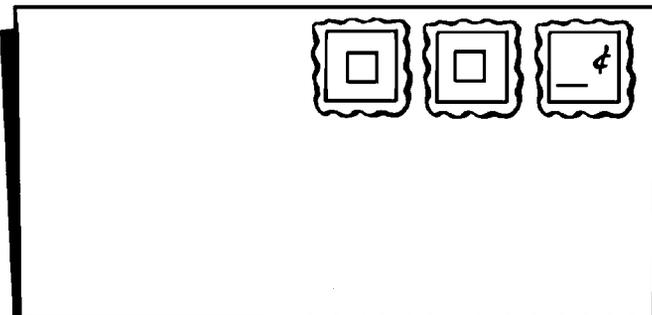
The square stamps cost the same.

1. How much is each square stamp? _____
2. How did you figure out the answer to #1? _____

3. Write the cost on each square stamp below. What is the total cost?



4. Write the cost on each square stamp below. What is the missing number?

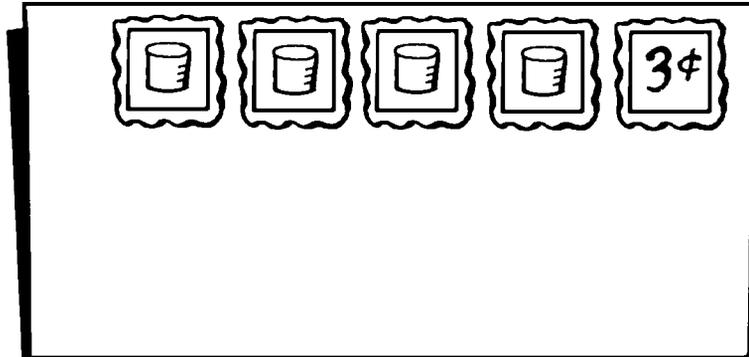


PROBLEM

5

How much is one cylinder stamp?

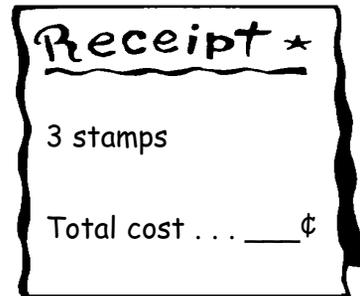
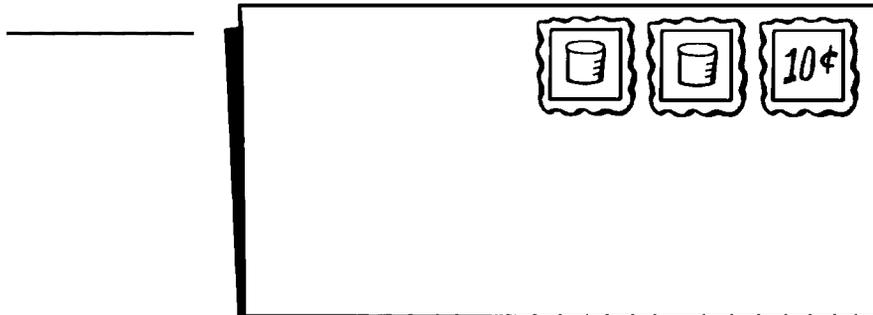
The total cost of the five stamps on the envelope is 15¢.



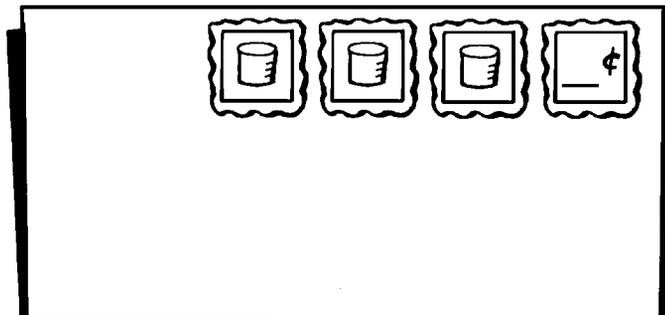
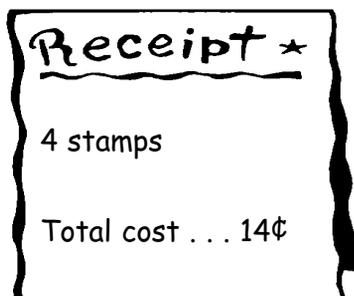
The cylinder stamps cost the same.

1. How much is each cylinder stamp? _____
2. How did you figure out the answer to #1? _____

3. Write the cost on each cylinder stamp below. What is the total cost?



4. Write the cost on each cylinder stamp below. What is the cost of the fourth stamp? _____



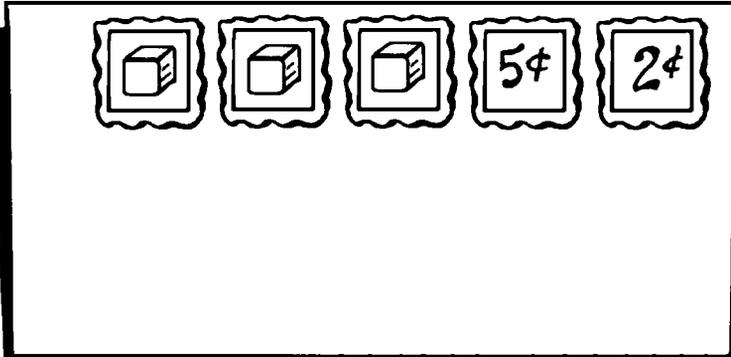
STAMP STUMPERS

PROBLEM

6

How much is one cube stamp?

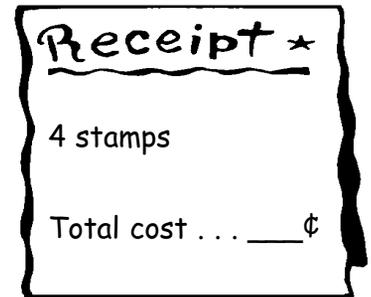
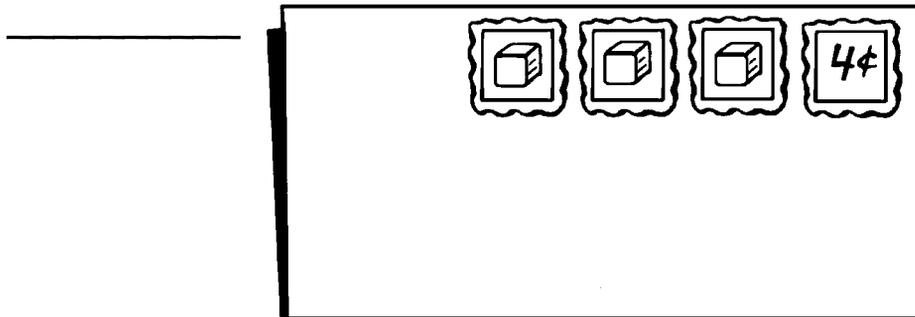
The total cost of the five stamps on the envelope is 31¢.



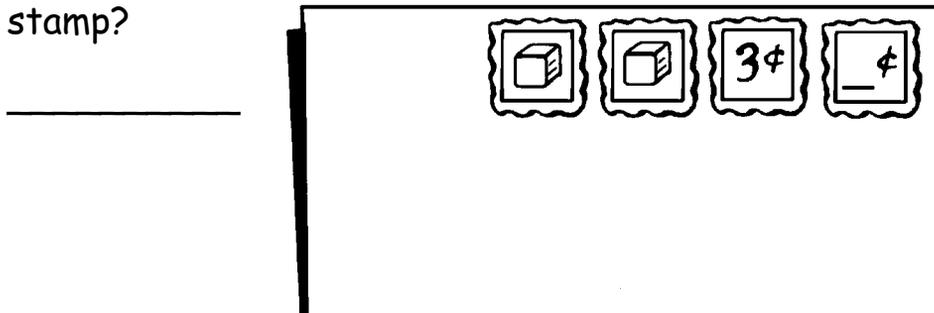
The cube stamps cost the same.

1. How much is one cube stamp? _____
2. How did you figure out the answer to #1? _____

3. Write the cost on each cube stamp below. What is the total cost?



4. Write the cost on each cube stamp. What is the cost of the fourth stamp?

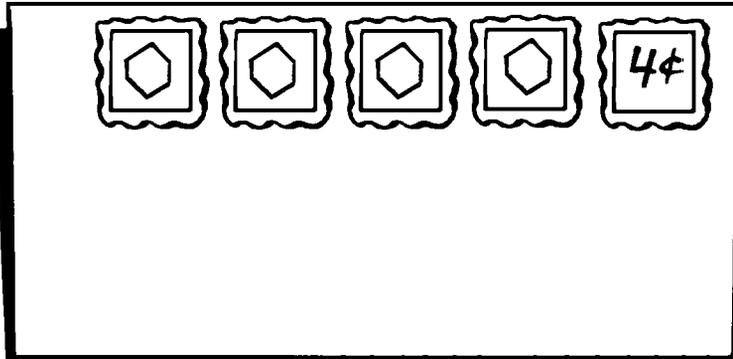


PROBLEM

7

How much is one hexagon stamp?

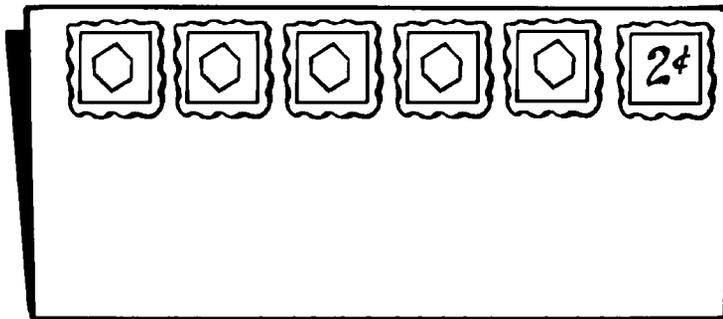
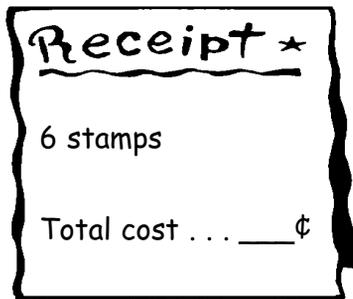
The total cost of the five stamps on the envelope is 40¢.



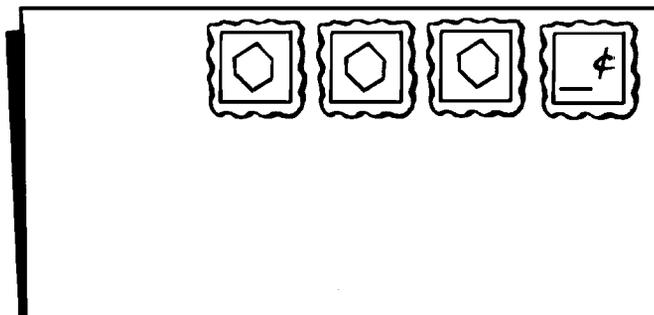
The hexagon stamps cost the same.

1. How much is each hexagon stamp? _____
2. How did you figure out the answer to #1? _____

3. Write the cost in each hexagon below. What is the total cost?



4. Write the cost in each hexagon. What is the missing number?



Jersey Number

Overview

Students use clues and reason logically to figure out the number represented by a letter on a player's jersey.

Algebra Focus

Solve for values of unknowns • Replace letters with their values

Problem-Solving Strategies

Make a list of possible solutions • Test possible solutions with clues •
Use logical reasoning

Related Math Skills

Compute with whole numbers • Compare numbers • Identify factors of numbers •
Identify odd and even numbers

Math Language

Less than $<$ • Greater than $>$ • Digit • Difference • Sum • Even number •
Odd number • Factor

Introducing the Problem Set

Make photocopies of “Solve the Problem: Jersey Number” (page 33) and distribute to students. Have students work in pairs, encouraging them to discuss strategies they might use to solve the problem. You may want to walk around and listen in on some of their discussions. After a few minutes, display the problem on the board (or on the overhead if you made a transparency) and use the following questions to guide a whole-class discussion on how to solve the problem:

- Why is 9 the greatest number on Ima's list? (*Clue 1 shows that when A is added to itself, the sum is less than 20. Since A must be less than 10, then the greatest number that A can represent is 9; $9 + 9 = 18$.)*)
- What other numbers are on Ima's list? (*8, 7, 6, 5, 4, 3, 2, 1, and 0*)

- Which clue do you think Ima will use next? *(Any of the clues will give useful information. If Ima uses Clue 2, she can cross off 0, 1, 2, 3, 4, and 5. That leaves 6, 7, 8, and 9.)*
- What does Clue 3 mean? *(A is an even number. When you divide A by 2, you get a whole number for an answer.)*
- Which numbers does Clue 3 eliminate? *(7 and 9)*
- Which remaining number fits Clue 4? *(8)*

Work together as a class to answer the questions in “Solve the Problem: Jersey Number.”

Math Chat With the Transparency

Display the “Make the Case: Jersey Number” transparency on the overhead. Before students can decide which character is “sharp as a tack,” they need to figure out the answer to the problem. Encourage students to work in pairs to solve the problem. Then bring the class together for another whole-class discussion. Ask:

- Who has the right answer? *(Wally Walrus)*
- How did you figure it out? *(From Clue 2, B is less than 90 – 40, or 50. So B can be 49 or less. Make a list of those numbers. From Clue 1, B has to have a factor of 5, so eliminate all numbers except for 5, 10, 15, 20, 25, 30, 35, 40, and 45. Clue 3 eliminates all even numbers leaving 5, 15, 25, 35, and 45. Clue 4 indicates that the tens digit is one less than the ones digit. Only 45 fits that clue.)*
- How do you think Marlee Marlin got the answer, 35? *(35 fits clues 1, 2, and 3. Marlee Marlin probably forgot to use Clue 4.)*
- How do you think Ralph Rhino got the answer 43? *(43 fits clues 2, 3, and 4. Ralph Rhino probably forgot to use Clue 1.)*

Name _____ Date _____

JERSEY NUMBER

SOLVE THE PROBLEM **What is the number on the player's jersey?**

The letter **A** stands for the number on the jersey.
Use the clues to figure out **A**.



CLUES:
1) $A + A < 20$
2) $A > 5$
3) 2 is a factor of **A**
4) 3 is not a factor of **A**

I'll start with Clue 1. I'll begin making a list of numbers for **A**.



1. What are all the numbers on Ima's list?

2. What is **A**? _____

3. How did you figure out the number on the jersey?

4. Check your number with the clues. Show your work here.

33

Name _____ Date _____

JERSEY NUMBER

MAKE THE CASE **What is the number on the player's jersey?**

The letter **B** stands for the number on the jersey.
Use the clues to figure out **B**.



CLUES:
1) 5 is a factor of **B**
2) $B < 90 - 40$
3) **B** is not an even number
4) The tens digit is one less than the ones digit

I believe that **B** is 45.



I am certain that **B** is 35.



Obviously **B** is 43.



Who is sharp as a tack?

34

**SOLVE
THE
PROBLEM**

What is the number on the player's jersey?

The letter **A** stands for the number on the jersey.

Use the clues to figure out **A**.



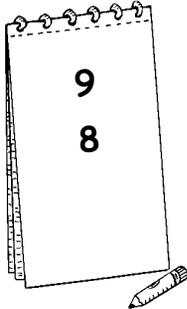
CLUES:

- 1) $A + A < 20$
- 2) $A > 5$
- 3) 2 is a factor of **A**
- 4) 3 is not a factor of **A**

I'll start with Clue 1. I'll begin making a list of numbers for **A**.



Ima Thinker



1. What are all the numbers on Ima's list?

2. What is **A**? _____

3. How did you figure out the number on the jersey?

4. Check your number with the clues. Show your work here.

JERSEY NUMBER

MAKE THE CASE

What is the number on the player's jersey?

The letter **B** stands for the number on the jersey.

Use the clues to figure out **B**.

CLUES:

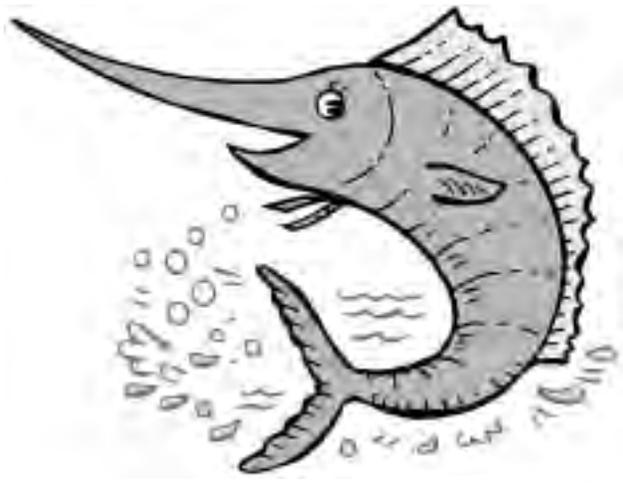
- 1) 5 is a factor of **B**
- 2) **B** < 90 - 40
- 3) **B** is not an even number
- 4) The tens digit is one less than the ones digit



I believe that **B** is 45.



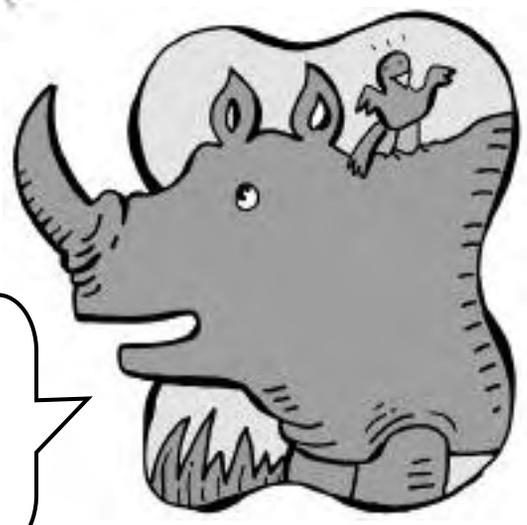
Wally Walrus



Marlee Marlin

I am certain that **B** is 35.

Obviously **B** is 43.



Ralph Rhino

Who is sharp as a tack?

PROBLEM

1

What is the number on the player's jersey?

The letter **C** stands for the number on the jersey.

Use the clues to figure out **C**.

CLUES:

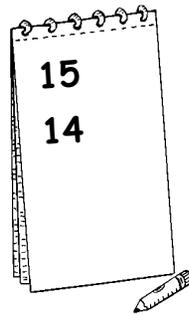
- 1) **C** < 6 + 10
- 2) **C** is an odd number
- 3) 5 is not a factor of **C**
- 4) 3 is a factor of **C**
- 5) **C** is not 3 x 3



I'll start with Clue 1.
I'll begin making a list of numbers less than 16.



Ima Thinker



1. Why did Ima start with Clue 1?

2. What is **C**? _____

3. How did you figure out the number on the jersey?

4. Check your number with the clues. Show your work here.

PROBLEM

2

What is the number on the player's jersey?

The letter **D** stands for the number on the jersey.

Use the clues to figure out **D**.

CLUES:

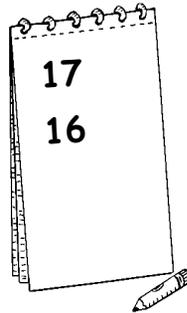
- 1) 3 is a factor of **D**
- 2) **D** > 9 - 4
- 3) **D** is not an even number
- 4) **D** < 18
- 5) **D** is not $2 \times 2 + 5$



I'll start with Clue 4.
I'll begin making a list of numbers less than 18.



Ima Thinker



1. Why did Ima start with Clue 4?

2. What is **D**? _____

3. How did you figure out the number on the jersey?

4. Check your number with the clues. Show your work here.

PROBLEM

3

What is the number on the player's jersey?

The letter **E** stands for the number on the jersey.

Use the clues to figure out **E**.

CLUES:

- 1) **E** > 10 - 8
- 2) **E** is not an even number
- 3) **E** + **E** + **E** < 24
- 4) 3 is not a factor of **E**
- 5) **E** is not 1 x 5

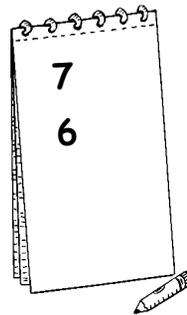


I'll start with Clue 3.
I'll begin making a list of numbers less than 8.



Ima Thinker

1. Why did Ima start with Clue 3?



2. What is **E**? _____

3. How did you figure out the number on the jersey?

4. Check your number with the clues. Show your work here.

PROBLEM

4

What is the number on the player's jersey?

The letter **F** stands for the number on the jersey.

Use the clues to figure out **F**.

CLUES:

- 1) $F + F < 20$
- 2) $F + F + F > 12$
- 3) **F** is not an odd number
- 4) 3 is not a factor of **F**



1. Which clue did you use first? Why? _____

2. What is **F**? _____

3. How did you figure out the number on the jersey?

4. Check your number with the clues. Show your work here.

PROBLEM

5

What is the number on the player's jersey?

The letter **G** stands for the number on the jersey.

Use the clues to figure out **G**.

CLUES:

- 1) **G** $>$ 20
- 2) **G** $<$ 30
- 3) **G** is an odd number
- 4) 3 is a factor of **G**
- 5) The difference between the tens digit and the ones digit of **G** is 1



1. Which clue did you use first? Why? _____

2. What is **G**? _____

3. How did you figure out the number on the jersey?

4. Check your number with the clues. Show your work here.

PROBLEM

6

What is the number on the player's jersey?

The letter **H** stands for the number on the jersey.

Use the clues to figure out **H**.

CLUES:

- 1) $4 \times \mathbf{H} > 40$
- 2) 3 is a factor of **H**
- 3) **H** is not an odd number
- 4) $\mathbf{H} < 40 \div 2$
- 5) The sum of the digits of **H** is not 9



1. Which clue did you use first? Why? _____

2. What is **H**? _____

3. How did you figure out the number on the jersey?

4. Check your number with the clues. Show your work here.

PROBLEM

7

JERSEY NUMBER

What is the number on the player's jersey?

The letter **J** stands for the number on the jersey.

Use the clues to figure out **J**.

CLUES:

- 1) **J** > 20
- 2) **J** < 10 + 30
- 3) The ones digit of **J** is greater than the tens digit
- 4) 5 is a factor of **J**
- 5) The sum of the digits of **J** is an even number



1. Which clue did you use first? Why? _____

2. What is **J**? _____

3. How did you figure out the number on the jersey?

4. Check your number with the clues. Show your work here.

Weigh In

Overview

Students examine three scales, each showing the total weight of kids, animals, and other objects, then solve for the weight of each.

Algebra Focus

Solve two or three equations with two or three unknowns • Replace unknowns with their values

Problem-Solving Strategies

Reason deductively • Test cases

Related Math Skills

Compute with whole numbers

Math Language

Pounds • Scale • Weigh • Total weight

Introducing the Problem Set

Make photocopies of “Solve the Problem: Weigh In” (page 44) and distribute to students. Have students work in pairs, encouraging them to discuss strategies they might use to solve the problem. You may want to walk around and listen in on some of their discussions. After a few minutes, display the problem on the board (or on the overhead if you made a transparency) and use the following questions to guide a whole-class discussion on how to solve the problem:

- Look at the three scales. Who are on scale A? (*Tom and Smudge the cat*)
- Who is on scale B? (*Tom*)
- Who are on scale C? (*Tom and Alex the dog*)
- Whose weight do you know for sure? (*Tom’s weight*) How do you know? (*He is the only one on scale B.*)

- How can knowing that Tom weighs 85 pounds help you figure out Smudge's weight? (*If Tom weighs 85 pounds, and the total weight of Tom and Smudge is 100 pounds, then Smudge must weigh $100 - 85$, or 15 pounds.*)
- How can you figure out Alex's weight? (*On scale C, Tom and Alex weigh a total of 125 pounds. Since Tom weighs 85 pounds, Alex weighs $125 - 85$, or 40 pounds*)

Work together as a class to answer the questions in "Solve the Problem: Weigh In."

Math Chat With the Transparency

Display the "Make the Case: Weigh In" transparency on the overhead. Before students can decide which character is "sharp as a tack," they need to figure out the answer to the problem. Encourage students to work in pairs to solve the problem. Then bring the class together for another whole-class discussion. Ask:

- Who has the right answer? (*Ralph Rhino*)
- How did you figure it out? (*On scale C, five bags of rocks weighed 10 pounds. So one bag of rocks is $10 \div 5$, or 2 pounds. Since a bag of rocks is 2 pounds, the fishbowl on scale B is $7 - 2$, or 5 pounds. Since a fishbowl weighs 5 pounds, James on scale A must weigh $75 - 5$, or 70 pounds.*)
- How do you think Wally Walrus got the answer of 68 pounds? (*He probably subtracted the weights of both the bag of rocks and the fishbowl, or 7 pounds, from 75 pounds.*)
- How do you think Marlee Marlin got the answer of 73? (*She probably subtracted the weight of the bag of rocks from 75 pounds instead of subtracting the weight of one fishbowl.*)

Name _____ Date _____

SOLVE THE PROBLEM **WEIGH IN**

How much does each one weigh?

Scale A Scale B Scale C

I know how much Tom weighs. I'll write that number on all his pictures.

Ima Thinker

1. What number of pounds will Ima write on Tom's pictures? _____
2. Alex the dog weighs _____ pounds.
3. Smudge the cat weighs _____ pounds.
4. How did you figure out the number of pounds for Smudge?

44

Name _____ Date _____

MAKE THE CASE **WEIGH IN**

How much does James weigh?

Scale A Scale B Scale C

Note: The bags of rocks weigh the same amount.

It's clear. James weighs 68 pounds.

Marlee Marlin

That's easy. James is 73 pounds.

Ralph Rhino

No way! James weighs 70 pounds.

Wally Walrus

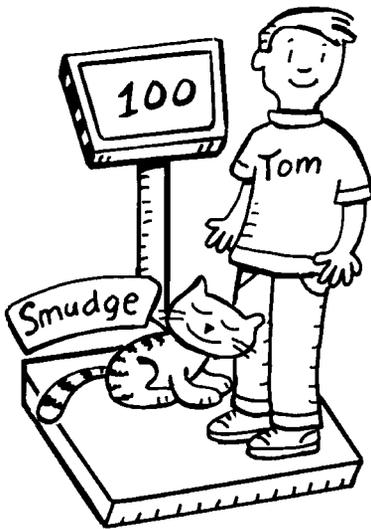
Who is sharp as a tack?

45

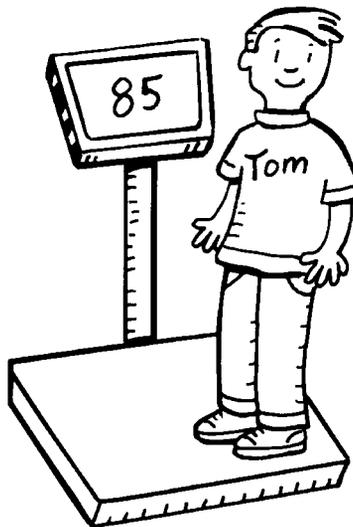
WEIGH IN

**SOLVE
THE
PROBLEM**

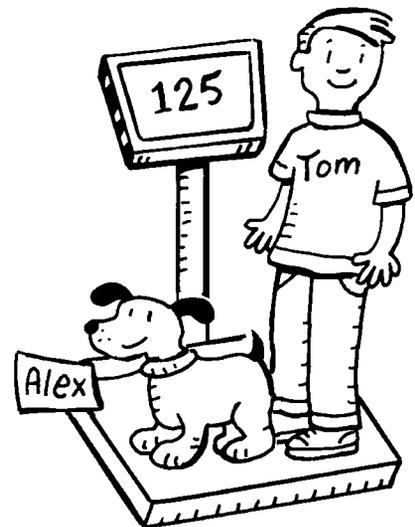
How much does each one weigh?



Scale A



Scale B



Scale C

I know how much Tom weighs. I'll write that number on all his pictures.



Ima Thinker

1. What number of pounds will Ima write on Tom's pictures? _____
2. Alex the dog weighs _____ pounds.
3. Smudge the cat weighs _____ pounds.
4. How did you figure out the number of pounds for Smudge?

WEIGH IN

MAKE THE CASE

How much does James weigh?



Scale A



Scale B



Scale C

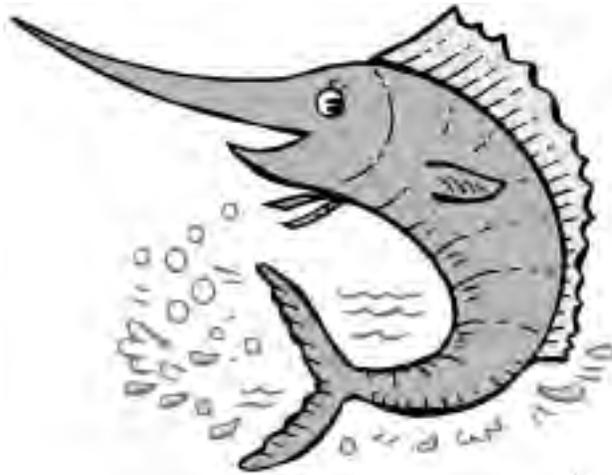
Note:
The bags of rocks weigh the same amount.



It's clear.
James weighs
68 pounds.

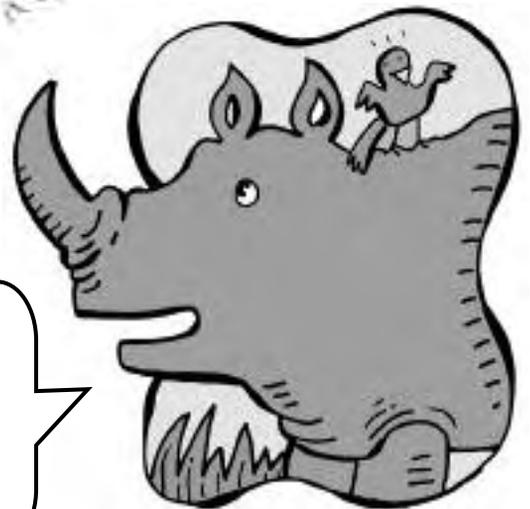


Wally Walrus



Marlee Marlin

That's easy.
James is 73
pounds.



Ralph Rhino

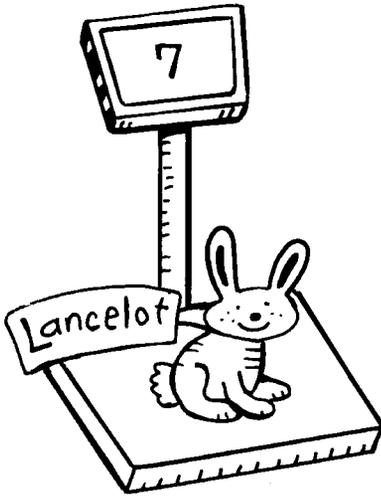
No way!
James weighs
70 pounds.

Who is sharp as a tack?

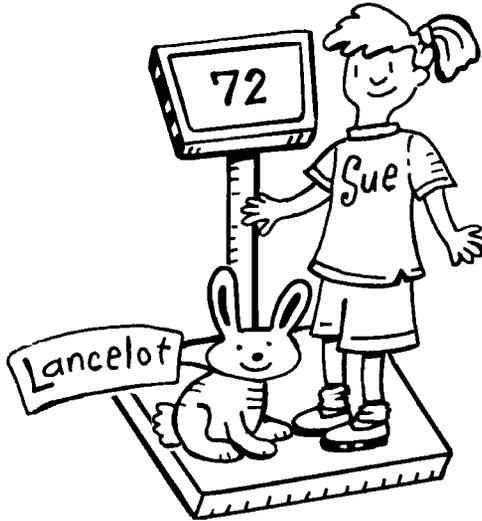
PROBLEM

1

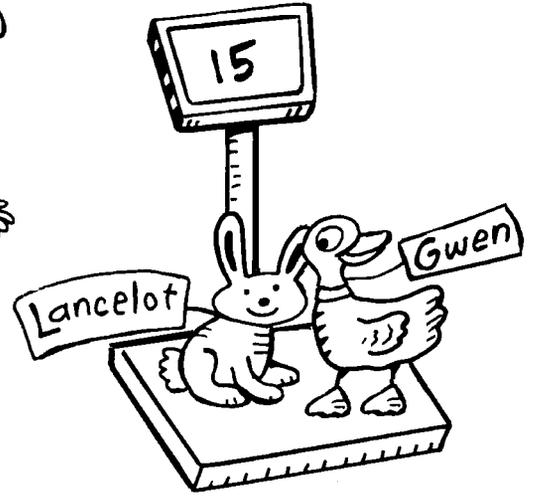
How much does each one weigh?



Scale A



Scale B



Scale C

I know how much Lancelot weighs. I'll write that number on all his pictures.



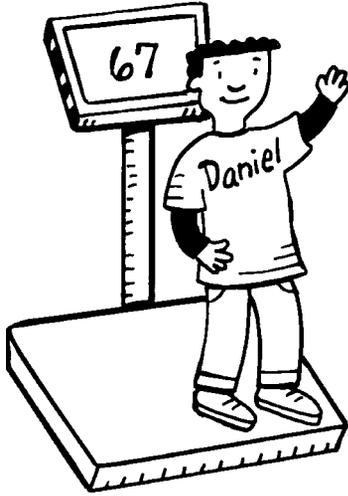
Ima Thinker

1. What number of pounds will Ima write on Lancelot's pictures? _____
2. Gwen the duck weighs _____ pounds.
3. Sue weighs _____ pounds.
4. How much do Sue, Lancelot, and Gwen weigh altogether? _____

PROBLEM

2

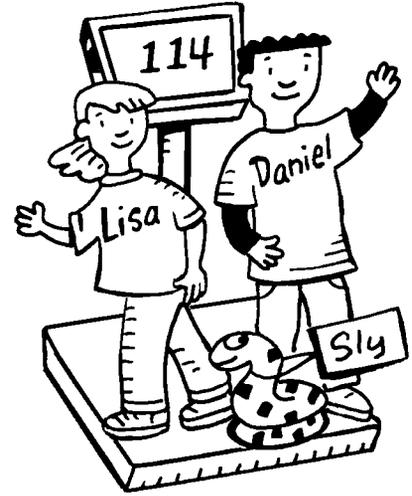
How much does each one weigh?



Scale A



Scale B



Scale C

I know how much Daniel weighs. I'll write that number on all his pictures.



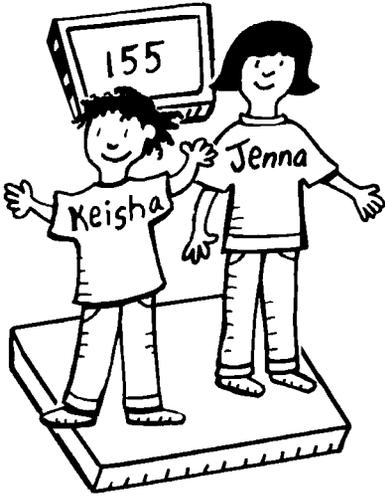
Ima Thinker

1. What number of pounds will Ima write on the pictures of Daniel? _____
2. Lisa weighs _____ pounds.
3. Sly the snake weighs _____ pounds.
4. How much more does Daniel weigh than Lisa? _____

PROBLEM

3

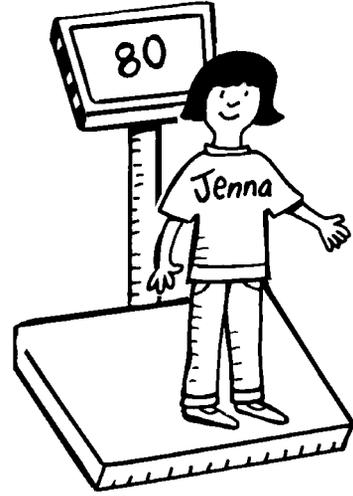
How much does each one weigh?



Scale A



Scale B



Scale C

I know how much Jenna weighs. I'll write that number on all her pictures.



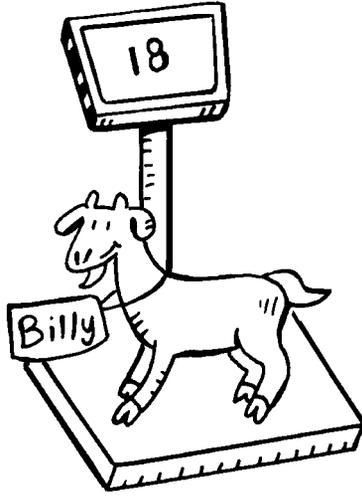
Ima Thinker

1. What number of pounds will Ima write on the pictures of Jenna? _____
2. Keisha weighs _____ pounds.
3. Sasha the dog weighs _____ pounds.
4. Altogether, Jenna, Keisha, and Sasha weigh _____ pounds.

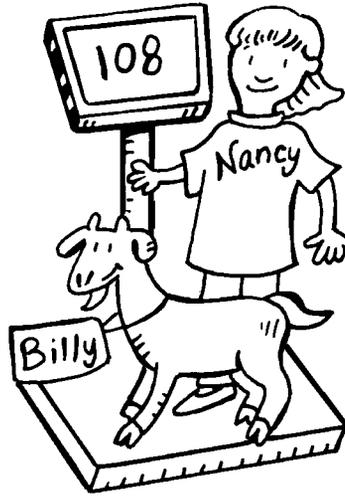
PROBLEM

4

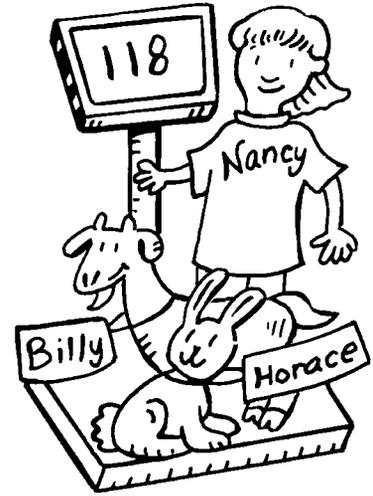
How much does each one weigh?



Scale A



Scale B



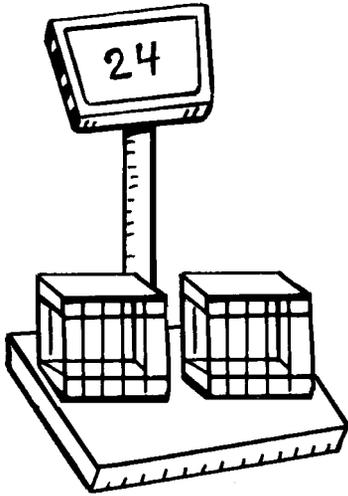
Scale C

1. Billy the goat weighs _____ pounds.
2. Nancy weighs _____ pounds.
3. Horace the rabbit weighs _____ pounds.
4. How much more does Billy weigh than Horace? _____

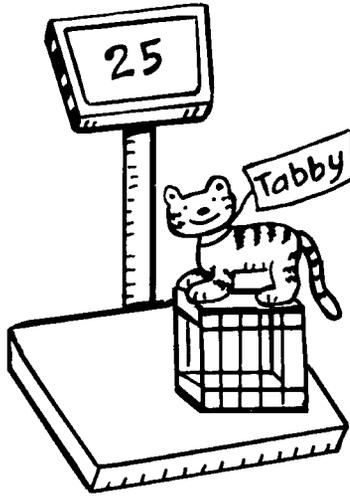
PROBLEM

5

How much does each one weigh?



Scale A



Scale B



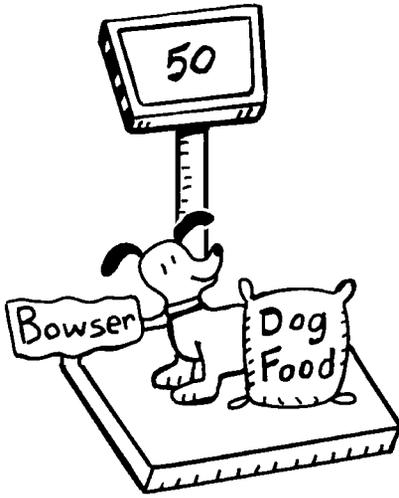
Scale C

1. One cage weighs _____ pounds.
2. Tabby the cat weighs _____ pounds.
3. Winslow the rabbit weighs _____ pounds.
4. How did you figure out how much Winslow weighs?

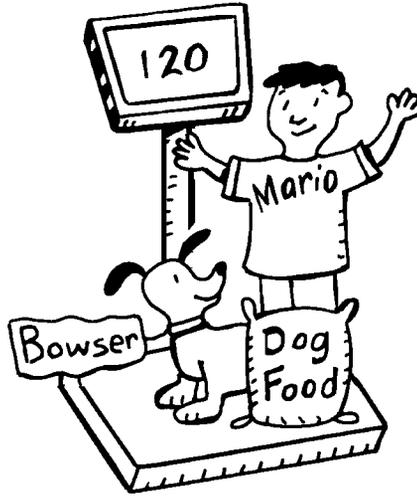
PROBLEM

6

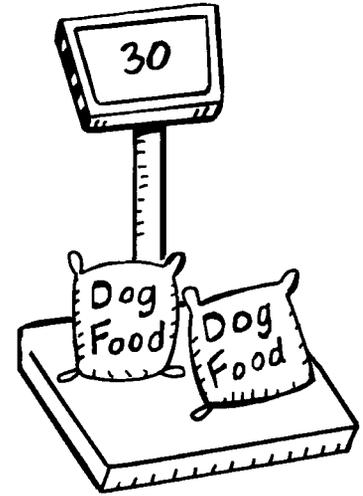
How much does each one weigh?



Scale A



Scale B



Scale C

1. One bag of dog food weighs _____ pounds.
2. Bowser the dog weighs _____ pounds.
3. Mario weighs _____ pounds.
4. How did you figure out how much Mario weighs?

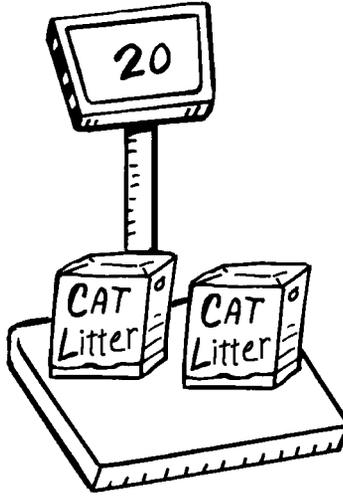
PROBLEM

7

How much does each one weigh?



Scale A



Scale B



Scale C

1. One box of cat litter weighs _____ pounds.
2. One bag of cat food weighs _____ pounds.
3. El Gato the cat weighs _____ pounds.
4. How did you figure out how much El Gato weighs?

Balancing Animals

Overview

Shown two pan balances with toy animals, students identify how many of one type of toy animal will balance another type of toy animal.

Algebra Focus

Understand that substituting one set of animals with a second set of equal weight preserves balance • Explore equality through the use of pan balances

Problem-Solving Strategies

Reason about proportional relationships

Related Math Skills

Compute with whole numbers

Math Language

Balance • Weigh the same

Introducing the Problem Set

Make photocopies of “Solve the Problem: Balancing Animals” (page 55) and distribute to students. Have students work in pairs, encouraging them to discuss strategies they might use to solve the problem. You may want to walk around and listen in on some of their discussions. After a few minutes, display the problem on the board (or on the overhead if you made a transparency) and use the following questions to guide a whole-class discussion on how to solve the problem:

- Look at the pan balances. What do you see? (*Two pan balances that show equal weights. The first pan balance shows that 2 fish balance one frog. The second pan balance shows that 3 frogs balance one shark.*)
- Which weighs more—one frog or one fish? (*One frog*) How do you know? (*It takes 2 fish to balance one frog, so the frog weighs twice as much as one fish, or one fish is half the weight of one frog.*)

- What do you need to figure out? (*How many fish will balance one shark?*)
- What will you do first? (*Write “2 fish” on each frog in the second pan balance.*)
- If one frog weighs 2 pounds, how many pounds is one shark? (*6 pounds*) How do you know? (*3 frogs balance one shark, and $2 + 2 + 2 = 6$*)

Work together as a class to answer the questions in “Solve the Problem: Balancing Animals.”

Math Chat With the Transparency

Display the “Make the Case: Balancing Animals” transparency on the overhead. Before students can decide which character is “sharp as a tack,” they need to figure out the answer to the problem. Encourage students to work in pairs to solve the problem. Then bring the class together for another whole-class discussion. Ask:

- Who has the right answer? (*Wally Walrus*)
- How did you figure it out? (*One crab balances 3 clams, so 2 crabs will balance 6 clams. Since 6 clams balance 1 lobster, 2 crabs balance 1 lobster.*)
- How do you think Marlee Marlin got the answer 3? (*She probably mixed up crabs and clams, and forgot to multiply the 3 clams by 2.*)
- How do you think Ralph Rhino got the answer 18? (*He probably multiplied 3 times the number of clams in the second pan: $3 \times 6 = 18$.*)

Name _____ Date _____

SOLVE THE PROBLEM **BALANCING ANIMALS**

How many fish will balance one shark?

Toy animals that are the same weigh the same.

I know how many fish balance one frog. I'll write that number of fish on each frog.

Ima Thinker

1. What number of fish will Ima write on each frog? _____
2. How many frogs balance one shark? _____
3. How many fish will balance one shark? _____
4. How did you figure out the answer to #3? _____

55

Name _____ Date _____

MAKE THE CASE **BALANCING ANIMALS**

How many crabs will balance one lobster?

Toy animals that are the same weigh the same.

That's easy. Two crabs will balance one lobster.

Obviously it's 3 crabs.

Marlee Marlin

You're both wrong. I am sure it's 18 crabs.

Wally Walrus **Ralph Rhino**

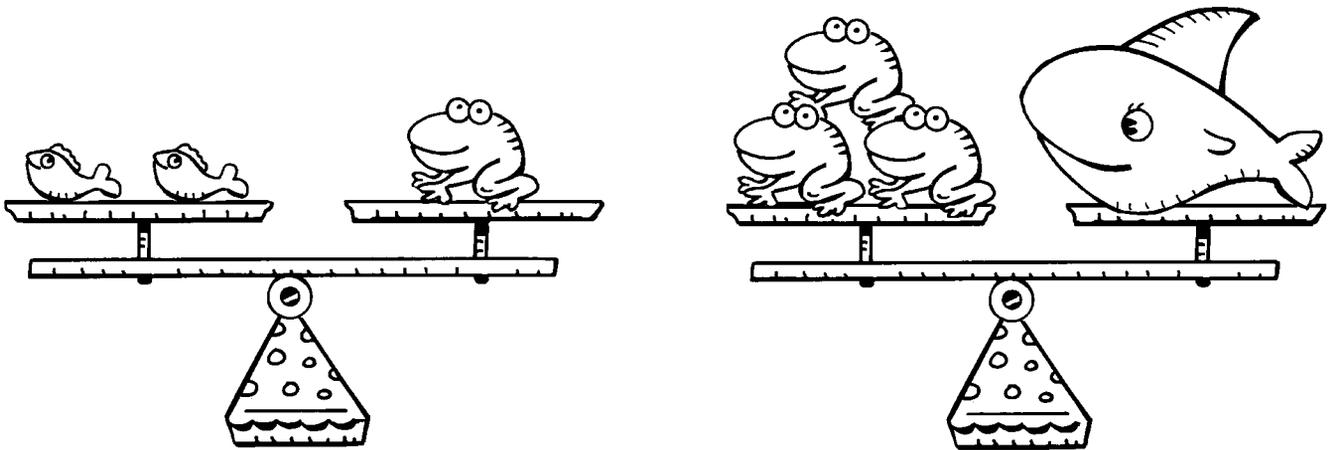
Who is sharp as a tack?

56

BALANCING ANIMALS

**SOLVE
THE
PROBLEM**

How many fish will balance one shark?



Toy animals that are the same weigh the same.

I know how many fish balance one frog. I'll write that number of fish on each frog.



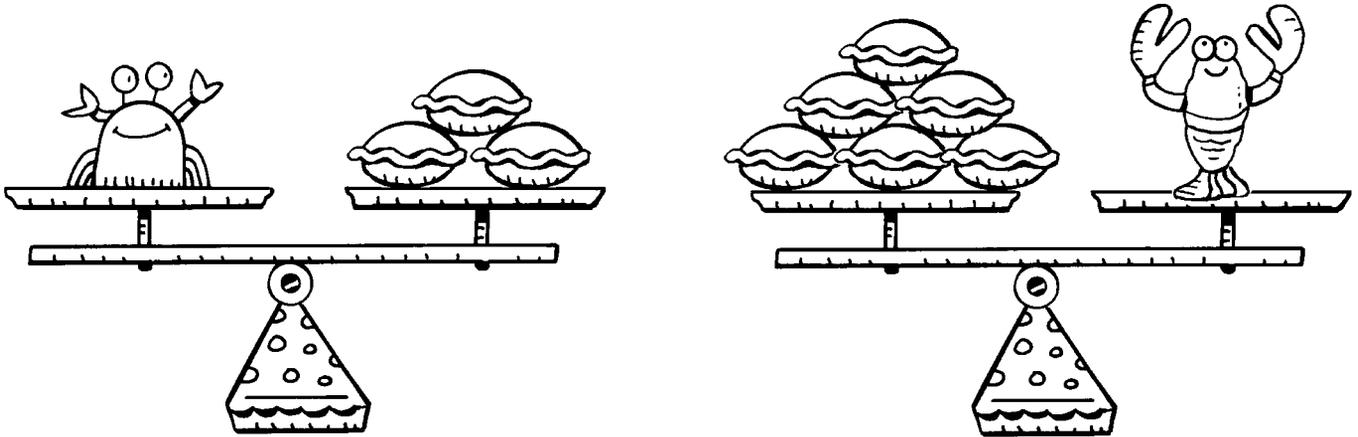
Ima Thinker

1. What number of fish will Ima write on each frog? _____
2. How many frogs balance one shark? _____
3. How many fish will balance one shark? _____
4. How did you figure out the answer to #3 _____

BALANCING ANIMALS

MAKE THE CASE

How many crabs will balance one lobster?



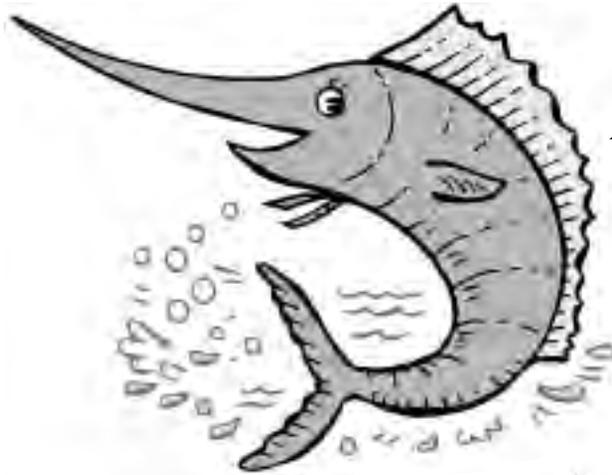
Toy animals that are the same weigh the same.

That's easy. Two crabs will balance one lobster.



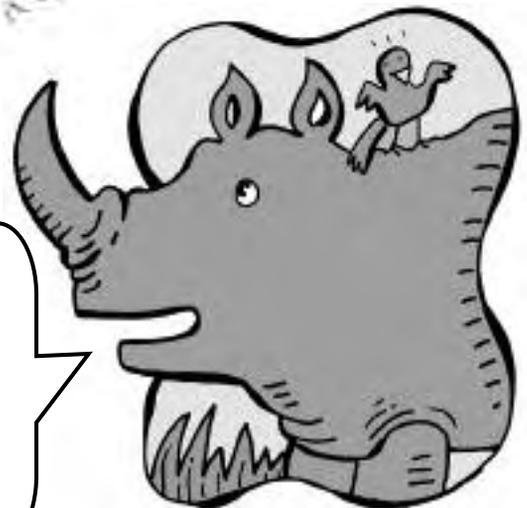
Wally Walrus

Obviously it's 3 crabs.



Marlee Marlin

You're both wrong. I am sure it's 18 crabs.



Ralph Rhino

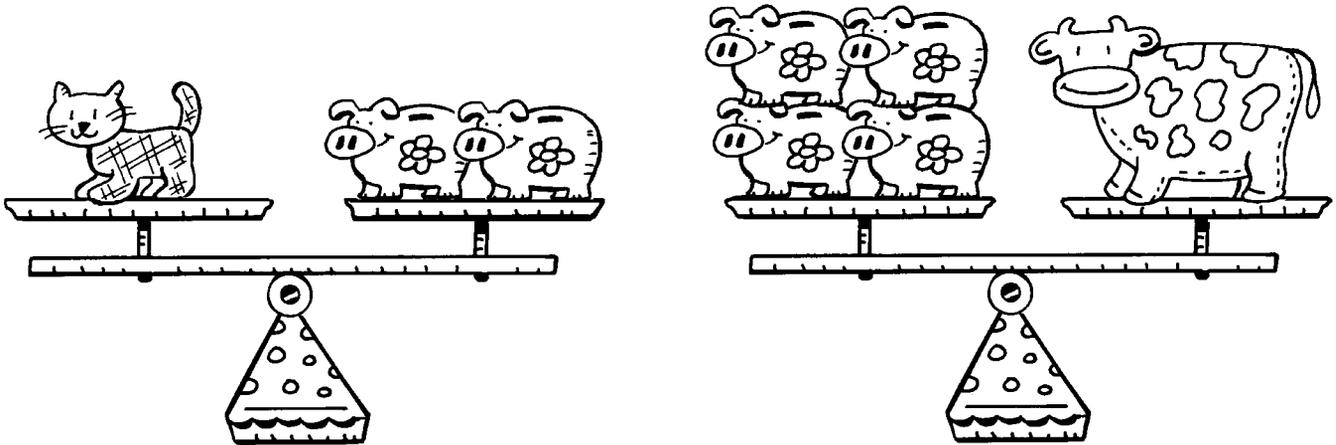
Who is sharp as a tack?

BALANCING ANIMALS

PROBLEM

1

How many cats will balance one cow?



Toy animals that are the same weigh the same.

I know how many cats balance two pigs. I'll write that number of cats on each set of two pigs.



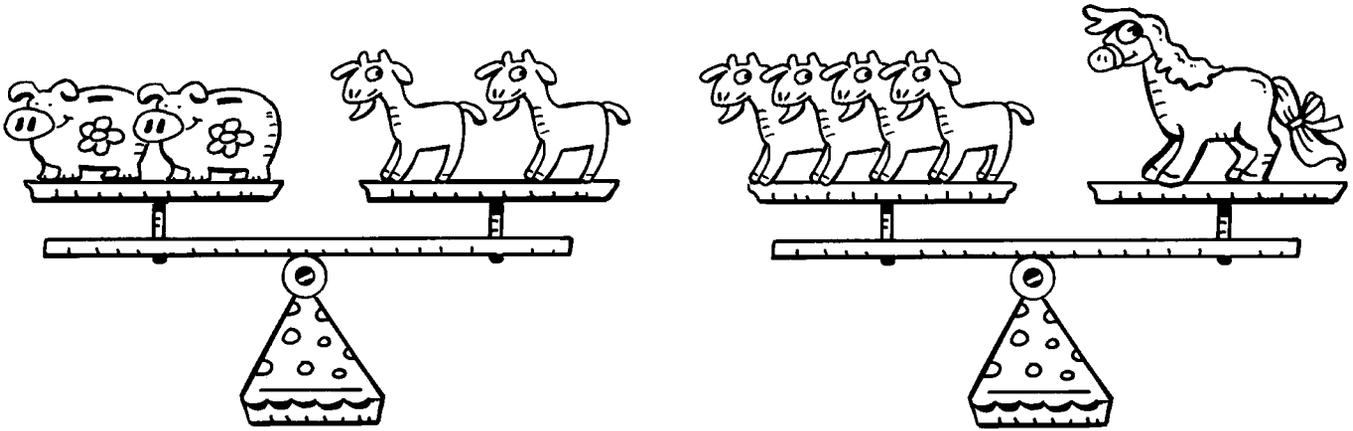
Ima Thinker

1. What number of cats will Ima write on each set of two pigs? _____
2. How many pigs balance one cow? _____
3. How many cats will balance one cow? _____
4. How did you figure out the answer to #3? _____

PROBLEM

2

How many pigs will balance one horse?



Toy animals that are the same weigh the same.

I know how many pigs balance 2 goats. I'll write that number of pigs on each set of 2 goats.



Ima Thinker

1. How many goats balance 2 pigs?

2. How many pigs will balance one horse?

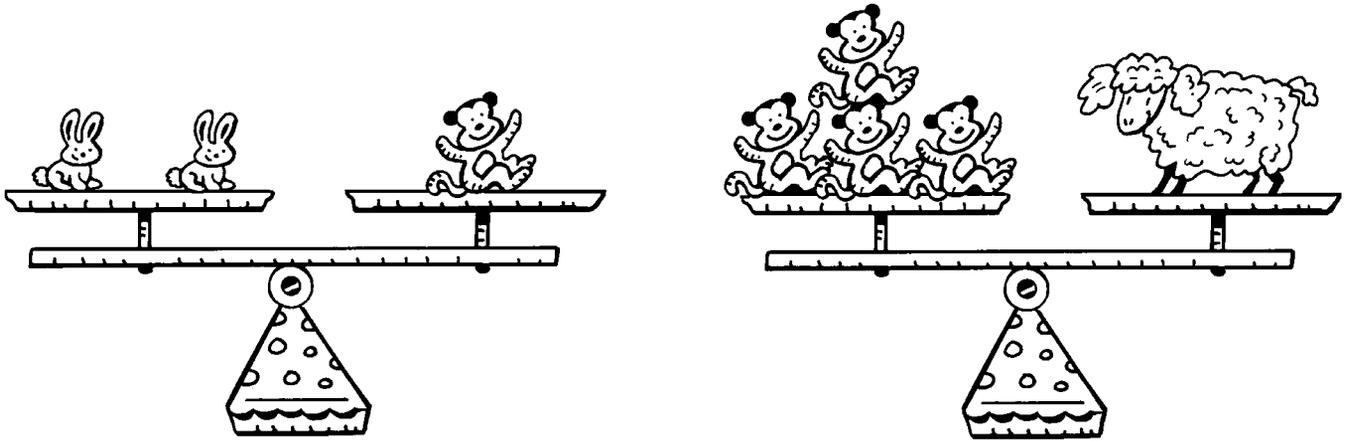
3. How did you figure out the answer to #2? _____

4. If one goat weighs 2 pounds, what is the weight of one horse?

PROBLEM

3

How many rabbits will balance one lamb?



Toy animals that are the same weigh the same.

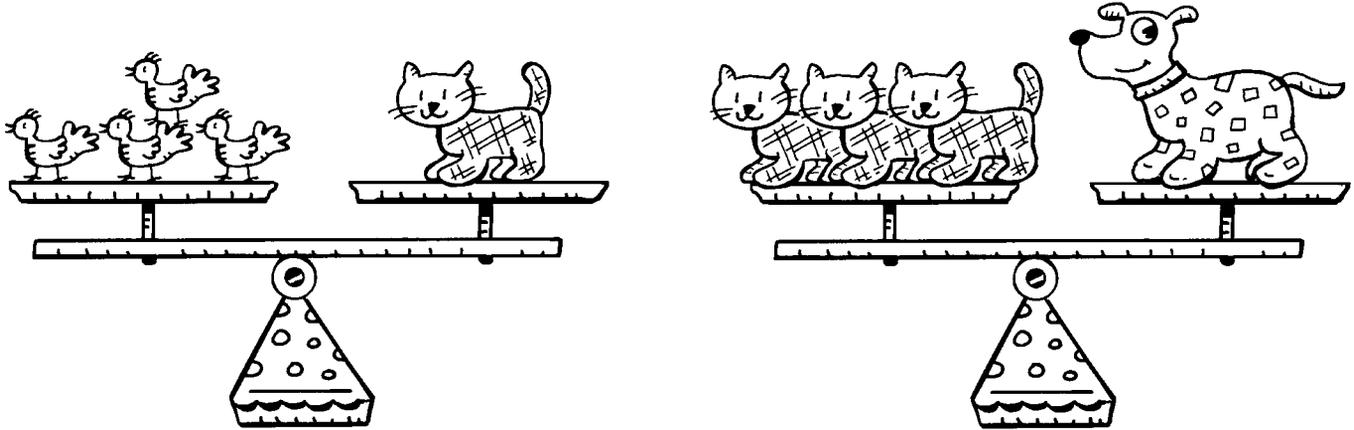
1. How many rabbits balance one monkey? _____
2. How many rabbits will balance one lamb? _____
3. How did you figure out the answer to #2? _____

4. If one monkey weighs 4 pounds, what is the weight of one lamb?

PROBLEM

4

How many birds will balance one dog?



Toy animals that are the same weigh the same.

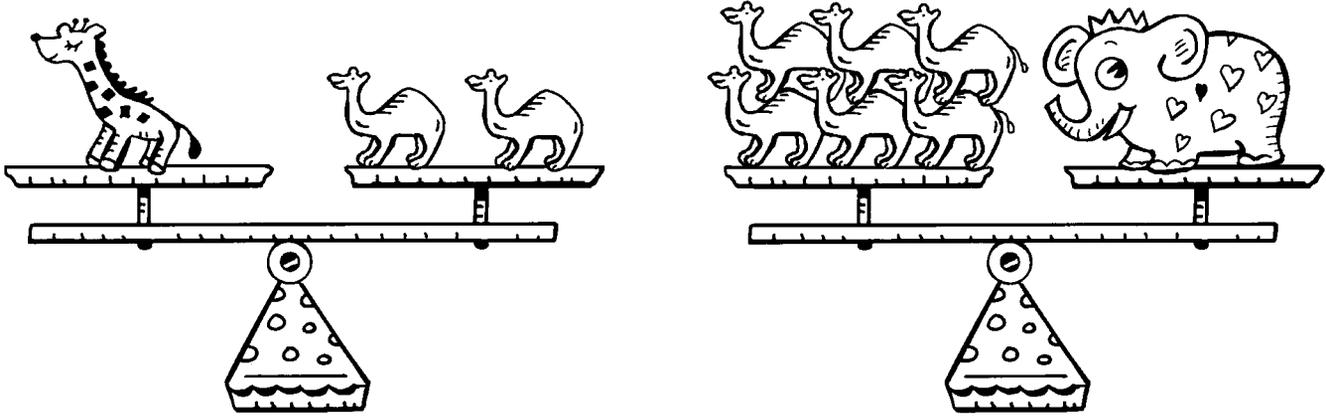
1. How many cats balance one dog? _____
2. How many birds will balance one dog? _____
3. How did you figure out the answer to #2? _____

4. If one bird weighs 1 pound, what is the weight of one dog? _____

PROBLEM

5

How many giraffes will balance one elephant?



Toy animals that are the same weigh the same.

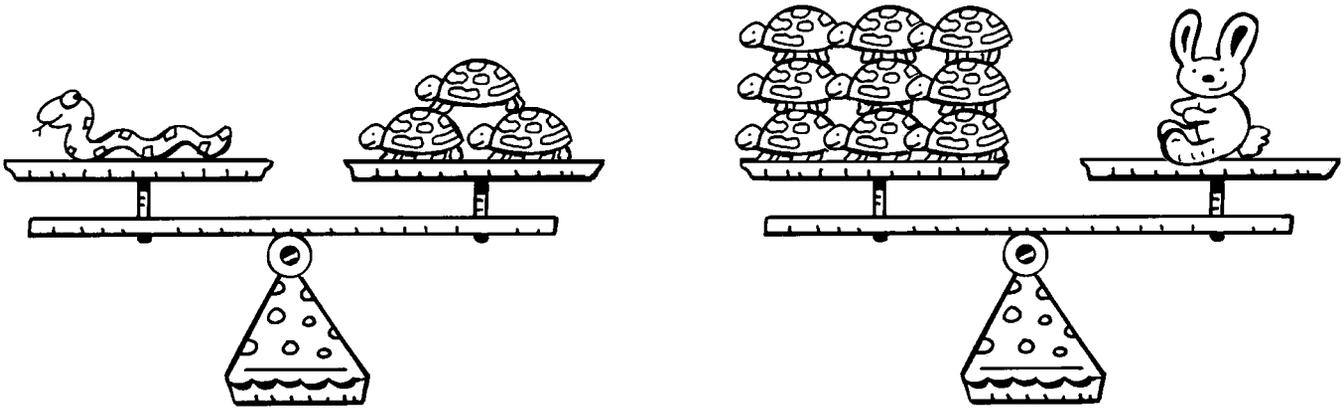
1. How many camels balance one giraffe? _____
2. How many giraffes will balance one elephant? _____
3. How did you figure out the answer to #2? _____

4. If one giraffe weighs 6 pounds, what is the weight of one elephant?

PROBLEM

6

How many snakes will balance one rabbit?



Toy animals that are the same weigh the same.

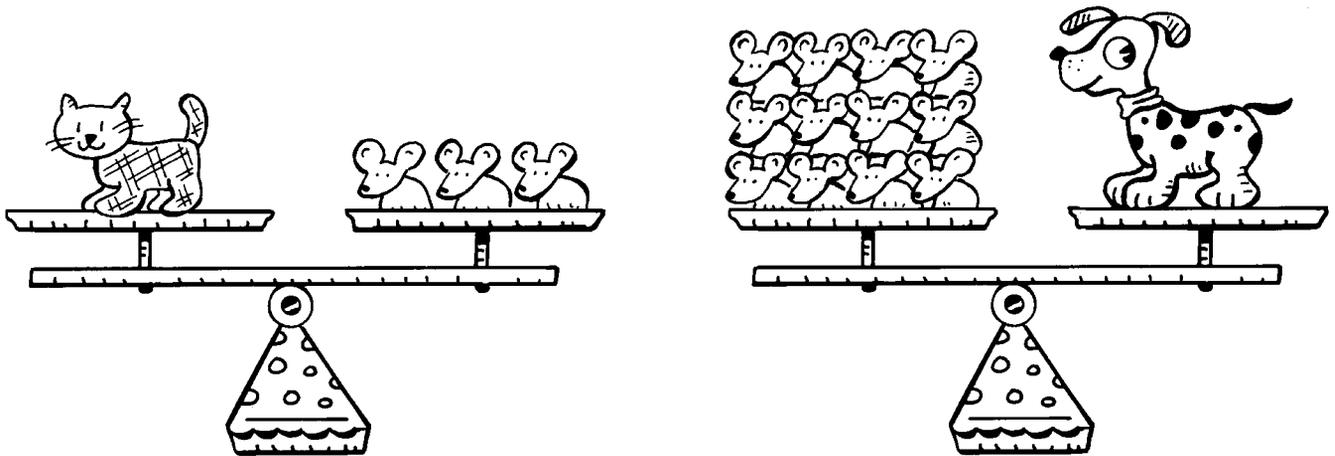
1. How many turtles balance one snake? _____
2. How many snakes will balance one rabbit? _____
3. How did you figure out the answer to #2? _____

4. If one snake weighs 3 pounds, what is the weight of one rabbit?

PROBLEM

7

How many kittens will balance one puppy?



Toy animals that are the same weigh the same.

1. How many mice balance one puppy? _____
2. How many kittens will balance one puppy? _____
3. How did you figure out the answer to #2? _____

4. If one puppy weighs 12 pounds, what is the weight of one kitten?

Where's My Seat?

Overview

Presented with a rectangular array of consecutive numbers, students identify the relationship between row numbers and seat numbers in the rows.

Algebra Focus

Explore variables as representing varying quantities • Describe the functional relationship between the last number in a row and the row number • Describe the functional relationship between an element in a row and elements directly above and below it

Problem-Solving Strategies

Describe parts of patterns • Generalize pattern relationships

Related Math Skills

Compute with counting numbers

Math Language

Row • Spatial terminology: behind, in front of, next to, first (seat), last (seat)

Introducing the Problem Set

Make photocopies of “Solve the Problem: Where’s My Seat?” (page 66) and distribute to students. Have students work in pairs, encouraging them to discuss strategies they might use to solve the problem. You may want to walk around and listen in on some of their discussions. After a few minutes, display the problem on the board (or on the overhead if you made a transparency) and use the following questions to guide a whole-class discussion on how to solve the problem:

- What is the last number in Row 1? (5) Row 2? (10) Row 5? (25)
- How can you figure out the last number in a row? (Count the row numbers by 5s or multiply 5 x row number)

- What is Carl's seat number? (40) How do you know? (The last number of Row 8 is 5×8 , or 40)
- Where is Alphonse sitting? (First seat in Row 10) How can you figure out the number of the first seat in Row 10? (It is one more than the last seat in Row 9, or $5 \times 9 + 1 = 46$)
- What is Peter's seat number? (41) How did you figure it out? ($46 - 5 = 41$)

Work together as a class to answer the questions in "Solve the Problem: Where's My Seat?"

Math Chat With the Transparency

Display the "Make the Case: Where's My Seat?" transparency on the overhead. Before students can decide which character is "sharp as a tack," they need to figure out the answer to the problem. Encourage students to work in pairs to solve the problem. Then bring the class together for another whole-class discussion. Ask:

- Who has the right answer? (Marlee Marlin)
- How did you figure it out? (The last seat in Row 7 is 70. The first seat in Row 8 is 71. The seat next to 71 is 72.)
- How do you think Wally Walrus got the answer 82? (He probably thought that all of the seats in Row 8 have numbers in the 80s. So the first seat is 81 and the one next to it is $81 + 1$, or 82.)
- How do you think Ralph Rhino got the answer of 71? (He probably didn't read the whole problem. He got the number of the first seat of the row, but forgot to get the number of the seat next to the first seat.)

Name _____ Date _____

SOLVE THE PROBLEM **WHERE'S MY SEAT?**

There are 20 rows of seats like these.

ROW 6	.	.	.	.	.
ROW 5	21	22	.	.	.
ROW 4	16	17	18	19	20
ROW 3	11	12	13	14	15
ROW 2	6	7	8	9	10
ROW 1	1	2	3	4	5

STAGE

I'm sitting in the last seat in Row 8. What is my seat number?

Carl

The last seat in Row 1 is 5. The last seat in Row 2 is 10. The last seat in Row 3 is 15. I see a pattern.

Ima Thinker

1. What pattern did Ima see? _____
2. Carl is in seat _____.
3. Alphonse is sitting in the first seat in Row 10. Alphonse is in seat _____.
4. Peter is sitting in the seat right in front of Alphonse. Peter is in seat _____.

66

Name _____ Date _____

MAKE THE CASE **WHERE'S MY SEAT?**

I'm sitting in Row 8. My seat is next to the first seat in the row. What is my seat number?

There are 10 rows of seats like these.

ROW 5	.	.	.	.	.	.	.	.	.
ROW 4	31	32	.	.	.	.	.	.	.
ROW 3	21	22	23	24	25	26	27	28	29	30
ROW 2	11	12	13	14	15	16	17	18	19	20
ROW 1	1	2	3	4	5	6	7	8	9	10

STAGE

That's easy. She is in seat 82.

Marlee Marlin

72 is the right answer. I just know it.

Wally Walrus

No way. It has to be seat 71.

Ralph Rhino

Who is sharp as a tack?

67

WHERE'S MY SEAT?

**SOLVE
THE
PROBLEM**

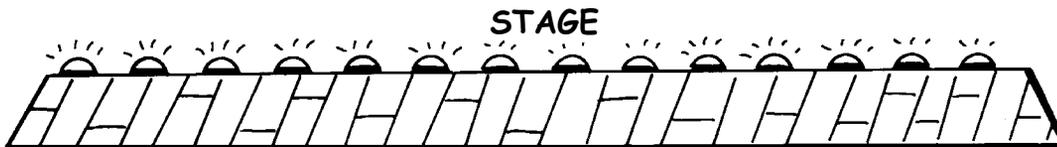
There are 20 rows of seats like these.

ROW 6	.	.	.	.	.
ROW 5	21	22	.	.	.
ROW 4	16	17	18	19	20
ROW 3	11	12	13	14	15
ROW 2	6	7	8	9	10
ROW 1	1	2	3	4	5

I'm sitting in the last seat in Row 8.
What is my seat number?



Carl



The last seat in Row 1 is 5.
The last seat in Row 2 is 10.
The last seat in Row 3 is 15.
I see a pattern.



Ima Thinker

1. What pattern did Ima see? _____

2. Carl is in seat _____ .
3. Alphonse is sitting in the first seat in Row 10. Alphonse is in seat _____ .
4. Peter is sitting in the seat right in front of Alphonse.
Peter is in seat _____ .

WHERE'S MY SEAT?

MAKE THE CASE

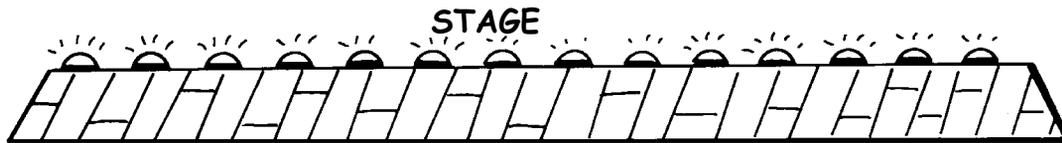
I'm sitting in Row 8. My seat is next to the first seat in the row. What is my seat number?



Olivia

There are 10 rows of seats like these.

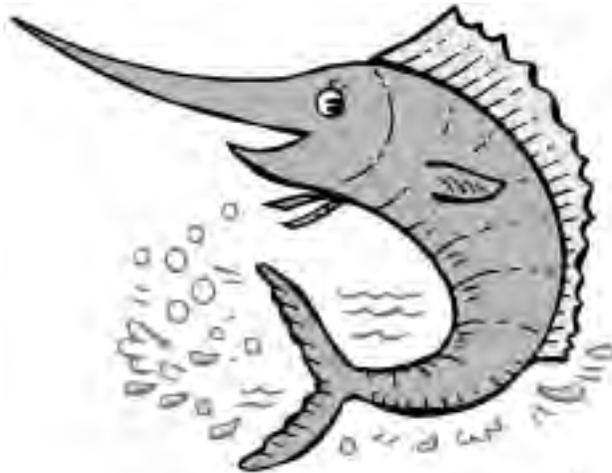
ROW 5	.	.	.	.	.	.	.	.	.	.
ROW 4	31	32	.	.	.	.	.	.	.	.
ROW 3	21	22	23	24	25	26	27	28	29	30
ROW 2	11	12	13	14	15	16	17	18	19	20
ROW 1	1	2	3	4	5	6	7	8	9	10



That's easy. She is in seat 82.



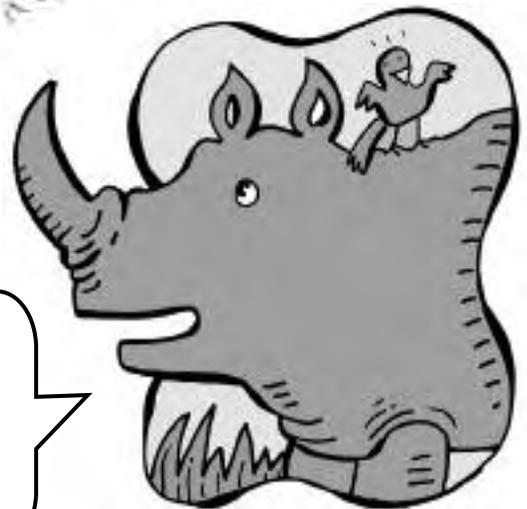
Wally Walrus



Marlee Marlin

72 is the right answer. I just know it.

No way. It has to be seat 71.



Ralph Rhino

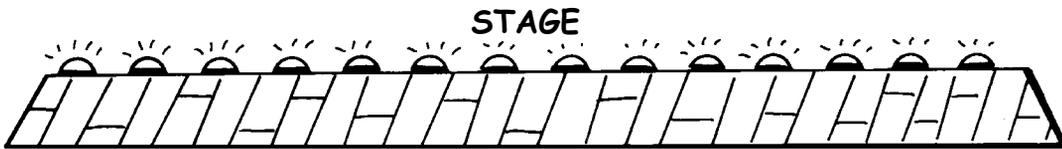
Who is sharp as a tack?

WHERE'S MY SEAT?

PROBLEM 1

There are 20 rows of seats like these.

ROW 6	.	.	.	.
ROW 5	17	18	.	.
ROW 4	13	14	15	16
ROW 3	9	10	11	12
ROW 2	5	6	7	8
ROW 1	1	2	3	4



I'm sitting in the last seat in Row 6. What is my seat number?



The last seat in Row 1 is 4.
The last seat in Row 2 is 8.
The last seat in Row 3 is 12.
I see a pattern.



Ima Thinker

1. What pattern did Ima see? _____

2. Jeffrey is in seat _____.
3. Frida is sitting right behind Jeffrey. Frida is in seat _____.
4. Theo is sitting next to Frida. Theo is in seat _____.

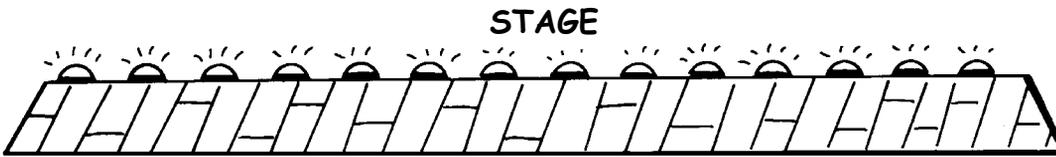
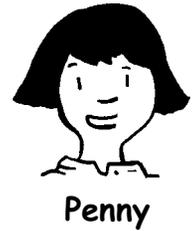
WHERE'S MY SEAT?

**PROBLEM
2**

There are 20 rows of seats like these.

ROW 6	.	.	.
ROW 5	13	14	.
ROW 4	10	11	12
ROW 3	7	8	9
ROW 2	4	5	6
ROW 1	1	2	3

I'm sitting in the last seat in Row 9. What is my seat number?



The last seat in Row 1 is 3.
The last seat in Row 2 is 6.
The last seat in Row 3 is 9.
I see a pattern.



1. What pattern did Ima see? _____

2. Penny is in seat _____ .
3. Zach is sitting next to Penny. Zach is in seat _____ .
4. Felipe is sitting right in front of Zach. Felipe is in seat _____ .

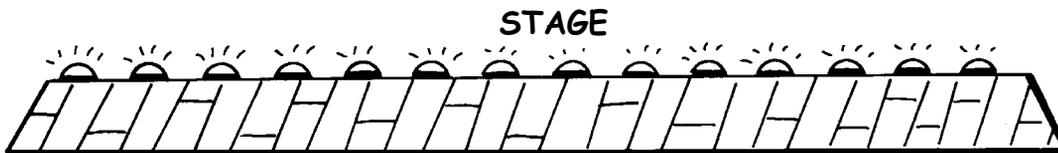
WHERE'S MY SEAT?

**PROBLEM
3**

There are 20 rows of seats like these.

ROW 5	33	34	.	.	.	.	.	.
ROW 4	25	26	27	28	29	30	31	32
ROW 3	17	18	19	20	21	22	23	24
ROW 2	9	10	11	12	13	14	15	16
ROW 1	1	2	3	4	5	6	7	8

I'm sitting in the last seat in Row 10. What is my seat number?



The last seat in Row 1 is 8.
The last seat in Row 2 is 16.
The last seat in Row 3 is 24.
I see a pattern.



Ima Thinker

1. What pattern did Ima see? _____

2. Jeremy is sitting in seat _____.
3. Dina is sitting next to Jeremy. Dina is in seat _____.
4. Logan is sitting in the first seat in Row 10. Logan is in seat _____.

WHERE'S MY SEAT?

PROBLEM

4

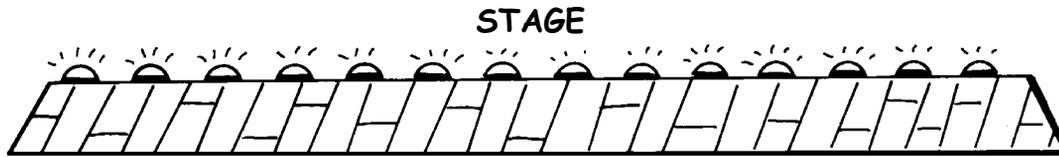
There are 20 rows of seats like these.

ROW 6	.	.	.	.
ROW 5	17	18	.	.
ROW 4	13	14	15	16
ROW 3	9	10	11	12
ROW 2	5	6	7	8
ROW 1	1	2	3	4

I'm sitting in the last seat in Row 7.
What is my seat number?



Helena



1. Helena is sitting in seat _____ .
2. Ginny is sitting in the first seat in Row 7. Ginny is in seat _____ .
3. Tomas is sitting right in front of Ginny. Tomas is in Row _____ and his seat number is _____ .
4. Leo is sitting right in front of Tomas. Leo is in Row _____ and his seat number is _____ .

WHERE'S MY SEAT?

**PROBLEM
5**

My seat is next to the last seat of Row 7.
What is my seat number?



Stefan

There are 20 rows of seats like these.

ROW 6	.	.	.	.	.	.	.	.	.	.
ROW 5	41	42	.	.	.	.	.	.	.	.
ROW 4	31	32	33	34	35	36	37	38	39	40
ROW 3	21	22	23	24	25	26	27	28	29	30
ROW 2	11	12	13	14	15	16	17	18	19	20
ROW 1	1	2	3	4	5	6	7	8	9	10

STAGE



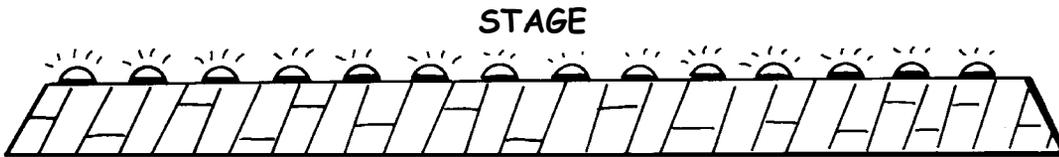
1. Stefan is sitting in seat _____.
2. A.J. sat two rows directly in front of Stefan. A.J. sat in Row _____ and seat _____.
3. Charlie sat in seat 93. Charlie was in Row _____.
4. How did you figure out Charlie's row number? _____

WHERE'S MY SEAT?

**PROBLEM
6**

There are 20 rows of seats like these.

ROW 6	.	.	.	.	.
ROW 5	21	22	.	.	.
ROW 4	16	17	18	19	20
ROW 3	11	12	13	14	15
ROW 2	6	7	8	9	10
ROW 1	1	2	3	4	5



My seat is the middle seat in Row 6.
What is my seat number?



Katya

1. Katya is sitting in seat _____.
2. Doug sat directly behind Katya. Doug is in Row _____ and seat _____.
3. Jimmy sat two rows directly behind Doug. Jimmy is in Row _____ and seat _____.
4. How did you figure out Jimmy's seat number? _____

WHERE'S MY SEAT?

**PROBLEM
7**

There are 20 rows of seats like these.

ROW 6	.	.	.	.	.	.
ROW 5	25	26	.	.	.	.
ROW 4	19	20	21	22	23	24
ROW 3	13	14	15	16	17	18
ROW 2	7	8	9	10	11	12
ROW 1	1	2	3	4	5	6

STAGE



I'll go to the first seat in Row 9 and sit down. What is my seat number?



Stella

1. Stella is sitting at seat _____.
2. Ally sat right next to Stella. Ally is in seat _____.
3. Samantha sat right in front of Ally. Samantha is in Row _____ and seat _____.
4. How did you figure out Samantha's seat number? _____

SOLVE
IT



1. Look What is the problem?

2. Plan and Do What will you do first? How will you solve the problem?

3. Answer and Check How can you be sure your answer is correct?

SOLVE IT: DOG DATA

How much is each dog's doctor bill?



Use the facts to figure out the doctor's bill for each dog.

FACTS:

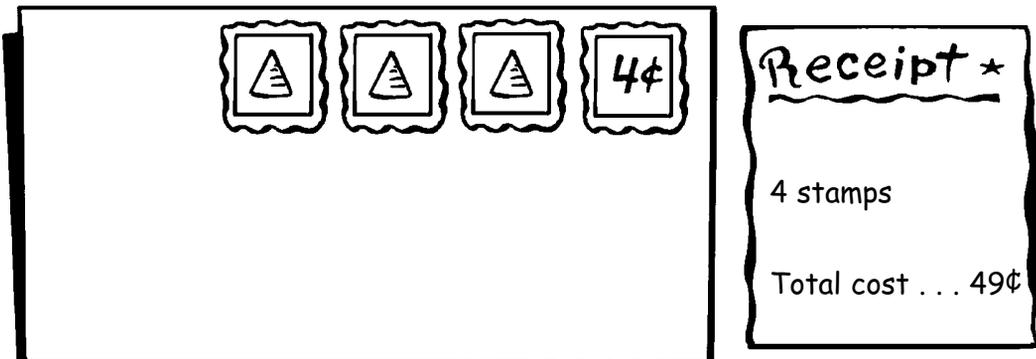
- (A) Spot's bill was twice as much as Windy Day's bill.
- (B) Windy Day's bill was \$50 more than DeVine's bill.
- (C) DeVine's bill was $\frac{1}{3}$ of Holly Wood's bill.
- (D) Holly Wood's bill was \$30.

SOLVE IT: STAMP STUMPERS

How much is one cone stamp?

The total cost of the four stamps on the envelope is 49¢.

The cone stamps cost the same.



SOLVE IT: JERSEY NUMBER

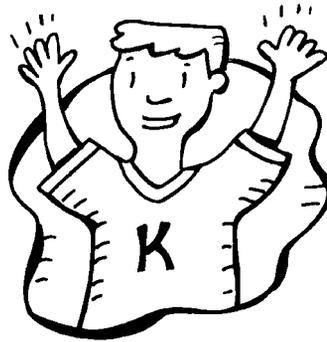
What is the number on the player's jersey?

The letter **K** stands for the number on the jersey.

Use the clues to figure out **K**.

CLUES:

- 1) $2 \times K > 18$
- 2) 4 is a factor of **K**
- 3) The tens digit is one more than the ones digit
- 4) $K < 100 - 60$



SOLVE IT: WEIGH IN

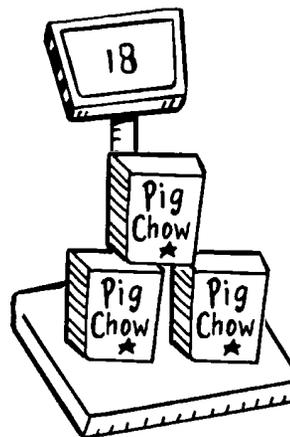
How much does Maria the pig weigh?



Scale A



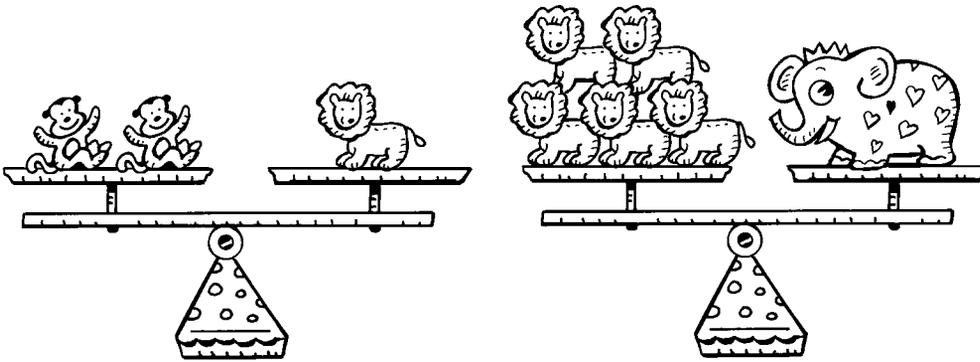
Scale B



Scale C

SOLVE IT: BALANCING ANIMALS

How many monkeys will balance one elephant?



Toy animals that are the same weigh the same.

SOLVE IT: WHERE'S MY SEAT?

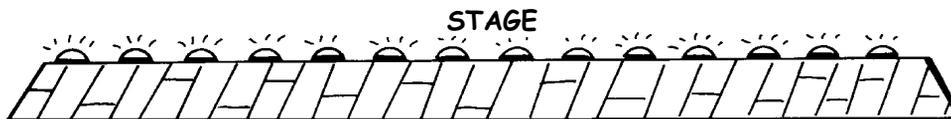
Henry is sitting in the first seat in Row 7. I'm sitting next to Henry. What's my seat number?



Kayla

There are 20 rows of seats like these.

ROW 4	28	.	.	.	.	.	.	.	.
ROW 3	19	20	21	22	23	24	25	26	27
ROW 2	10	11	12	13	14	15	16	17	18
ROW 1	1	2	3	4	5	6	7	8	9



ANSWER KEY

Dog Data (pages 11–19) Solve the Problem

1. Fact C
2. 12
3. 15
4. Work backward. Fact C: Holly Wood is 6 years old. Fact B: Ms. Clean is 2×6 , or 12 years old. Fact A: Popeye is $12 + 3$, or 15 years old.

Make the Case

Who is sharp as a tack?
Marlee Marlin

Problem 1

1. Fact C
2. 7 years old
3. 2 years old
4. Work backward. Fact C: Bubba is 14 years old. Fact B: DeVine is $\frac{1}{2}$ of 14, or 7 years old. Fact A: Howdy is $7 - 5$, or 2 years old.

Problem 2

1. Fact D
2. 48 pounds
3. 38 pounds
4. Work backward. Fact D: Windy Day weighs 24 pounds. Fact C: Dandy weighs 2×24 , or 48 pounds. Fact B: Bubba weighs $48 - 10$, or 38 pounds. Fact A: Melody weighs $38 - 4$, or 34 pounds.

Problem 3

1. Fact D
2. 50 pounds
3. 25 pounds
4. Work backward. Fact D: Madam Peppy weighs 5 pounds. Fact C: DeVine weighs 10×5 , or 50 pounds. Fact B: Popeye is $\frac{1}{2}$ of 50, or 25 pounds. Fact A: Spot is $25 - 4$, or 21 pounds.

Problem 4

1. Fact D
2. 38 pounds
3. 55 pounds
4. Work backward. Fact D: Ms. Clean weighs 19 pounds. Fact C: Holly Wood weighs 2×19 , or 38 pounds. Fact B: Howdy weighs $38 + 17$, or 55 pounds. Fact A: Betsy weighs $55 - 10$, or 45 pounds.

Problem 5

1. Fact D
2. 9 ounces
3. 17 ounces
4. Work backward. Fact D: Howdy eats 18 ounces of food. Fact C: Ms. Clean eats $\frac{1}{2} \times 18$, or 9 ounces. Fact B: Dandy eats $9 + 8$, or 17 ounces. Fact A: Spot eats $17 - 2$, or 15 ounces.

Problem 6

1. Fact D
2. 12 ounces
3. 3 ounces
4. Work backward. Fact D: Windy Day eats 8 ounces of food. Fact C: Popeye eats $20 - 8$, or 12 ounces. Fact B: Madam Peppy eats $\frac{1}{4}$ of 12, or 3 ounces. Fact A: Melody eats $6 + 3$, or 9 ounces.

Problem 7

1. Fact D
2. \$80
3. \$90
4. Work backward. Fact D: Ms. Clean's bill was \$40. Fact C: Madam Peppy's bill was $2 \times \$40$, or \$80. Fact B: Dandy's bill was $\$80 + \10 , or \$90. Fact A: Betsy's bill was $\$150 - \90 , or \$60.

Solve It: Dog Data

1. Look: Facts are given about the doctor bills for four dogs. Fact D about Holly Wood's bill is the only cost known. To figure out DeVine's bill, we need to use Holly Wood's bill. For Windy Day's bill, we need to know DeVine's bill. For Spot's bill, we need to know Windy Day's bill.
2. Plan and Do: Work backward. Fact D: Holly Wood's bill was \$30. Fact C: DeVine's bill was $\frac{1}{2}$ of \$30, or \$10. Fact B: Windy Day's bill was $\$50 + \10 , or \$60. Fact A: Spot's bill was $2 \times \$60$, or \$120.
3. Answer and Check: Spot's bill was \$120, Windy Day's bill was \$60, DeVine's bill was \$20, and Holly Wood's bill was \$30. To check, use the amounts of the bills for each dog and check against the facts. Do they make sense? DeVine's bill: \$10, which is $\frac{1}{2}$ of Holly Wood's \$30 bill. Windy Day's bill: \$60, which is \$50 more than DeVine's bill of \$10. Spot's bill: \$120, which is $2 \times$ Windy Day's \$60 bill.

Stamp Stumpers (pages 22–30)

Solve the Problem

1. By taking away the 5¢ stamp from the envelope and subtracting 5¢ from the total cost, the amount left would be the cost of the four chevron stamps
2. $13¢ - 5¢ = 8¢$
3. 2¢
4. When you take away the 5¢ stamp, the total cost changes to $13¢ - 5¢$, or 8¢. So the four chevron stamps cost 8¢. One chevron stamp is $8¢ \div 4$, or 2¢.

Make the Case

Who is sharp as a tack? Ralph Rhino

Problem 1

1. By taking the 2¢ stamp off the envelope and subtracting 2¢ from the total cost, the amount left is the cost of the three octagon stamps.
2. $17¢ - 2¢ = 15¢$
3. 5¢
4. When you take away the 2¢ stamp, the total cost changes to $17¢ - 2¢$, or 15¢. So the three octagon stamps cost 15¢. That means that one octagon stamp is $15¢ \div 3$, or 5¢.

Problem 2

1. By taking the 3¢ stamp off the envelope and subtracting 3¢ from the total cost, the amount left is the cost of the three pentagon stamps.
2. 10¢
3. $33¢ - 3¢ = 30¢$; $30¢ \div 3 = 10¢$
4. 30¢

Problem 3

1. By taking the 8¢ stamp off the envelope and subtracting 8¢ from the total cost, the number left is the cost of the three triangle stamps.
2. 7¢
3. $29¢ - 8 = 21¢$; $21¢ \div 3 = 7¢$
4. 30¢

Problem 4

1. 6¢
2. $25¢ - 1¢ = 24¢$; $24¢ \div 4 = 6¢$
3. 20¢
4. 8¢

Problem 5

1. 3¢
2. $15¢ - 3¢ = 12¢$; $12¢ \div 4 = 3¢$
3. 16¢
4. 5¢

Problem 6

1. 8¢
2. $31¢ - 2¢ - 5¢ = 24¢$; $24¢ \div 3 = 8¢$
3. 28¢
4. 9¢

Problem 7

1. 9¢
2. $40¢ - 4¢ = 36¢$; $36¢ \div 4 = 9¢$
3. 47¢
4. 20¢

Solve It: Stamp Stumpers

1. Look: There are four stamps on the envelope and a receipt that shows the total cost of 49¢. There are three cone stamps and one 4¢ stamp. The problem is to figure out the cost of one cone stamp.
2. Plan and Do: First, pretend to take the 4¢ stamp off the envelope and subtract 4¢ from the total cost. That means that the cost of the three cone stamps is $49¢ - 4¢$, or 45¢. Divide 45¢ by 3 to get the value of one cone stamp.
3. Answer and Check: Each stamp is $45¢ \div 3$, or 15¢. To check, record 15¢ on each cone and add the costs: $15¢ + 4¢ + 15¢ + 15¢ = 49¢$. This sum matches the total cost.

Jersey Number (pages 33–41)

Solve the Problem

1. 9, 8, 7, 6, 5, 4, 3, 2, 1, and 0
2. A = 8
3. Possible answer: From Clue 1, A is 9 or less. Make a list of those numbers. Clue 2 eliminates 0 through 5, leaving 6, 7, 8, and 9. Clue 3 eliminates 7 and 9, leaving 6 and 8. Clue 4 eliminates 6. So, A is 8.
4. Replace A with 8. Check 8 with each clue: $8 + 8 < 20$, $8 > 5$, 2 is a factor of 8, and 3 is not a factor of 8.

Make the Case

Who is sharp as a tack? Wally Walrus

Problem 1

1. Clue 1 gives the greatest number that C can be. C is 15 or less.
2. C = 3
3. Possible answer: Clue 1 gives the list of numbers 0 through 15. Clue 2 eliminates all even numbers. Clue 3 eliminates 5 and 15. Clue 4 eliminates all numbers except for 3 and 9. Clue 5 eliminates 9. So, C is 3.
4. Replace C with 3. Check 3 with each clue.

Problem 2

1. Clue 4 gives the greatest number that D can be. D is 17 or less.
2. D = 15
3. Possible answer: Clue 4 gives D as 17 or less. List the numbers 0 through 17. Clue 2 eliminates zero through 5. Clue 3 eliminates all even numbers. Clue 1 eliminates 7, 11, 13, and 17. Clue 5 eliminates 9. So, D is 15.
4. Replace D with 15. Check 15 with each clue.

Problem 3

1. Clue 3 gives the greatest number that E can be. E is 7 or less.
2. E = 7
3. Possible answer: Clue 3 gives the list of numbers 0 through 7. Clue 1 eliminates 0, 1, and 2. Clue 2 eliminates 4 and 6. Clue 4 eliminates 3. Clue 5 eliminates 5. So, E is 7.
4. Replace E with 7. Check 7 with each clue.

Problem 4

1. Clue 1 gives the greatest number that F can be. F is 9 or less.
2. F = 8
3. Possible answer: Clue 1 gives the list of numbers 0 through 9. Clue 2 eliminates all numbers less than 5. Clue 3 eliminates all odd numbers. Clue 4 eliminates 6. So, F is 8.
4. Replace F with 8. Check 8 with each clue.

Problem 5

1. Clue 2 gives the greatest number that G can be. G is 29 or less.
2. G = 21
3. Possible answer: Clue 2 gives the list of numbers 0 through 29. Clue 1 eliminates all numbers 20 and less. Clue 3 eliminates all even numbers. Clue 4 eliminates all numbers except for 21 and 27. Clue 5 eliminates 27. So, G is 21.
4. Replace G with 21. Check 21 with each clue.

Problem 6

1. Clue 4 gives the greatest number that H can be. H is 19 or less.
2. H = 12
3. Possible answer: Clue 4 gives the list of numbers 0 through 19. Clue 1 eliminates all numbers 10 and less. Clue 3 eliminates all odd numbers. Clue 2 eliminates 14 and 16. Clue 5 eliminates 18. So, H is 12.
4. Replace H with 12. Check 12 with each clue.

Problem 7

1. Clue 2 gives the greatest number that J can be. J is 39 or less.
2. J = 35
3. Possible answer: Clue 2 gives the list of numbers 0 through 39. Clue 1 eliminates all numbers 20 and less. Clue 4 eliminates all numbers except for 25, 30, and 35. Clue 3 eliminates 30. Clue 5 eliminates 25. So, J is 35.
4. Replace J with 35. Check 35 with each clue.

Solve It: Jersey Number

1. Look: Four clues are given to figure out the number on the player's jersey. The number is represented by the letter K.
2. Plan and Do: Clues 1 and 4 establish the range for K. $K > 9$ and $K < 40$, so K can be any number 10 through 39. Clue 2 indicates that 4 is a factor of K, so eliminate all numbers except for 12, 16, 20, 24, 28, 32, and 36. The only number that fits Clue 3 is 32. So, K is 32.
3. Answer and Check: $K = 32$. Replace K with 32. Check 32 with each clue.

Weigh In (pages 44–52)**Solve the Problem**

1. 85
2. 40
3. 15
4. Answers will vary. Possible answer: On scale B, Tom weighs 85 pounds. On scale A, Tom and Smudge weigh 100 pounds altogether. So Smudge weighs $100 - 85$, or 15 pounds.

Make the Case

Who is sharp as a tack? Ralph Rhino

Problem 1

1. 7
2. 8
3. 65
4. 80 pounds

Problem 2

1. 67
2. 43
3. 4
4. 24 pounds

Problem 3

1. 80
2. 75
3. 40
4. 195

Problem 4

1. 18
2. 90
3. 10
4. 8 pounds

Problem 5

1. 12
2. 13
3. 7
4. Answers may vary. Possible answer: The cage and Tabby are 25 pounds. Winslow weighs $32 - 25$, or 7 pounds.

Problem 6

1. 15
2. 35
3. 70
4. Answers may vary. Possible answer: Bowser and one bag of food weigh 50 pounds on scale A. Since Bowser and one bag of food is 50 pounds, then on scale B, Mario is $120 - 50$, or 70 pounds.

Problem 7

1. 10
2. 9
3. 14
4. Answers may vary. Possible answer: On scale B, one box of cat litter is $20 \div 2$, or 10 pounds. On scale C, one bag of cat food is $27 \div 3$, or 9 pounds. On scale A, the box of cat litter and the bag of cat food are $10 + 9$, or 19 pounds. So, El Gato the cat is $33 - 19$, or 14 pounds.

Solve It: Weigh In

1. Look: Three scales A, B, and C. On A, Peter and one box of dog bones are 66 pounds. On B, Peter and Maria the pig are 77 pounds. On C, 3 boxes of dog bones are 18 pounds. The problem is to figure out how much Maria weighs.
2. Plan and Do: On scale C, one box of dog bones is $18 \div 3$, or 6 pounds. On scale A, the box of dog bones is 6 pounds, so Peter is $66 - 6$, or 60 pounds. On scale B, since Peter is 60 pounds, then Maria the pig is $77 - 60$, or 17 pounds.
3. Answer and Check: Maria is 17 pounds. To check, replace each box of dog bones with 6 pounds, Peter with 60 pounds, and Maria with 17 pounds, and figure out the sum of the weight on each scale. The sums should match the numbers of pounds shown on the scales.

Balancing Animals (pages 55–63)**Solve the Problem**

1. 2 fish
2. 3 frogs
3. 6 fish
4. Two fish balance 1 frog, so 6 fish will balance 3 frogs. That means 6 fish will balance 1 shark.

Make the Case

Who is sharp as a tack? Wally Walrus

Problem 1

1. 1 cat
2. 4 pigs
3. 2 cats
4. One cat balances 2 pigs, so 2 cats will balance 4 pigs. That means 2 cats will balance 1 cow.

Problem 2

1. 2 goats
2. 4 pigs
3. Two goats balance 2 pigs, so 4 goats will balance 4 pigs. That means 4 pigs will balance 1 horse.
4. 8 pounds

Problem 3

1. 2 rabbits
2. 8 rabbits
3. Two rabbits balance 1 monkey, so 8 rabbits will balance 4 monkeys. That means 8 rabbits will balance 1 lamb.
4. 16 pounds

Problem 4

1. 3 cats
2. 12 birds
3. Four birds balance 1 cat, so 12 birds will balance 3 cats. That means 12 birds will balance one dog.
4. 12 pounds

Problem 5

1. 2 camels
2. 3 giraffes
3. One giraffe balances 2 camels, so 3 giraffes will balance 6 camels. That means 3 giraffes will balance one elephant.
4. 18 pounds

Problem 6

1. 3 turtles
2. 3 snakes
3. One snake balances 3 turtles, so 3 snakes will balance 9 turtles. That means 3 snakes will balance 1 rabbit.
4. 9 pounds

Problem 7

1. 12 mice
2. 4 kittens
3. Three mice balance 1 kitten, so 12 mice will balance 4 kittens. That means 4 kittens will balance 1 puppy.
4. 3 pounds

Solve It: Balancing Animals

1. Look: There are two pan balances. On the first pan balance, 2 monkeys balance 1 lion. On the second pan balance, 5 lions balance 1 elephant. The problem is to figure out how many monkeys will balance one elephant.
2. Plan and Do: One lion balances 2 monkeys, so 5 lions will balance 10 monkeys. That means 10 monkeys will balance 1 elephant.
3. Answer and Check: 10 monkeys will balance one elephant. To check, write the number of monkeys on each lion and count the monkeys. There should be 10.

Where's My Seat? (pages 66–74)**Solve the Problem**

1. The number of the last seat in a row is 5 times the row number.
2. 40
3. 46
4. 41

Make the Case

Who is sharp as a tack? Marlee Marlin

Problem 1

1. The number of the last seat in a row is 4 times the row number.
2. 24
3. 28
4. 27

Problem 2

1. The number of the last seat in a row is 3 times the row number.
2. 27
3. 26
4. 23

Problem 3

1. The number of the last seat in a row is 8 times the row number.
2. 80
3. 79
4. 73

Problem 4

1. 28
2. 25
3. Row 6 and seat 21
4. Row 5 and seat 17

Problem 5

1. 69
2. Row 5 and seat 49
3. Row 10
4. Answers may vary. Possible answer: The last seat in Row 9 is 9×10 , or 90. So, 93 is in row 10.

Problem 6

1. 28
2. Row 7 and seat 33
3. Row 9 and seat 43
4. Answers may vary. Possible answer: Katya is in Row 6 and seat 28. Doug is in Row 7 and seat $28 + 5$, or 33. Jimmy is in Row 9 and in seat $33 + 5 + 5$, or 43.

Problem 7

1. 49
2. 50
3. Row 8 and seat 44
4. Answers may vary. Possible answer: The last number in Row 8 is 8×6 , or 48. Stella is in $48 + 1$, or seat 49 in Row 9. Ally is in seat $49 + 1$, or 50. Samantha is in Row 8 and seat $50 - 6$, or 44.

Solve It: Where's My Seat?

1. Look: Rows of numbers with 9 numbers in each row. The last number in each row is a multiple of 9 and is $9 \times$ the row number. The problem is to figure out Kayla's seat number.
2. Plan and Do: First figure out where Henry is sitting. The number of the last seat in Row 6 is 6×9 , or 54. The first seat in Row 7 is $54 + 1$, or 55 so Henry is in seat 55. Kayla is in seat $55 + 1$, or 56.
3. Answer & Check: The answer is 56. To check, use a different solution method. The last seat in Row 7 is 7×9 , or 63. There are 9 seats in a row. Count backward from 63 to the first seat in the row, 55. Then the seat next to the first seat is 56.



How old are the dogs?

Use the facts to figure out each dog's age.



Dandy



Madam Peppy

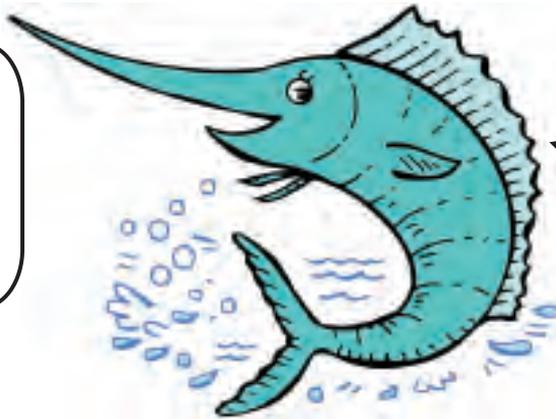


Windy Day

FACTS:

- (A) Dandy's age is twice Madam Peppy's age.
- (B) Madam Peppy is 2 years older than Windy Day.
- (C) Windy Day is 4 years old.

Clearly, Dandy is 6 years old, Madam Peppy is 2 years old, and Windy Day is 4 years old.



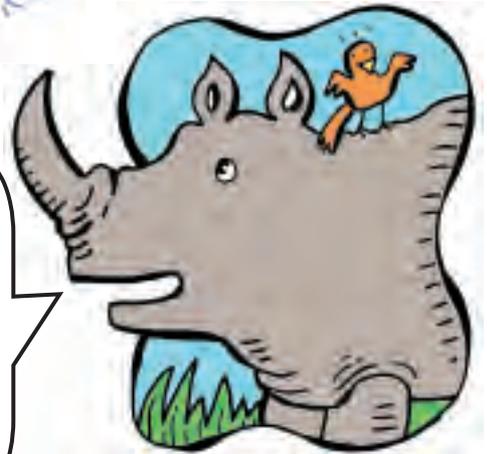
Marlee Marlin

Without a doubt, Dandy is 12 years old, Madam Peppy is 6 years old, and Windy Day is 4 years old.



Wally Walrus

I'm sure that Dandy is 8 years old, Madam Peppy is 6 years old, and Windy Day is 4 years old.



Ralph Rhino

Who is sharp as a tack?



How much is one trapezoid stamp?

The total cost of the five stamps on the envelope is 21¢.

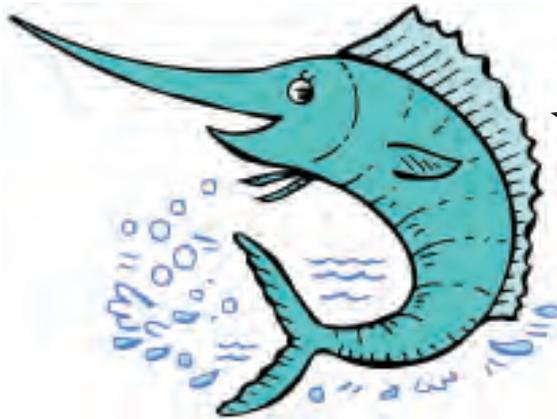


The trapezoid stamps cost the same.

That's easy.
One trapezoid
stamp costs
5¢.

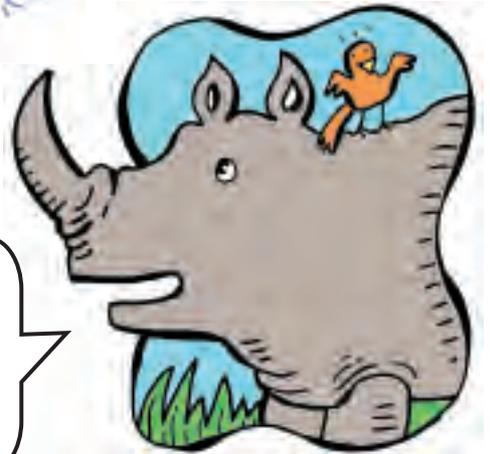


Wally Walrus



Marlee Marlin

I'm sure
it costs 6¢.



Ralph Rhino

You're both
wrong. It has
to be 4¢.

Who is sharp as a tack?



What is the number on the player's jersey?

The letter **B** stands for the number on the jersey.

Use the clues to figure out **B**.

CLUES:

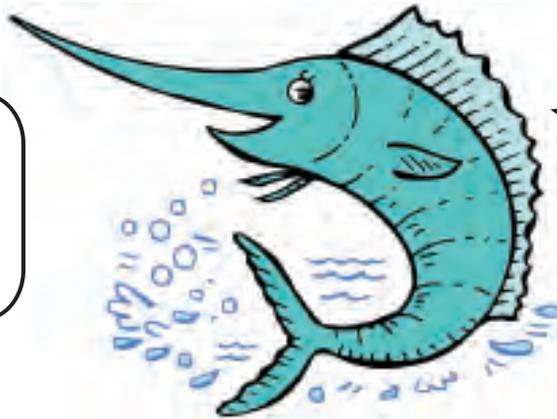
- 1) 5 is a factor of **B**
- 2) $\mathbf{B} < 90 - 40$
- 3) **B** is not an even number
- 4) The tens digit is one less than the ones digit



I believe that **B** is 45.

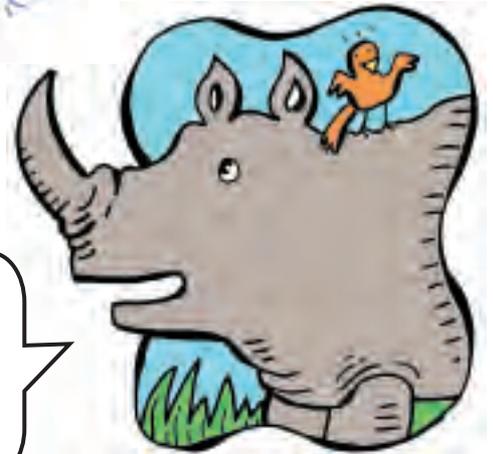


Wally Walrus



Marlee Marlin

I am certain that **B** is 35.

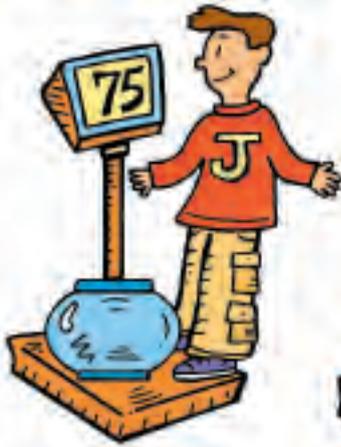


Ralph Rhino

Obviously **B** is 43.

Who is sharp as a tack?

How much does James weigh?



Scale A



Scale B

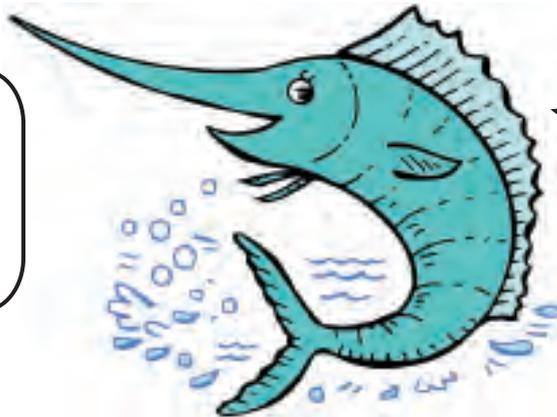


Scale C

Note:
The bags of
rocks weigh the
same amount.



It's clear.
James weighs
68 pounds.



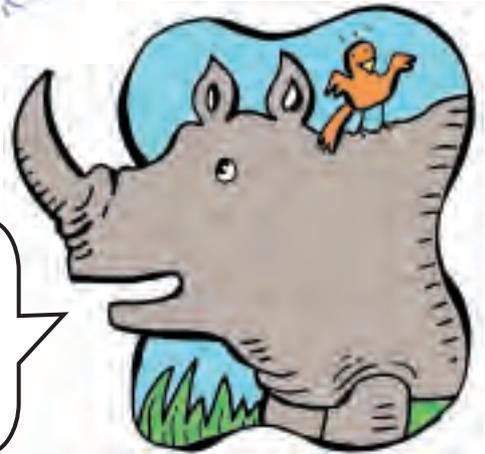
Marlee Marlin

That's easy.
James is 73
pounds.



Wally Walrus

No way!
James weighs
70 pounds.

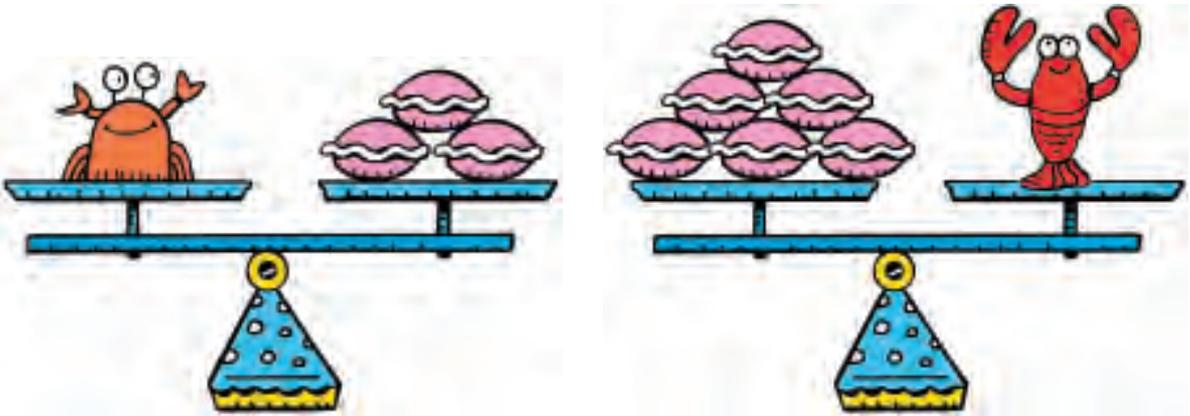


Ralph Rhino

Who is sharp as a tack?



How many crabs will balance one lobster?

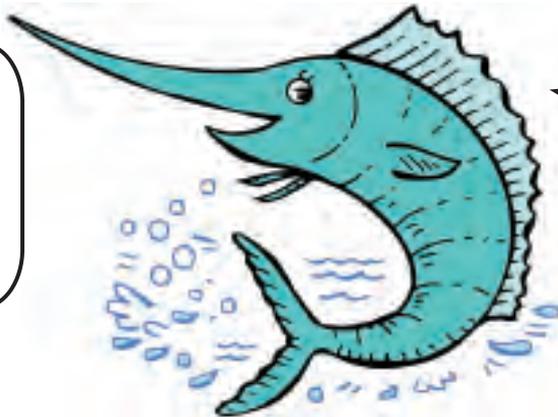


Toy animals that are the same weigh the same.

That's easy.
Two crabs will
balance one
lobster.



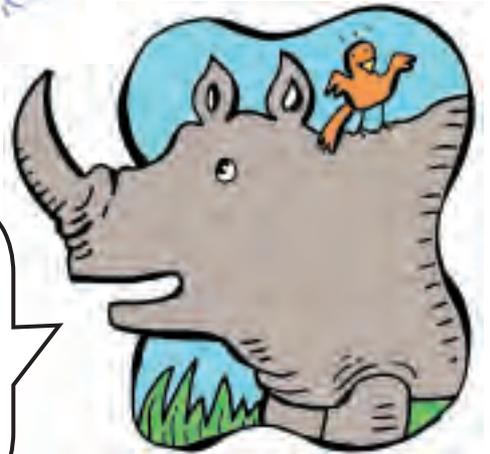
Wally Walrus



Marlee Marlin

Obviously
it's 3 crabs.

You're both
wrong. I am
sure it's
18 crabs.



Ralph Rhino

Who is sharp as a tack?

MAKE THE CASE
4

WHERE'S MY SEAT?

I'm sitting in Row 8. My seat is next to the first seat in the row. What is my seat number?



There are 10 rows of seats like these.

ROW 5	.	.	.	.	.	.	.	.	.	.
ROW 4	31	32	.	.	.	.	.	.	.	.
ROW 3	21	22	23	24	25	26	27	28	29	30
ROW 2	11	12	13	14	15	16	17	18	19	20
ROW 1	1	2	3	4	5	6	7	8	9	10

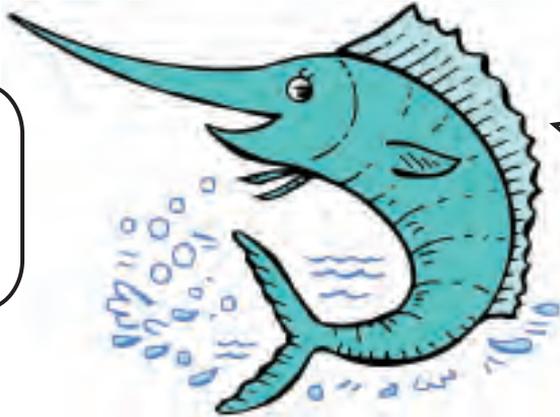
STAGE



That's easy.
She is in
seat 82.



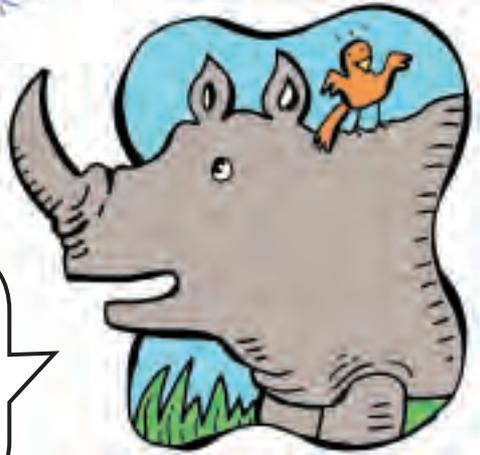
Wally Walrus



Marlee Marlin

72 is the
right answer.
I just know it.

No way.
It has to be
seat 71.



Ralph Rhino

Who is sharp as a tack?



1. Look What is the problem?

2. Plan and Do What will you do first? How will you solve the problem?

3. Answer and Check How can you be sure your answer is correct?

SOLVE IT: DOG DATA

How much is each dog's doctor bill?



Spot



Windy Day



DeVine



Holly Wood

Use the facts to figure out the doctor's bill for each dog.

FACTS:

- (A) Spot's bill was twice as much as Windy Day's bill.
- (B) Windy Day's bill was \$50 more than DeVine's bill.
- (C) DeVine's bill was $\frac{1}{3}$ of Holly Wood's bill.
- (D) Holly Wood's bill was \$30.

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SOLVE IT: STAMP STUMPERS

How much is one cone stamp?

The total cost of the four stamps on the envelope is 49¢.

The cone stamps cost the same.



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SOLVE IT: JERSEY NUMBER

What is the number on the player's jersey?

The letter **K** stands for the number on the jersey.
Use the clues to figure out **K**.

CLUES:

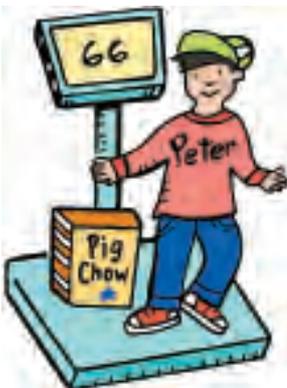
- 1) $2 \times K > 18$
- 2) 4 is a factor of **K**
- 3) The tens digit is one more than the ones digit
- 4) $K < 100 - 60$



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SOLVE IT: WEIGH IN

How much does Maria the pig weigh?



Scale A



Scale B

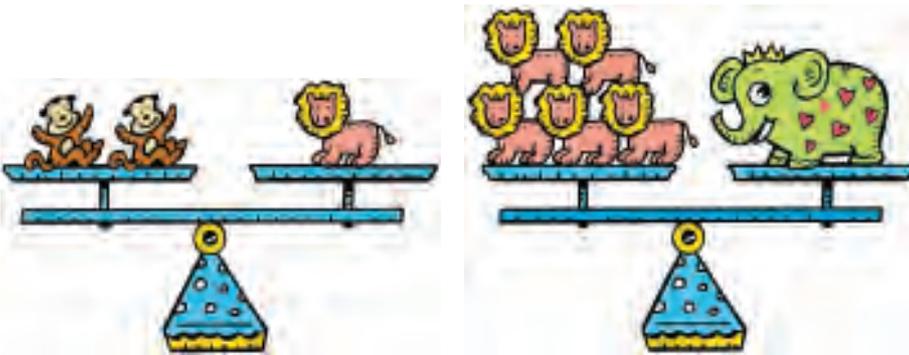


Scale C

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SOLVE IT: BALANCING ANIMALS

How many monkeys will balance one elephant?



Toy animals that are the same weigh the same.

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SOLVE IT: WHERE'S MY SEAT?

Henry is sitting in the first seat in Row 7. I'm sitting next to Henry. What's my seat number?



There are 20 rows of seats like these.

ROW 4	28	.	.	.	.	.	.	.	.
ROW 3	19	20	21	22	23	24	25	26	27
ROW 2	10	11	12	13	14	15	16	17	18
ROW 1	1	2	3	4	5	6	7	8	9

STAGE



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