GRADE 4

MATHEMATICS

Real-World Problem Solving

Complete Student Edition

GLOBAL SOVEREIGN UNIVERSITY

"Building a Bridge to Freedom Through Education

Grade 4 Mathematics: Real-World Problem Solving

Student Edition

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Why This Book Is Different

🏆 NOBEL PRIZE RESEARCH SAYS:

"Students who score 96% on classroom math tests succeed only 1% of the time in real life."

— Banerjee & Duflo, *Nature*, February 2025

The Research That Proves Traditional Math Education Fails

In February 2025, Nobel Prize-winning economists published a groundbreaking study in *Nature*, the world's most respected scientific journal. They tested over 1,400 children in India and discovered something shocking:

Children who ace classroom math CANNOT use it in the real world.

Students who scored 96% on standard school math problems could solve simple real-world market calculations only 1% of the time. Meanwhile, children who worked in markets—without formal education—solved the same problems with 96% accuracy.

The researchers' conclusion was clear:

"Schools need to build a bridge between math learned in the classroom and math encountered in real-life situations."

The Problem: Abstract Doesn't Transfer to Applied

The Nobel laureates found that school children learned *procedures* but not *understanding*. They could solve "24 × 8" on a worksheet by adding 24 eight times. But give them a real problem—"How much do 8 items cost at $24 each?"—and they froze.

Market children used efficient mental strategies: breaking 11 × 43 into (10 × 43) + 43, rounding for easier calculation, working with meaningful quantities. School children followed rigid, slow methods that worked for tests but failed in life.

It's not that school kids were less intelligent. It's that their education never connected the math to reality.

The GSU Solution: Real-World Math

This textbook does exactly what the Nobel laureates recommend. Instead of abstract problems, every calculation has a professional context:

Traditional Math	GSU Real-World Math
"Multiply 3.45 × 6.8"	"You're the Restaurant Manager. Your order is 6.8 pounds at $3.45/lb. What's the cost?"
"Find 15% of 80"	"A customer's bill is $80. Calculate the 15% tip."
"Add 2/3 + 3/4"	"Your recipe needs 2/3 cup butter and 3/4 cup oil. Total fat?"

Same math. Completely different learning.

Your Roles in This Book

You won't just learn math in this book. You'll BE someone who uses it:

- **The Restaurant Manager** — Decimals, percentages, tips
- **The Warehouse Supervisor** — Volume and shipping
- **The Video Game Designer** — Coordinates and graphing
- **The Catering Chef** — Fractions and scaling
- **The Landscaping Contractor** — Area and perimeter
- **The Sports Analyst** — Statistics and predictions
- **The Travel Agent** — Time zones and large numbers
- **The Small Business Owner** — Profit and loss
- **The Science Lab Technician** — Formulas and order of operations
- **The Startup Founder** — Everything combined

These aren't pretend jobs. These are skills you can use THIS WEEK.

The Bottom Line

Nobel Prize-winning researchers proved that traditional education fails to prepare students for real-world math. The gap between classroom success and life success is catastrophic: 96% to 1%.

This textbook closes that gap.

Every problem. Every skill. Every chapter. Connected to reality.

Because math isn't an academic exercise. It's a survival skill.

Global Sovereign University is a 501(c)(3) educational foundation. This textbook is provided FREE because learning should never be limited by economics.

Research Citation:

Banerjee, A., Duflo, E., et al. (2025). Children's arithmetic skills do not transfer between applied and academic mathematics. *Nature*. https://doi.org/10.1038/s41586-024-08502-w

The lead authors received the 2019 Nobel Prize in Economics "for their experimental approach to alleviating global poverty."

Table of Contents

Welcome!

This year, you become a problem solver who uses mathematics in the real world.

You'll take on exciting roles:
• **Store Manager:** Track inventory and money
• **Event Planner:** Calculate supplies for festivals
• **Pet Shop Owner:** Use fractions for feeding schedules
• **Recipe Master:** Scale recipes up and down
• **Construction Worker:** Measure and build
• **Sports Manager:** Analyze team statistics
• **Junior Banker:** Manage savings and spending
• **Delivery Driver:** Plan routes and schedules
• **Garden Designer:** Discover patterns and equations
• **Business Owner:** Create your own lemonade stand!

How to Use This Book:
The Scenario: Step into a real role
The Skill: Learn the mathematics
Worked Examples: See step-by-step solutions
Practice Problems: Build mastery
Action Reports: Apply everything

Remember: Show your work! The process matters as much as the answer.

How to Show Your Work

Every problem includes workspace. Use it!

Step 1: Read Carefully • What information is given? What are you finding?

Step 2: Plan • What operation(s) will you use? Can you estimate first?

Step 3: Calculate • Write each step. Line up numbers neatly. Label your work.

Step 4: Check • Does it match your estimate? Does it make sense?

Example:

Problem: Store sold 1,234 pencils Monday and 2,456 Tuesday. Total? Work: Estimate 1,000 + 2,500 = 3,500

1,234 + 2,456 = 3,690
Answer: 3,690 pencils (matches estimate) ✓

CHAPTER 1

The Classroom Store

Chapter Goal: Use place value and multi-digit operations to run a school supply business.

Congratulations! You've just been hired as the manager of the Classroom Store, a student-run business that sells school supplies to your entire school. Running this store requires careful mathematical thinking every day. You'll track thousands of items, manage money, make ordering decisions, and ensure your customers are happy.

Let's open for business!

Section 1: Taking Inventory — Understanding Large Numbers

✎ The Scenario

The school district just delivered your starting inventory: 3,256 pencils, 1,847 erasers, 2,093 notebooks, 4,125 sticker sheets, and 5,678 index cards. You need to record these quantities accurately in your inventory system. One mistake could mean running out of supplies or wasting money on items you don't need!

✎ The Skill: Place Value

Place value means the position of each digit determines its value. Think about the number 3,256: • The 3 is in the thousands place, so it means 3,000

- The 2 is in the hundreds place, so it means 200
- The 5 is in the tens place, so it means 50
- The 6 is in the ones place, so it means 6

Understanding place value helps you read, write, compare, and round numbers accurately.

✎ Worked Example: Breaking Down 3,256

Standard form: 3,256

Expanded form: 3,000 + 200 + 50 + 6

Word form: Three thousand, two hundred fifty-six

Each digit has a value based on WHERE it sits. The 3 is worth 3×1,000 = 3,000.

✎ Worked Example: Comparing 4,256 and 4,265

Compare from left to right, starting with the biggest place value:

- Thousands: Both have 4 → keep looking
- Hundreds: Both have 2 → keep looking
- Tens: 5 vs 6 → 5 is less than 6

Answer: 4,256 < 4,265

The first difference determines which number is larger!

✎ Worked Example: Rounding 4,783 to the Nearest Hundred Step 1:

Find the hundreds place (7)

Step 2: Look at the digit to the right (8 in tens place)

Step 3: Is it 5 or more? YES! So round UP

Answer: 4,783 rounds to 4,800

If the tens digit were 4 or less, we would round DOWN to 4,700.

✎ **Worked Example: Rounding 6,549 to the Nearest Thousand** Step 1: Find the thousands place (6)

Step 2: Look at the hundreds digit (5)
Step 3: Is it 5 or more? YES! Round UP
Answer: 6,549 rounds to 7,000

✎ Practice: Place Value

1. Write 5,384 in expanded form.
Work:

_____ **Answer:** _____

2. What is the value of the digit 7 in 6,742?
Work:

_____ **Answer:** _____

3. Compare using <, >, or =: 4,256 ___ 4,265
Work:

_____ **Answer:** _____

4. Write the number: 8 thousands, 3 hundreds, 0 tens, 5 ones.
Work:

_____ **Answer:** _____

5. Order from least to greatest: 3,842; 3,824; 3,482; 3,248
Work:

_____ **Answer:** _____

6. Write 2,456 in word form.
Work:

_____ **Answer:** _____

7. Round 4,783 to the nearest hundred.
Work:

_____

_____

_____ **Answer:** _____

8. Which is greater: 6,099 or 6,100? Explain your reasoning.
Work:

_____

_____

_____ **Answer:** _____

9. Write the smallest 4-digit number using 7, 2, 9, 4 (use each digit once).
Work:

_____

_____

_____ **Answer:** _____

10. Write the largest 4-digit number using 3, 8, 1, 6 (use each digit once).
Work:

_____

_____

_____**Answer:** _____

11. A box has 8 thousands + 12 hundreds + 4 tens + 3 ones. Write in standard form. (Hint: Regroup!)
Work:

_____

_____

_____ **Answer:** _____

12. The store sold 3,456 items last month and 3,564 this month. Which month had more sales? Work:

_____

_____

_____ **Answer:** _____

13. Write 9,007 in expanded form. (Watch out for the zeros!)

_____

_____

_____ **Answer:** _____

14. Round 6,549 to the nearest thousand.
Work:

_____

_____

_____ **Answer:** _____

15. What number is 100 more than 4,967?
Work:

_____
_____
_____ **Answer:** _____

16. Compare using <, >, or =: 7,890 ___ 7,809
Work:

_____
_____
_____ **Answer:** _____

17. In the number 45,678, what is the value of the 5?
Work:

_____
_____
_____ **Answer:** _____

18. Order from greatest to least: 5,678; 5,687; 5,768; 5,867
Work:

_____
_____
_____ **Answer:** _____

19. Round 3,450 to the nearest hundred. (Hint: What happens when the digit is exactly 5?) Work:

_____
_____
_____ **Answer:** _____

20. What number is 1,000 less than 8,234?
Work:

_____
_____
_____ **Answer:** _____

Section 2: Monday Restock — Multi-Digit Addition

✏ The Scenario

Three deliveries arrived this morning! You had 1,347 pencils in stock. Delivery #1 brought 2,456 pencils. Delivery #2 brought 1,234 more. You need to calculate your new inventory totals. Accurate addition is essential for knowing what you have!

✏ The Skill: Addition with Regrouping

When a column adds to 10 or more, we 'carry' or 'regroup' to the next place value. Always estimate first to check if your answer makes sense!

✎ Worked Example: Adding 1,347 + 2,456

Step 1 - Estimate: 1,000 + 2,000 = 3,000 (answer should be close)

Step 2 - Set up vertically and add column by column from right to left:

- Ones: 7 + 6 = 13 → write 3, carry 1
- Tens: 1 + 4 + 5 = 10 → write 0, carry 1
- Hundreds: 1 + 3 + 4 = 8 → write 8
- Thousands: 1 + 2 = 3 → write 3

Answer: 3,803 pencils (close to our estimate of 3,000) ✓

✎ Worked Example: Adding Three Numbers: 1,347 + 2,456 + 1,234 Method 1: Add two at a time

1,347 + 2,456 = 3,803

3,803 + 1,234 = 5,037

Method 2: Stack all three and add each column

Answer: 5,037 pencils total

✎ Worked Example: Adding Money: $1,234.56 + $2,789.34 Key rule: Line up the decimal points!

Add cents: 56 + 34 = 90 cents

Add dollars: 1,234 + 2,789 = 4,023 dollars

Answer: $4,023.90

✎ Worked Example: Checking with Estimation

Problem: 4,892 + 3,567

Estimate: 5,000 + 4,000 = 9,000

Actual: 4,892 + 3,567 = 8,459

Check: 8,459 is close to 9,000 ✓

✎ Practice: Multi-Digit Addition

1. Calculate: 2,456 + 1,378

Work:

_____

_____

_____ **Answer:** _____

2. Calculate: 3,847 + 2,956

Work:

_____

_____

_____ **Answer:** _____

3. You have 1,245 red pens and receive 2,367 more. What is the total?
Work:

Answer: _____

4. Calculate: 456 + 789 + 234
Work:

Answer: _____

5. Store earned $1,456 Monday, $2,378 Tuesday, $1,892 Wednesday. Total earnings? Work:

Answer: _____

6. Calculate: 5,678 + 3,456
Work:

Answer: _____

7. Add three deliveries: 2,456 + 3,789 + 1,234
Work:

Answer: _____

8. Estimate first, then calculate: 4,892 + 3,567
Work:

Answer: _____

9. Had 3,456 notebooks. Received 1,234 more, then 2,567 more. New total?
Work:

Answer: _____

10. Calculate: 6,789 + 2,345 + 1,876
Work:

Answer: _____

11. Three busiest days: $4,567 + $5,234 + $3,899. Total sales?

Work:

Answer: _____

12. Calculate: 7,654 + 2,789

Work:

Answer: _____

13. Combine inventory from 3 boxes: 2,345 + 1,876 + 3,459 items

Work:

Answer: _____

14. Calculate: 8,234 + 567 + 3,491

Work:

Answer: _____

15. Add: $234.56 + $567.89 + $123.45

Work:

Answer: _____

16. Inventory from 4 boxes: 1,250 + 1,340 + 1,125 + 1,285

Work:

Answer: _____

17. Calculate: 9,999 + 1 (What happens?)

Work:

Answer: _____

18. Weekly deposits: $456.78 + $523.45 + $398.67 + $612.34 + $445.89

Work:

Answer: _____

19. Calculate: 4,567 + 3,892 + 2,541

Work:

_____

_____

_____ **Answer:** _____

20. Total of all starting inventory: 3,256 + 1,847 + 2,093 + 4,125 + 5,678

Work:

_____

_____

_____ **Answer:** _____

Section 3: The Big Sale — Multi-Digit Subtraction

✍ The Scenario

It's the Back-to-School Sale! You started with 5,037 pencils and sold 2,789 by lunchtime. How many pencils remain? Knowing your current inventory helps you avoid disappointing customers who want to buy supplies.

✍ The Skill: Subtraction with Regrouping

When you can't subtract a digit because the top number is smaller, you need to 'borrow' or 'regroup' from the next place value. This is like breaking a ten-dollar bill into ten ones.

✎ Worked Example: Subtracting 5,037 - 2,789

Step 1 - Estimate: 5,000 - 3,000 = 2,000

Step 2 - Work right to left, borrowing when needed:

- Ones: 7 - 9? Can't do it! Borrow from tens.
- But tens is 3, and we need to borrow... it becomes complex with the 0. • Borrow through: 5,037 → 5,0(2)(17) → 4,(10)(2)(17) → 4,9,12,17
- Now: 17-9=8, 12-8=4, 9-7=2, 4-2=2

Answer: 2,248 pencils remain ✓

✎ Worked Example: Subtracting from Zeros: 6,000 - 3,456 When subtracting from a number with zeros, you must borrow through multiple places: 6,000 → 5,10,0,0 → 5,9,10,0 → 5,9,9,10

Now subtract: 10-6=4, 9-5=4, 9-4=5, 5-3=2

Answer: 2,544

✎ Worked Example: Making a Reorder Decision

Current stock: 2,248 pencils

Reorder point: 2,000 pencils (when to order more)

2,248 - 2,000 = 248 pencils above reorder point

But the sale continues! If you expect to sell 300+ more today...

Decision: YES, place a reorder now to avoid running out!

✎ Worked Example: Checking Subtraction with Addition

Problem: 7,234 - 4,567 = ?

Answer: 2,667

Check: 2,667 + 4,567 = 7,234 ✓

If the check doesn't equal the original number, redo the problem!

✎ Practice: Multi-Digit Subtraction

1. Calculate: 5,234 - 2,678

Work:

_____

_____

_____ **Answer:** _____

2. Had 4,567 erasers, sold 1,789. How many remain?

Work:

_____

_____

_____ **Answer:** _____

3. Calculate: 6,000 - 3,456

Work:

_____

_____

_____ **Answer:** _____

4. Register had $8,456. Gave $3,789 in change. What remains?

Work:

_____

_____

_____ **Answer:** _____

5. Calculate: 7,234 - 4,567

Work:

_____

_____

_____ **Answer:** _____

6. Started with 5,000 notebooks. Sold 2,347 Monday and 1,456 Tuesday. How many left?

Work

_____

_____

_____ **Answer:** _____

7. Calculate: 9,000 - 4,567

Work:

_____

_____

_____ **Answer:** _____

8. Reorder point is 1,500. Have 4,234 markers, sold 2,856. Do you need to reorder?

Work:

_____

_____

_____ **Answer:** _____

9. Calculate: 8,234 - 3,789

Work:

_____

_____

_____ **Answer:** _____

10. Had 6,543 items. Sold 2,345. Got 123 returns. Current inventory?

Work:

_____

_____

_____ **Answer:** _____

11. Calculate: 7,006 - 2,789

Work:

_____

_____

_____ **Answer:** _____

12. Budget is $10,000. Spent $7,234. How much remains?

Work:

_____

_____

_____ **Answer:** _____

13. Calculate: 5,003 - 1,678

Work:

_____

_____

_____ **Answer:** _____

14. Last year total: $45,678. This year: $52,345. How much more this year?

Work:

_____

_____

_____ **Answer:** _____

15. Calculate: 8,040 - 3,567

Work:

Answer: _____

16. Subtract: $500.00 - $267.89

Work:

Answer: _____

17. Calculate: 10,000 - 6,543

Work:

Answer: _____

18. Started week with 8,500 items. Daily sales: 1,234; 1,456; 1,789; 1,123; 1,567. Remaining?

Work:

Answer: _____

19. Calculate: 9,001 - 5,678

Work:

Answer: _____

20. Had $25,000 budget. Expenses: $8,456 + $7,234 + $5,678. Remaining budget?

Work:

Answer: _____

Section 4: Counting the Register — Money Math

?? The Scenario

The store closes at 3:00 PM. Time to count the register! You started with $1,234.56 in the drawer. Customers paid a total of $6,789.34 throughout the day. You gave back $3,456.78 in change. What should the register contain now?

?? The Skill: Decimal Operations with Money

Money uses decimals. The digits after the decimal point represent cents. The most important rule: ALWAYS line up the decimal points when adding or subtracting!

✎ Worked Example: Balancing the Register

Starting amount: $1,234.56

+ Customer payments: $6,789.34

= Subtotal: $8,023.90

- Change given: $3,456.78

Register should have: $4,567.12

If the actual count doesn't match, there's an error somewhere!

✎ Worked Example: Making Change: Customer Pays $100 for $67.89 Purchase

Method 1: Subtract

$100.00 - $67.89 = $32.11

Method 2: Count up

$67.89 → $67.90 (1¢) → $68.00 (10¢) → $70.00 ($2) → $100.00

($30) Total: 1¢ + 10¢ + $2 + $30 = $32.11

Change due: $32.11

✎ Worked Example: Adding Multiple Transactions

Monday: $234.56

Tuesday: $567.89

Wednesday: $345.67

Line up decimals and add:

234.56

567.89

+ 345.67

Total: $1,148.12

✎ Worked Example: Finding How Much More is Needed Goal:

Raise $5,000 for new equipment

Currently have: $3,678.90

$5,000.00 - $3,678.90 = $1,321.10 still needed

Amount needed: $1,321.10

?? Practice: Money Math

1. Add: $45.67 + $123.89

Work:

_____

_____

_____ **Answer:** _____

2. Subtract: $234.56 - $78.90

Work:

_____

_____

_____ **Answer:** _____

3. Register has $456.78, receive $234.56 in sales. New total?

Work:

_____

_____

_____ **Answer:** _____

4. Customer pays $100.00 for $67.89 purchase. What change?

Work:

_____

_____

_____ **Answer:** _____

5. Add: $45.67 + $89.12 + $34.56

Work:

_____

_____

_____ **Answer:** _____

6. Register: $1,234.56. Give $567.89 change. What remains?

Work:

_____

_____

_____ **Answer:** _____

7. Calculate: $456.78 + $234.56 + $789.12

Work:

_____

_____

_____ **Answer:** _____

8. Subtract: $1,000.00 - $678.90

Work:

_____

_____

_____ **Answer:** _____

9. Monday sales: $2,345.67. Tuesday: $3,456.78. Combined total?

Work:

Answer: _____

10. Customer total is $89.99. Pays with $100.00. Change due?

Work:

Answer: _____

11. Start with $500, earn $2,345.67 in sales, give $1,234.56 change. Register total?

Work:

Answer: _____

12. Need $5,000.00. Have $3,678.90. How much more needed?

Work:

Answer: _____

13. Calculate: $250.00 + $675.50 - $123.89

Work:

Answer: _____

14. Three purchases: $45.99, $67.50, $123.75. Total?

Work:

Answer: _____

15. Had $2,500.00. Spent $456.78, $234.56, and $189.99. Remaining?

Work:

Answer: _____

16. Weekly earnings: $1,234.56 + $1,567.89 + $1,345.67 + $1,456.78 + $1,789.34

Work:

Answer: _____

17. Customer pays $50.00 for $23.47 item. Change?
Work:

_____ **Answer:** _____

18. Bank balance: $4,567.89. Deposit $1,234.56. Withdraw $500.00. New balance? Work:

_____ **Answer:** _____

19. Price is $199.99. Tax is $16.50. Total due?
Work:

_____ **Answer:** _____

20. Had $10,000.00 budget. Expenses: $2,345.67, $3,456.78, $1,234.56. Remaining?
Work:

_____ **Answer:** _____

Chapter 1 Action Report: Store Manager's Weekly Summary

Complete this manager's report using ALL your Chapter 1 skills! Show your work for each problem.

Inventory Report

1. TOTAL INVENTORY: Store has 3,456 pencils, 2,789 pens, 4,123 markers, and 1,892 erasers. What is the total number of writing supplies?
Work:

_____ **Answer:** _____

2. WEEKLY SALES: Sold 1,234 pencils Monday, 987 Tuesday, 1,456 Wednesday, 876 Thursday, 1,547 Friday. Total pencils sold?
Work:

_____ **Answer:** _____

3. REMAINING STOCK: Started with 3,456 pencils, sold the total from problem 2. How many pencils remain?

Work:

Answer: _____

4. REORDER CHECK: Reorder point is 1,500 pencils. Based on problem 3, do you need to reorder? By how much are you above or below?

Work:

Answer: _____

Financial Report

5. DAILY REGISTER: Started $567.89, received $4,567.34 in payments, gave $2,345.67 change. Ending balance?

Work:

Answer: _____

6. WEEKLY REVENUE: Mon $1,234.56, Tue $987.34, Wed $1,567.89, Thu $876.54, Fri $2,345.67. Total weekly revenue?

Work:

Answer: _____

7. PROFIT CALCULATION: Weekly revenue (from #6) minus weekly expenses of $4,567.00. Weekly profit?

Work:

Answer: _____

8. BUDGET STATUS: Monthly budget is $25,000. Week 1 spent $5,678.90, Week 2 spent $6,234.56. Remaining budget?

Work:

Answer: _____

Analysis Questions

9. PLACE VALUE: The store's inventory ID number is 48,052. Write this in expanded form and word form.

Work:

Answer: _____

10. COMPARISON: Store A sold 4,567 items. Store B sold 4,657 items. Store C sold 4,576 items. Rank from most to least sales.

Work:

Answer: _____

11. ROUNDING: For the monthly report, round total inventory of 12,847 items to the nearest thousand.

Work:

Answer: _____

12. ESTIMATION: Estimate 4,892 + 3,178 by rounding to nearest thousand, then calculate the exact answer. How close was your estimate?

Work:

Answer: _____

CHAPTER 2

The Festival Planner

Chapter Goal: Use multiplication, division, and geometry to plan a community event.

Welcome to the Festival Planning Committee! The Fall Festival is your school's biggest event of the year. As lead planner, you'll calculate supplies for hundreds of guests, divide money among charities, and design the festival layout. Mathematics makes it all possible!

Section 1: The Inventory — Multi-Digit Multiplication

◆◆ The Scenario

You need prizes for carnival games! Super-Bounce Balls come in boxes of 24. Your school has 15 classes with 25 students each. How many students total? Will 18 boxes of balls be enough for one prize per student?

◆◆ The Skill: Multi-Digit Multiplication

For larger numbers, we can use the area model (breaking numbers into parts) or the standard algorithm. Always estimate first!

✎ Worked Example: Area Model: 15 × 25

Break each number into parts: 15 = 10 + 5 and 25 = 20 + 5

Create a grid and multiply each part:

- 10 × 20 = 200
- 10 × 5 = 50
- 5 × 20 = 100
- 5 × 5 = 25

Total: 200 + 50 + 100 + 25 = 375 students

✎ Worked Example: Standard Algorithm: 34 × 27

Step 1: Multiply by ones digit (7)

34 × 7 = 238

Step 2: Multiply by tens digit (20)

34 × 20 = 680

Step 3: Add partial products

Answer: 238 + 680 = 918

✎ Worked Example: Checking: Are 18 Boxes Enough?

Need: 375 students (one prize each minimum)

Have: 18 boxes × 24 balls per box

18 × 24 = 432 balls

432 > 375

Answer: YES! We have 57 extra prizes

✎ Worked Example: Money Multiplication: Ticket Sales Tickets cost $12 each. Sold 145 tickets.

145 × 12 = 145 × 10 + 145 × 2 = 1,450 + 290 = 1,740

Total earned: $1,740

✏️ Practice: Multi-Digit Multiplication

1. Calculate: 23 × 14

Work:

_____

_____

_____ **Answer:** _____

2. Calculate: 36 × 25

Work:

_____

_____

_____ **Answer:** _____

3. 15 tables with 8 chairs each. Total chairs?

Work:

_____

_____

_____ **Answer:** _____

4. Calculate: 42 × 18

Work:

_____

_____

_____ **Answer:** _____

5. 24 boxes with 36 prizes each. Total prizes?

Work:

_____

_____

_____ **Answer:** _____

6. Calculate: 56 × 34

Work:

_____

_____

_____ **Answer:** _____

7. Tickets are $12 each. Sold 145. Total earned?

Work:

_____

_____

_____ **Answer:** _____

8. Calculate: 67 × 43

Work:

_____

_____

_____ **Answer:** _____

9. 28 volunteers work 6 hours each. Total volunteer hours?
Work:

Answer: _____

10. Calculate: 85 × 52
Work:

Answer: _____

11. 15 classes, 24 students each, need 3 tickets per student. Total tickets needed? Work:

Answer: _____

12. Stage rental: $75 per hour for 8 hours. Total cost?
Work:

Answer: _____

13. Calculate: 48 × 37
Work:

Answer: _____

14. 125 guests, each receives 4 raffle tickets. Total tickets needed?
Work:

Answer: _____

15. Calculate: 94 × 28
Work:

Answer: _____

16. Parking lot has 35 rows with 18 spaces each. Total capacity?
Work:

Answer: _____

17. Calculate: 63 × 45

Work:

_____

_____

_____ **Answer:** _____

18. Food vendor serves 256 guests, 3 items each. Total items served?

Work:

_____

_____

_____ **Answer:** _____

19. Calculate: 78 × 54

Work:

_____

_____

_____ **Answer:** _____

20. Festival runs 12 hours. Average 85 visitors per hour. Total visitors?

Work:

_____

_____

_____ **Answer:** _____

Section 2: The Ticket Booth — Long Division

✍ The Scenario

The festival raised $1,452 to donate! You want to split it equally among 4 local charities. How much does each charity receive? What if there's money left over?

✍ The Skill: Long Division

Long division follows a pattern: Divide, Multiply, Subtract, Bring down. Repeat until done!

✎ Worked Example: Long Division: 1,452 ÷ 4

Step by step:

- 14 ÷ 4 = 3 remainder 2
- Bring down 5 → 25 ÷ 4 = 6 remainder 1
- Bring down 2 → 12 ÷ 4 = 3 exactly

Answer: $363 per charity

Check: 363 × 4 = 1,452 ✓

✎ Worked Example: Handling Remainders: 1,457 ÷ 4

1,457 ÷ 4 = 364 remainder 1

Each charity gets $364, with $1 left over

Options for the extra $1:

- Give one charity $365 (others get $364)
- Buy a thank-you card for all volunteers

Real-world decisions go beyond just the math!

✎ Worked Example: Division for Equal Groups

Problem: 936 students need to form teams of 12.

936 ÷ 12 = 78 teams

Check: 78 × 12 = 936 ✓

✎ Worked Example: Finding How Many Groups Fit

Have 1,728 cookies. Each box holds 144 cookies.

1,728 ÷ 144 = 12 boxes needed

All cookies fit perfectly with no remainder!

✎ Practice: Long Division

1. Calculate: 864 ÷ 4

Work:

_____

_____

_____ **Answer:** _____

2. Calculate: 1,575 ÷ 5

Work:

_____

_____

_____ **Answer:** _____

3. Split $2,436 equally among 6 game booths. Each gets?

Work:

_____

_____

_____ **Answer:** _____

4. Calculate: 2,184 ÷ 7

Work:

_____

_____

_____ **Answer:** _____

5. 945 guests seated at tables of 9. How many tables needed?

Work:

_____

_____

_____ **Answer:** _____

6. Calculate: 3,456 ÷ 8

Work:

_____

_____

_____ **Answer:** _____

7. 1,250 prizes shared among 5 games equally. Each game gets?

Work:

Answer: _____

8. Calculate: 2,709 ÷ 3

Work:

Answer: _____

9. 4,872 tickets sold over 6 hours. Average per hour?

Work:

Answer: _____

10. Calculate: 5,432 ÷ 4

Work:

Answer: _____

11. $8,645 split among 5 partners. Each gets? Any remainder?

Work:

Answer: _____

12. 2,500 flyers for 8 volunteers to distribute. Each takes?

Work:

Answer: _____

13. Calculate: 7,236 ÷ 9

Work:

Answer: _____

14. 936 students form teams of 12. How many teams?

Work:

Answer: _____

15. Calculate: 4,128 ÷ 6

Work:

_____

_____

_____ **Answer:** _____

16. 1,500 programs split among 8 classrooms. Each gets?

Work:

_____

_____

_____ **Answer:** _____

17. Calculate: 2,345 ÷ 5

Work:

_____

_____

_____ **Answer:** _____

18. Cookie boxes hold 144 cookies. Have 1,728 cookies. How many boxes?

Work:

_____

_____

_____ **Answer:** _____

19. Calculate: 6,384 ÷ 8

Work:

_____

_____

_____ **Answer:** _____

20. $9,876 profit shared among 6 committees. Each gets?

Work:

_____

_____

_____ **Answer:** _____

Section 3: The Map Design — Geometry

◆◆ The Scenario

The festival will be held on a rectangular plot measuring 60 feet by 40 feet. You need to calculate the area for surface covering and the perimeter for fencing.

◆◆ The Skills

Area: The space inside a shape. For rectangles: Area = Length × Width

Perimeter: The distance around a shape. For rectangles: P = 2 × Length + 2 × Width

✎ Worked Example: Festival Plot Calculations

Plot dimensions: 60 ft × 40 ft

Area: 60 × 40 = 2,400 square feet

Perimeter: 60 + 40 + 60 + 40 = 200 feet of fencing needed

The stage takes up 10 × 10 = 100 sq ft, which is 100/2,400 ≈ 4% of total space

✎ Worked Example: Finding a Missing Side

A rectangle has perimeter 48 feet and length 14 feet. Find the width.

P = 2L + 2W

48 = 2(14) + 2W

48 = 28 + 2W

20 = 2W

Width: 10 feet

✎ Worked Example: Area with a Cutout (L-Shaped)

Large rectangle: 20 × 10 = 200 sq ft

Cutout section: 8 × 6 = 48 sq ft

Remaining area: 200 - 48 = 152 sq ft

✎ Worked Example: Border Area

Pool: 30 × 20 ft with a 2-ft wide border around it

Outer rectangle: 34 × 24 = 816 sq ft

Inner (pool): 30 × 20 = 600 sq ft

Border area: 816 - 600 = 216 sq ft

✎ Practice: Geometry

1. Rectangle 12 ft × 8 ft. Find the area.

Work:

_____

_____

_____ **Answer:** _____

2. Square with sides 15 ft. Find the perimeter.

Work:

_____

_____

_____ **Answer:** _____

3. Booth measures 8 ft × 6 ft. Area of booth space?

Work:

_____

_____

_____ **Answer:** _____

4. Need fence around 25 ft × 18 ft area. How much fence?
Work:

Answer: _____

5. Stage is 12 ft × 12 ft square. Area?
Work:

Answer: _____

6. Walkway: 50 ft long, 4 ft wide. Area?
Work:

Answer: _____

7. Festival plot: 80 ft × 50 ft. Total area?
Work:

Answer: _____

8. Square has perimeter 36 ft. What is the side length?
Work:

Answer: _____

9. Rectangle area is 72 sq ft, length is 9 ft. Width?
Work:

Answer: _____

10. Three booths: 6×8, 5×10, 8×8 ft. Combined area?
Work:

Answer: _____

11. Plot 100×60 ft. Stage 15×15 ft. Area remaining?
Work:

Answer: _____

12. Rectangle 24 ft × 16 ft. Perimeter?

Work:

Answer: _____

13. Two squares: 10×10 and 8×8. Combined area?

Work:

Answer: _____

14. Perimeter is 48 ft, length is 14 ft. Width?

Work:

Answer: _____

15. L-shaped area: 20×10 with 8×6 cut out. Remaining area?

Work:

Answer: _____

16. 2-ft wide border around 30×20 pool. Border area only?

Work:

Answer: _____

17. Room is 15×12 ft. Carpet costs $3/sq ft. Total cost?

Work:

Answer: _____

18. Square garden area is 144 sq ft. Side length?

Work:

Answer: _____

19. Fence costs $12/ft. Rectangle 40×30 ft needs fence. Cost?

Work:

Answer: _____

20. Three sections: 25×20, 30×15, 20×20 ft. Total area?
Work:

_____ **Answer:** _____

Chapter 2 Action Report: Festival Planning Summary

Use ALL Chapter 2 skills to complete this planning report!

Supplies & Budget

1. PRIZES NEEDED: 15 classes × 25 students × 3 prizes each. Total prizes? Work:

_____ **Answer:** _____

2. PRIZE CHECK: Boxes contain 48 prizes. Need total from #1. How many boxes to order?
Work:

_____ **Answer:** _____

3. CHARITY: Raised $2,568 to split among 4 charities. Each receives?
Work:

_____ **Answer:** _____

Layout Planning

4. TOTAL AREA: Festival plot is 75 ft × 50 ft. Area?
Work:

_____ **Answer:** _____

5. BOOTH SPACE: 5 booths, each 10 × 12 ft. Combined booth area?
Work:

_____ **Answer:** _____

6. REMAINING: Plot area (#4) minus booth area (#5). Space for activities?

Work:

_____

_____

_____ **Answer:** _____

7. FENCING: Perimeter of 75 × 50 plot for safety fence?

Work:

_____

_____

_____ **Answer:** _____

Financial Summary

8. TICKET REVENUE: $8 tickets, goal is $2,400. How many tickets must sell? Work:

_____

_____

_____ **Answer:** _____

9. VOLUNTEER HOURS: 144 volunteers ÷ 8-person teams. How many teams?

Work:

_____

_____

_____ **Answer:** _____

10. EXPENSE TRACKING: Budget $3,000. Spent $456 + $789 + $234 + $567. Remaining?

Work

_____

_____

_____ **Answer:** _____

CHAPTER 3

The Pet Shop Owner

Chapter Goal: Master fractions through feeding schedules, tank measurements, and inventory.

Welcome to Paws & Fins Pet Shop! As the owner, you'll use fractions every single day. How much food for each animal? What fraction of tanks need cleaning? What portion of your inventory is fish supplies? Let's care for these animals with mathematical precision!

Section 1: Understanding Fractions

?? The Scenario

Your pet shop is divided into sections: 3/8 for dogs, 2/8 for cats, 1/8 for fish, and 2/8 for small animals. Understanding fractions helps you manage space, food, and supplies.

?? The Skill: Fraction Basics

Numerator (top): The number of parts you have

Denominator (bottom): The total number of equal parts

In 3/8: You have 3 parts out of 8 total equal parts.

✎ Worked Example: Naming Fractions

A cage has 6 equal compartments. 4 have hamsters.

Fraction with hamsters: 4/6

Fraction empty: 2/6

Notice: 4/6 + 2/6 = 6/6 = 1 whole cage

✎ Worked Example: Fractions of a Group

12 puppies: 7 are brown, 5 are white

Fraction brown: 7/12

Fraction white: 5/12

Check: 7/12 + 5/12 = 12/12 = 1 (all puppies accounted for)

✎ Worked Example: Fractions and Remainders

Bag of food is 3/4 full. What fraction is empty?

A full bag = 4/4

Empty portion: 4/4 - 3/4 = 1/4

Answer: 1/4 of the bag is empty

?? Practice: Understanding Fractions

1. Cage has 6 compartments, 4 have hamsters. Fraction with hamsters?

Work:

_____

_____

_____ **Answer:** _____

2. Tank divided into 5 sections, 2 have plants. Fraction with plants?

Work:

Answer: _____

3. 12 puppies, 7 are brown. Fraction that are brown?

Work:

Answer: _____

4. Bag is 3/4 full. What fraction is empty?

Work:

Answer: _____

5. 8 tanks in store, 5 need cleaning. Fraction needing cleaning?

Work:

Answer: _____

6. 10 birds total, 3 are parrots. Fraction that are parrots?

Work:

Answer: _____

7. 24 animals total, 6 are reptiles. Fraction that are reptiles?

Work:

Answer: _____

8. Water bowl is 2/3 full. Fraction that is empty?

Work:

Answer: _____

9. 15 fish, 9 are goldfish. Fraction that are goldfish?

Work:

Answer: _____

10. 20 cages, 8 are empty. Fraction that are occupied?
Work:

Answer: _____

11. Treat jar has 16 treats, 10 given away. Fraction remaining?
Work:

Answer: _____

12. Pet shop open 5 days out of 7 days per week. Fraction open?
Work:

Answer: _____

13. 30 bags of food, 12 are dog food. Fraction that is dog food?
Work:

Answer: _____

14. Cat food bowl 5/6 full. Fraction empty?
Work:

Answer: _____

15. 18 leashes, 6 are red. Fraction that are red?
Work:

Answer: _____

16. Fish tank 7/8 full of water. Fraction empty?
Work:

Answer: _____

17. 25 customers today, 15 bought something. Fraction that bought?
Work:

Answer: _____

18. 12 puppies sleeping, 5 are awake. Fraction sleeping?

Work:

_____

_____

_____ **Answer:** _____

Section 2: Equivalent Fractions

✍ The Skill

Equivalent fractions are different fractions that represent the same amount. You can find them by multiplying or dividing both the numerator and denominator by the same number.

✎ Worked Example: Finding Equivalents: 2/4 = 1/2

Divide both numerator and denominator by 2:

2 ÷ 2 = 1

4 ÷ 2 = 2

So: 2/4 = 1/2

To go UP: 1/2 × 2/2 = 2/4, or 1/2 × 3/3 = 3/6

✎ Worked Example: Simplifying 8/12

Find a common factor of 8 and 12: Both divisible by 4

8 ÷ 4 = 2

12 ÷ 4 = 3

Simplified: 8/12 = 2/3

✎ Worked Example: Finding a Missing Numerator

3/4 = ?/12

What times 4 equals 12? → 3

Multiply numerator by same: 3 × 3 = 9

Answer: 3/4 = 9/12

✍ Practice: Equivalent Fractions

1. Find equivalent: 3/6 = ?/2

Work:

_____

_____

_____ **Answer:** _____

2. Find equivalent: 2/5 = ?/10

Work:

_____

_____

_____ **Answer:** _____

3. Simplify: 4/8

Work:

_____

_____

_____ **Answer:** _____

4. Simplify: 6/9

Work:

Answer: _____

5. Are 2/3 and 4/6 equivalent? Prove it.

Work:

Answer: _____

6. Find equivalent: 3/4 = ?/12

Work:

Answer: _____

7. Simplify: 10/15

Work:

Answer: _____

8. Find three fractions equivalent to 1/2.

Work:

Answer: _____

9. Simplify: 8/12

Work:

Answer: _____

10. Which is in simplest form: 3/9, 2/5, or 4/6?

Work:

Answer: _____

11. Find equivalent: 4/6 = ?/3

Work:

Answer: _____

12. Simplify: 12/16

Work:

Answer: _____

13. Find equivalent: 5/6 = ?/18

Work:

Answer: _____

14. Simplify: 15/20

Work:

Answer: _____

15. Are 3/4 and 9/12 equivalent?

Work:

Answer: _____

16. Find equivalent: 2/3 = ?/15

Work:

Answer: _____

17. Simplify: 9/27

Work:

Answer: _____

18. Find equivalent: 1/4 = ?/20

Work:

Answer: _____

Section 3: Comparing Fractions

✎ Worked Example: Comparing 3/4 and 2/3

Method: Find a common denominator

LCD of 4 and 3 is 12

3/4 = 9/12

2/3 = 8/12

9/12 > 8/12

Answer: 3/4 > 2/3

✎ Worked Example: Comparing with Same Numerator

Compare 2/5 and 2/7

Same numerator: Larger denominator = smaller fraction

2/5 has smaller pieces than 2/7

Answer: 2/5 > 2/7

✎ Practice: Comparing Fractions

1. Compare: 1/2 ___ 2/5

Work:

_____

_____

_____ **Answer:** _____

2. Compare: 3/4 ___ 5/8

Work:

_____

_____

_____ **Answer:** _____

3. Compare: 2/3 ___ 3/5

Work:

_____

_____

_____ **Answer:** _____

4. Order least to greatest: 1/2, 1/3, 1/4

Work:

_____

_____

_____ **Answer:** _____

5. Compare: 5/6 ___ 7/8

Work:

_____

_____

_____ **Answer:** _____

6. Which is more food: 2/5 of a bag or 3/8 of a bag?

Work:

Answer: _____

7. Order greatest to least: 3/4, 2/3, 5/6

Work:

Answer: _____

8. Cat ate 3/8, dog ate 2/6 of same-size bowl. Who ate more?

Work:

Answer: _____

9. Compare: 4/5 ___ 7/10

Work:

Answer: _____

10. Order: 2/3, 5/6, 3/4, 7/12 from least to greatest

Work:

Answer: _____

11. Compare: 3/8 ___ 2/5

Work:

Answer: _____

12. Which is less: 5/12 or 3/8?

Work:

Answer: _____

13. Compare: 7/10 ___ 2/3

Work:

Answer: _____

14. Order greatest to least: 1/2, 3/5, 7/10

Work:

_____

_____

_____ **Answer:** _____

15. Compare: 4/9 ___ 5/12

Work:

_____

_____

_____ **Answer:** _____

Section 4: Adding & Subtracting Fractions

✎ Worked Example: Same Denominators: 1/4 + 2/4

When denominators match, just add the numerators:

1/4 + 2/4 = 3/4

The denominator stays the same!

✎ Worked Example: Different Denominators: 2/3 + 1/6

Step 1: Find common denominator (LCD of 3 and 6 is 6)

Step 2: Convert 2/3 to sixths: 2/3 = 4/6

Step 3: Add: 4/6 + 1/6 = 5/6

Answer: 5/6

✎ Worked Example: Subtracting: 7/8 - 1/4

Convert 1/4 to eighths: 1/4 = 2/8

7/8 - 2/8 = 5/8

Answer: 5/8 of the tank remains

✎ Practice: Fraction Operations

1. Add: 2/5 + 1/5

Work:

_____

_____

_____ **Answer:** _____

2. Add: 3/8 + 2/8

Work:

_____

_____

_____ **Answer:** _____

3. Subtract: 5/6 - 2/6

Work:

_____

_____

_____ **Answer:** _____

4. Add: 1/4 + 1/2

Work:

_____

_____

_____ **Answer:** _____

5. Subtract: 3/4 - 1/2

Work:

_____

_____

_____ **Answer:** _____

6. Morning feeding: 1/3 cup. Evening: 1/6 cup. Total?

Work:

_____

_____

_____ **Answer:** _____

7. Add: 2/3 + 1/4

Work:

_____

_____

_____ **Answer:** _____

8. Tank was 7/8 full. Used 1/4 for water change. How full now?

Work:

_____

_____

_____ **Answer:** _____

9. Add: 1/2 + 1/3 + 1/6

Work:

_____

_____

_____ **Answer:** _____

10. Subtract: 5/6 - 1/3

Work:

_____

_____

_____ **Answer:** _____

11. Add: 3/8 + 1/4

Work:

Answer: _____

12. Had 7/8 bag of food. Used 3/8. What fraction remains?

Work:

Answer: _____

13. Add: 2/5 + 3/10

Work:

Answer: _____

14. Subtract: 4/5 - 1/2

Work:

Answer: _____

15. Add: 1/6 + 2/3

Work:

Answer: _____

16. Bowl 5/6 full, drank 1/3. How full now?

Work:

Answer: _____

17. Add: 3/4 + 1/8

Work:

Answer: _____

18. Subtract: 11/12 - 3/4

Work:

Answer: _____

Chapter 3 Action Report: Pet Shop Weekly Summary

1. INVENTORY: 24 animals total. 1/3 are dogs, 1/4 are cats. How many dogs? How many cats?

Work:

_____

_____

_____ **Answer:** _____

2. FEEDING: Dog needs 3/4 cup AM + 2/4 cup PM. Daily total?

Work:

_____

_____

_____ **Answer:** _____

3. CLEANING: 12 tanks, 8 need cleaning. What fraction? Simplify.

Work:

_____

_____

_____ **Answer:** _____

4. SUPPLIES: Cat food 2/3 full, dog food 5/8 full. Which has more?

Work:

_____

_____

_____ **Answer:** _____

5. USAGE: Used 5/8 of treats Monday + 1/4 Tuesday. Total fraction used?

Work:

_____

_____

_____ **Answer:** _____

6. SPACE: Dogs 3/8, cats 2/8, fish 1/8 of store. Fraction for small animals?

Work:

_____

_____

_____ **Answer:** _____

7. MEASURE: Food scoop holds 2/6 cup. Simplify this fraction.

Work:

_____

_____

_____ **Answer:** _____

8. COMPARISON: Puppies weigh 3/4 lb, 2/3 lb, 5/6 lb. Order least to greatest. Work:

_____

_____

_____ **Answer:** _____

CHAPTER 4

The Recipe Master

Chapter Goal: Use fractions and mixed numbers to scale recipes and measure ingredients.

Welcome to the school cafeteria kitchen! As Recipe Master, you'll double recipes for big events, halve them for small groups, and measure ingredients precisely. Cooking is applied mathematics— and hungry students are counting on your accuracy!

Section 1: Understanding Mixed Numbers

?? The Skill

A mixed number combines a whole number and a fraction: 2 1/2 means 2 whole things plus 1/2 more.

An improper fraction has a numerator larger than its denominator: 5/2 means five halves.

✎ Worked Example: Converting Mixed to Improper: 2 1/2 Step 1:
Multiply whole number × denominator: 2 × 2 = 4
Step 2: Add the numerator: 4 + 1 = 5
Step 3: Keep the same denominator: 5/2
Answer: 2 1/2 = 5/2

✎ Worked Example: Converting Improper to Mixed: 11/4 Step 1:
Divide numerator by denominator: 11 ÷ 4 = 2 remainder 3
Step 2: Whole number is the quotient: 2
Step 3: Remainder becomes new numerator: 3
Step 4: Keep same denominator: 4
Answer: 11/4 = 2 3/4

✎ Worked Example: Comparing Mixed Numbers
Which is larger: 2 3/4 or 11/4?
Convert 2 3/4 to improper: (2×4)+3 = 11, so 2 3/4 = 11/4
Answer: They are equal! 2 3/4 = 11/4

?? Practice: Mixed Numbers

1. Convert to improper fraction: 3 1/4

Work:

_____

_____

_____ **Answer:** _____

2. Convert to improper fraction: 2 2/3

Work:

Answer:

3. Convert to mixed number: 9/4

Work:

Answer:

4. Convert to mixed number: 17/5

Work:

Answer:

5. Convert to improper fraction: 4 1/2

Work:

Answer:

6. Convert to mixed number: 23/6

Work:

Answer:

7. Which is larger: 2 3/4 or 11/4? Prove it.

Work:

Answer:

8. Recipe calls for 1 3/4 cups flour. Write as improper fraction.

Work:

Answer:

9. Convert to mixed number: 19/8

Work:

Answer:

10. Convert to improper fraction: 5 2/3

Work:

Answer: _____

11. Convert to mixed number: 25/4

Work:

Answer: _____

12. Convert to improper fraction: 3 5/8

Work:

Answer: _____

13. Convert to mixed number: 31/6

Work:

Answer: _____

14. Convert to improper fraction: 6 1/3

Work:

Answer: _____

15. Which is larger: 3 1/2 or 10/3?

Work:

Answer: _____

16. Convert to mixed number: 47/10

Work:

Answer: _____

17. Convert to improper fraction: 2 7/8

Work:

Answer: _____

18. Convert to mixed number: 33/8

Work:

_____

_____

_____ **Answer:** _____

Section 2: Adding Mixed Numbers

✎ Worked Example: Adding: 2 3/4 + 1 2/4

Step 1: Add the whole numbers: 2 + 1 = 3

Step 2: Add the fractions: 3/4 + 2/4 = 5/4

Step 3: Convert improper fraction: 5/4 = 1 1/4

Step 4: Add to whole number: 3 + 1 1/4 = 4 1/4

Answer: 4 1/4

✎ Worked Example: Adding with Different Denominators: 1 1/2 + 2 1/3 Step 1: Find common denominator: LCD of 2 and 3 is 6

Step 2: Convert fractions: 1/2 = 3/6 and 1/3 = 2/6

Step 3: Add: 1 3/6 + 2 2/6 = 3 5/6

Answer: 3 5/6

✎ Worked Example: Recipe Application

Morning batch: 2 1/4 cups flour. Afternoon batch: 1 3/4 cups flour.

2 1/4 + 1 3/4 = 3 4/4 = 4 cups total flour needed

✎ Practice: Adding Mixed Numbers

1. Add: 2 1/4 + 3 2/4

Work:

_____

_____

_____ **Answer:** _____

2. Add: 1 2/5 + 2 1/5

Work:

_____

_____

_____ **Answer:** _____

3. Add: 3 1/2 + 2 1/2

Work:

_____

_____

_____ **Answer:** _____

4. Add: 1 3/4 + 2 3/4

Work:

_____

_____

_____ **Answer:** _____

5. Add: 2 2/3 + 1 2/3

Work:

Answer: _____

6. 1 1/2 cups milk + 2 1/4 cups water. Total liquid?

Work:

Answer: _____

7. Add: 4 5/8 + 2 7/8

Work:

Answer: _____

8. Morning: 3 2/3 cups. Afternoon: 2 2/3 cups. Total?

Work:

Answer: _____

9. Add: 2 1/3 + 3 1/2

Work:

Answer: _____

10. Add: 1 3/4 + 2 2/3

Work:

Answer: _____

11. Add: 5 1/6 + 2 5/6

Work:

Answer: _____

12. Add: 3 2/5 + 4 4/5

Work:

Answer: _____

13. Add: 2 1/2 + 1 1/3 + 1 1/6

Work:

_____

_____

_____ **Answer:** _____

14. Recipe: 1 1/4 cups sugar + 2 1/2 cups flour. Total dry ingredients?

Work:

_____

_____

_____ **Answer:** _____

15. Add: 6 3/8 + 2 5/8

Work:

_____

_____

_____ **Answer:** _____

16. Add: 4 2/3 + 3 5/6

Work:

_____

_____

_____ **Answer:** _____

Section 3: Subtracting Mixed Numbers

✎ Worked Example: Subtracting: 4 3/4 - 2 1/4

Fractions have same denominator, and 3/4 > 1/4

Whole numbers: 4 - 2 = 2

Fractions: 3/4 - 1/4 = 2/4 = 1/2

Answer: 2 1/2

✎ Worked Example: Subtracting with Borrowing: 5 1/4 - 2 3/4 Problem:

Can't subtract 3/4 from 1/4!

Step 1: Borrow 1 from the 5: 5 1/4 becomes 4 + 1 1/4 = 4 5/4

Step 2: Now subtract: 4 5/4 - 2 3/4

Whole numbers: 4 - 2 = 2

Fractions: 5/4 - 3/4 = 2/4 = 1/2

Answer: 2 1/2

✎ Worked Example: Recipe Subtraction

Had 5 cups sugar. Used 2 1/3 cups. How much remains?

5 = 5 0/3 = 4 3/3 (borrow to subtract)

4 3/3 - 2 1/3 = 2 2/3 cups remaining

?? Practice: Subtracting Mixed Numbers

1. Subtract: 4 3/4 - 2 1/4

Work:

_____

_____

_____ **Answer:** _____

2. Subtract: 5 2/3 - 3 1/3

Work:

_____

_____

_____ **Answer:** _____

3. Subtract: 3 1/4 - 1 3/4 (borrowing needed!)

Work:

_____

_____

_____ **Answer:** _____

4. Subtract: 6 1/2 - 2 3/4

Work:

_____

_____

_____ **Answer:** _____

5. Had 4 cups sugar. Used 1 2/3 cups. Remaining?

Work:

_____

_____

_____ **Answer:** _____

6. Subtract: 7 1/8 - 4 5/8

Work:

_____

_____

_____ **Answer:** _____

7. 10 pounds flour - 6 3/4 pounds used. Left?

Work:

_____

_____

_____ **Answer:** _____

8. Subtract: 8 - 3 2/5

Work:

_____

_____

_____ **Answer:** _____

9. Subtract: 5 1/3 - 2 2/3

Work:

Answer: _____

10. Subtract: 9 1/4 - 5 3/4

Work:

Answer: _____

11. Had 6 1/2 cups. Used 2 3/4 cups. Remaining?

Work:

Answer: _____

12. Subtract: 7 2/5 - 3 4/5

Work:

Answer: _____

13. Subtract: 10 1/6 - 4 5/6

Work:

Answer: _____

14. Started with 8 gallons. Used 3 5/8 gallons. Remaining?

Work:

Answer: _____

15. Subtract: 12 - 5 3/4

Work:

Answer: _____

16. Subtract: 6 1/3 - 2 5/6

Work:

Answer: _____

Section 4: Multiplying Fractions

✎ Worked Example: Multiplying Two Fractions: 1/2 × 3/4 Step 1:
Multiply numerators: 1 × 3 = 3
Step 2: Multiply denominators: 2 × 4 = 8
Answer: 3/8

✎ Worked Example: Multiplying Fraction by Whole Number: 2/3 × 6 Write 6 as fraction: 6/1
Multiply: 2/3 × 6/1 = 12/3 = 4
Answer: 4

✎ Worked Example: Finding Half of a Recipe
Recipe needs 2/3 cup oil. Making half batch.
1/2 × 2/3 = 2/6 = 1/3 cup oil needed

✎ Worked Example: Multiplying Mixed Numbers
2 1/2 × 2
Convert: 2 1/2 = 5/2
5/2 × 2 = 10/2 = 5
Answer: 5

✎ Practice: Multiplying Fractions

1. Multiply: 1/2 × 1/4
Work:

_____ **Answer:** _____

2. Multiply: 2/3 × 3/4
Work:

_____ **Answer:** _____

3. Multiply: 1/4 × 8
Work:

_____ **Answer:** _____

4. Multiply: 3/5 × 2/3
Work:

_____ **Answer:** _____

5. Half of 2/3 cup is how much?

Work:

_____

_____

_____ **Answer:** _____

6. Multiply: 4/5 × 5/8

Work:

_____

_____

_____ **Answer:** _____

7. Triple the recipe: 3 × 2/3 cup = ?

Work:

_____

_____

_____ **Answer:** _____

8. Multiply: 2 1/2 × 2

Work:

_____

_____

_____ **Answer:** _____

9. Multiply: 3/4 × 2/5

Work:

_____

_____

_____ **Answer:** _____

10. Multiply: 5/6 × 3

Work:

_____

_____

_____ **Answer:** _____

11. Quarter of a recipe: 1/4 × 3/4 cup = ?

Work:

_____

_____

_____ **Answer:** _____

12. Multiply: 7/8 × 4/7

Work:

_____

_____

_____ **Answer:** _____

13. Multiply: 2/3 × 9

Work:

_____

_____

_____ **Answer:** _____

14. Multiply: 1 1/2 × 4

Work:

_____

_____

_____ **Answer:** _____

15. Multiply: 5/8 × 2/3

Work:

_____

_____

_____ **Answer:** _____

16. Double batch: 2 × 1 3/4 cups = ?

Work:

_____

_____

_____ **Answer:** _____

Chapter 4 Action Report: Kitchen Math

1. CONVERSION: Recipe needs 3 2/5 cups. Write as improper fraction.

Work:

_____

_____

_____ **Answer:** _____

2. DOUBLE BATCH: Original recipe: 1 3/4 cups milk. Doubled amount?

Work:

_____

_____

_____ **Answer:** _____

3. COMBINED: Cake needs 2 1/2 cups flour. Frosting needs 1 3/4 cups. Total flour?

Work:

_____

_____

_____ **Answer:** _____

4. REMAINING: Started with 5 cups sugar. Used 2 1/3 cups. How much left?

Work:

_____ **Answer:** _____

5. HALF BATCH: Full recipe uses 2/3 cup oil. Half batch needs?

Work:

_____ **Answer:** _____

6. TRIPLE: Recipe uses 1 1/4 cups butter. Triple batch needs?

Work:

_____ **Answer:** _____

7. SERVINGS: Recipe makes 2 1/2 gallons. Need 7 1/2 gallons. How many batches?

Work:

_____ **Answer:** _____

8. TOTAL: Breakfast used 3 2/3 cups flour. Lunch used 4 5/6 cups. Total today?

Work:

_____ **Answer:** _____

CHAPTER 5

The Construction Crew

Chapter Goal: Use measurement, conversion, and geometry to complete building projects.

Welcome to the Construction Crew! You're helping build a new playground for the elementary school. You'll measure lumber, convert between units, calculate surface areas, and figure out how much fencing to order. Hard hats on—let's build!

Section 1: Units of Length

⬛ Key Conversion Facts

Inches and Feet: 1 foot = 12 inches

Feet and Yards: 1 yard = 3 feet = 36 inches

✎ **Worked Example: Converting Feet to Inches: 8 ft = ? in** 1 foot = 12 inches 8 feet = 8 × 12 = 96 inches **Answer:** 96 inches
✎ **Worked Example: Converting Inches to Feet: 54 inches = ? ft ? in** Divide by 12: 54 ÷ 12 = 4 remainder 6 **Answer:** 4 feet 6 inches
✎ **Worked Example: Converting Yards to Feet: 5 yards = ? feet** 1 yard = 3 feet 5 yards = 5 × 3 = 15 feet **Answer:** 15 feet

⬛ Practice: Length Conversions

1. 5 feet = ___ inches

Work:

_____

_____

_____ **Answer:** _____

2. 36 inches = ___ feet

Work:

_____

_____

_____ **Answer:** _____

3. 2 yards = ___ feet

Work:

_____

_____

_____ **Answer:** _____

4. 4 feet 3 inches = ___ inches total

Work:

Answer: _____

5. 72 inches = ___ feet

Work:

Answer: _____

6. 7 feet = ___ inches

Work:

Answer: _____

7. 15 feet = ___ yards

Work:

Answer: _____

8. 100 inches = ___ feet ___ inches

Work:

Answer: _____

9. 6 yards = ___ inches

Work:

Answer: _____

10. 30 feet = ___ yards

Work:

Answer: _____

11. 3 feet 8 inches = ___ inches total

Work:

Answer: _____

12. 60 inches = ___ feet

Work:

_____

_____

_____ **Answer:** _____

13. 4 yards 2 feet = ___ feet total

Work:

_____

_____

_____ **Answer:** _____

14. 90 inches = ___ feet ___ inches

Work:

_____

_____

_____ **Answer:** _____

15. 18 feet = ___ yards

Work:

_____

_____

_____ **Answer:** _____

16. 2 yards 1 foot = ___ inches total

Work:

_____

_____

_____ **Answer:** _____

Section 2: Perimeter

✍ The Skill

Perimeter: The distance around a shape. Add all sides!

Rectangle formula: P = 2 × length + 2 × width (or P = 2L + 2W)

✎ Worked Example: Rectangle Perimeter: 12 ft × 8 ft

P = 2(12) + 2(8) = 24 + 16 = 40 feet

Or add all sides: 12 + 8 + 12 + 8 = 40 feet

Answer: 40 feet of fencing needed

✎ Worked Example: Finding Missing Side from Perimeter

Rectangle perimeter is 48 ft. Length is 14 ft. Find width.

P = 2L + 2W

48 = 2(14) + 2W
48 = 28 + 2W
20 = 2W
Width: 10 feet

⭐ Practice: Perimeter

1. Rectangle 12 ft × 8 ft. Perimeter?
Work:

_____

_____

_____ **Answer:** _____

2. Square with sides 9 ft. Perimeter?
Work:

_____

_____

_____ **Answer:** _____

3. Garden 15 ft × 10 ft. Fence needed?
Work:

_____

_____

_____ **Answer:** _____

4. Picture frame 24 in × 18 in. Border length?
Work:

_____

_____

_____ **Answer:** _____

5. Playground 50 ft × 30 ft. Perimeter?
Work:

_____

_____

_____ **Answer:** _____

6. Square perimeter is 48 ft. Side length?
Work:

_____

_____

_____ **Answer:** _____

7. Rectangle P = 60 ft, length = 18 ft. Width?
Work:

_____

_____

_____ **Answer:** _____

8. Triangle sides: 7 ft, 8 ft, 10 ft. Perimeter?

Work:

Answer: _____

9. Room 14 ft × 12 ft. Baseboard needed?

Work:

Answer: _____

10. Rectangle P = 100 ft, width = 20 ft. Length?

Work:

Answer: _____

11. Square perimeter 64 ft. Side length?

Work:

Answer: _____

12. Rectangle 25 ft × 15 ft. Perimeter?

Work:

Answer: _____

13. Fence costs $8/ft. Rectangle 40 × 30 ft. Total fence cost?

Work:

Answer: _____

14. Triangle P = 36 ft. Two sides are 12 ft and 14 ft. Third side?

Work:

Answer: _____

15. Rectangle P = 84 ft. Length is 3× width. Find both.

Work:

Answer: _____

16. Square garden. 120 ft of fence available. Maximum side length?

Work:

_____

_____

_____ **Answer:** _____

Section 3: Area

✓ The Skill

Area: The space inside a shape, measured in square units.

Rectangle formula: A = length × width

✎ Worked Example: Finding Area: 15 ft × 12 ft room

A = 15 × 12 = 180 square feet

Answer: 180 sq ft

✎ Worked Example: Finding Missing Side from Area

Rectangle area is 72 sq ft. Width is 8 ft. Find length.

A = L × W

72 = L × 8

L = 72 ÷ 8 = 9

Length: 9 feet

✎ Worked Example: Real-World Application: Flooring Cost Room: 20 ft × 18 ft. Flooring costs $4 per square foot.

Area: 20 × 18 = 360 sq ft

Cost: 360 × $4 = $1,440

✓ Practice: Area

1. Rectangle 15 ft × 12 ft. Area?

Work:

_____

_____

_____ **Answer:** _____

2. Square side 8 ft. Area?

Work:

_____

_____

_____ **Answer:** _____

3. Floor 20 ft × 18 ft. Square feet?

Work:

_____

_____

_____ **Answer:** _____

4. Wall 12 × 9 ft. Paint covers 50 sq ft/gal. How many gallons?
Work:

Answer: _____

5. Two rooms: 10×12 and 8×10 ft. Combined area?
Work:

Answer: _____

6. Grass seed $2/sq ft. Lawn 30×20 ft. Cost?
Work:

Answer: _____

7. Square area is 144 sq ft. Side length?
Work:

Answer: _____

8. Rectangle area is 72 sq ft, width is 8 ft. Length?
Work:

Answer: _____

9. Carpet $5/sq ft. Room 15×12 ft. Total cost?
Work:

Answer: _____

10. Driveway 40 ft × 12 ft. Square feet?
Work:

Answer: _____

11. Rectangle area 96 sq ft, length 12 ft. Width?
Work:

Answer: _____

12. Three rooms: 12×10, 14×12, 10×8 ft. Total area?

Work:

Answer: _____

13. Square area 225 sq ft. Side length?

Work:

Answer: _____

14. Tile costs $3/sq ft. Bathroom 8×6 ft. Cost?

Work:

Answer: _____

15. Playground 60×45 ft. Surface material $1.50/sq ft. Cost?

Work:

Answer: _____

16. Rectangle 24×18 ft. Area in square yards? (9 sq ft = 1 sq yd)

Work:

Answer: _____

Section 4: Weight and Capacity

?? Key Facts

Weight: 1 pound = 16 ounces, 1 ton = 2,000 pounds

Capacity: 1 gallon = 4 quarts = 8 pints = 16 cups

✎ Worked Example: Converting Pounds to Ounces

5 pounds = ? ounces

5 × 16 = 80 ounces

Answer: 80 ounces

✎ Worked Example: Converting Gallons to Quarts

3 gallons = ? quarts

3 × 4 = 12 quarts

Answer: 12 quarts

⭐ Practice: Weight and Capacity

1. 3 pounds = ___ ounces

Work:

_____

_____

_____ **Answer:** _____

2. 48 ounces = ___ pounds

Work:

_____

_____

_____ **Answer:** _____

3. 2 gallons = ___ quarts

Work:

_____

_____

_____ **Answer:** _____

4. 1.5 tons = ___ pounds

Work:

_____

_____

_____ **Answer:** _____

5. 5 gallons = ___ pints

Work:

_____

_____

_____ **Answer:** _____

6. 24 cups = ___ quarts

Work:

_____

_____

___ **Answer:** _____

7. 3,500 pounds = ___ tons ___ pounds

Work:

_____

_____

_____ **Answer:** _____

8. Need 960 lbs of sand. Bags hold 80 lbs. How many bags?
Work:

_____ **Answer:** _____

9. 4 quarts = ___ cups
Work:

_____ **Answer:** _____

10. 64 ounces = ___ pounds
Work:

_____ **Answer:** _____

11. 6 gallons = ___ cups
Work:

_____ **Answer:** _____

12. 1 ton 500 lbs = ___ pounds total
Work:

_____ **Answer:** _____

13. 32 pints = ___ gallons
Work:

_____ **Answer:** _____

14. Recipe needs 2 quarts. How many cups?
Work:

_____ **Answer:** _____

15. Truck holds 3 tons. Crates weigh 250 lbs each. Max crates?
Work:

_____ **Answer:** _____

16. Pool holds 5,000 gallons. How many quarts?
Work:

_____ **Answer:** _____

Chapter 5 Action Report: Construction Summary

1. LUMBER: Need boards 18 ft total. Boards come in 6 ft lengths. How many? Work:

_____ **Answer:** _____

2. CONVERSION: Blueprint shows 156 inches. Convert to feet.
Work:

_____ **Answer:** _____

3. FENCE: Playground 60×45 ft. Fence around perimeter?
Work:

_____ **Answer:** _____

4. SURFACE: Same 60×45 ft. Safety mulch costs $2/sq ft. Total cost?
Work:

_____ **Answer:** _____

5. CONCRETE: Need 1,200 lbs. Bags hold 40 lbs each. How many bags?
Work:

_____ **Answer:** _____

6. PAINT: Wall 15×10 ft. Gallon covers 100 sq ft. Enough with 1 gallon?

Work:

_____ **Answer:** _____

7. SANDBOX: Perimeter 24 ft, length 8 ft. Width? Area?
Work:

_____ **Answer:** _____

8. TOTAL AREA: Three play areas: 12×10, 8×6, 5×5 ft. Combined sq ft?

Work:

_____

_____

_____ **Answer:** _____

CHAPTER 6

The Sports League Manager

Chapter Goal: Collect, organize, and analyze data using tables, graphs, and statistics.

Welcome to Youth Sports League! As league manager, you'll track team scores, calculate batting averages, create standings, and make graphs to show performance. Data analysis helps you make fair decisions about playoffs, awards, and team improvements!

Section 1: Reading and Creating Data Tables

✎ The Scenario

You need to track the performance of 4 teams throughout the season. Tables help organize large amounts of information clearly.

✎ Worked Example: Reading a Team Standings Table

Team | Wins | Losses | Ties | Total Games
Eagles | 8 | 2 | 1 | 11
Tigers | 7 | 3 | 1 | 11
Bears | 5 | 5 | 1 | 11
Lions | 2 | 8 | 1 | 11
Eagles lead with 8 wins. Lions have most losses.

✎ Worked Example: Calculating Win Percentage

Eagles: 8 wins out of 11 games
Win fraction: 8/11
Win percentage: 8 ÷ 11 ≈ 0.727 = about 73%

✎ Practice: Data Tables

1. Eagles won 8 of 11 games. What fraction of games did they win?

Work:

_____

_____

_____ **Answer:** _____

2. Which team won exactly half their games?

Work:

_____

_____

_____ **Answer:** _____

3. What is the total number of wins across all four teams?

Work:

_____

_____

_____ **Answer:** _____

4. Playoffs require 6 or more wins. Which teams qualify?

Work:

Answer: _____

5. If Lions win 3 more games, what would be their new record?

Work:

Answer: _____

6. What is the average number of wins per team?

Work:

Answer: _____

7. What fraction of Bears' games were ties?

Work:

Answer: _____

8. What is the combined number of losses for Eagles and Tigers?

Work:

Answer: _____

9. Which team has the worst win-loss record?

Work:

Answer: _____

10. If Tigers win 2 more games next week, what's their total?

Work:

Answer: _____

11. Eagles lost what fraction of their games?

Work:

Answer: _____

12. How many more wins do Eagles have than Lions?

Work:

_____

_____

_____ **Answer:** _____

13. What percentage of Lions' games were losses? (Round to nearest %)

Work:

_____

_____

_____ **Answer:** _____

14. Total games played by all teams combined?

Work:

_____

_____

_____ **Answer:** _____

15. If all teams played 5 more games each, total games for league?

Work:

_____

_____

_____ **Answer:** _____

16. Bears need 2 more wins for playoffs. What would their record be?

Work:

_____

_____

_____ **Answer:** _____

Section 2: Bar Graphs and Line Plots

Basketball team scores this week:

Monday 42, Tuesday 38, Wednesday 51, Thursday 45, Friday 44

✎ Worked Example: Reading Bar Graph Data

Highest bar = best score: Wednesday with 51 points

Shortest bar = lowest score: Tuesday with 38 points

Range: 51 - 38 = 13 points between best and worst

Total: 42 + 38 + 51 + 45 + 44 = 220 points

✎ Practice: Graphs

1. What was the highest score this week?

Work:

_____

_____

_____ **Answer:** _____

2. What is the range (highest minus lowest)?

Work:

Answer: _____

3. What is the total points scored all five days?

Work:

Answer: _____

4. Which two days had the closest scores?

Work:

Answer: _____

5. Goal was 45 points per day. How many days met the goal?

Work:

Answer: _____

6. How many more points were scored Wednesday than Tuesday?

Work:

Answer: _____

7. What is the average daily score?

Work:

Answer: _____

8. If Thursday's score increased by 5, what would it be?

Work:

Answer: _____

9. Which day was closest to the average?

Work:

Answer: _____

10. Total points Monday through Wednesday?

Work:

_____

_____

_____ **Answer:** _____

11. How many points below the goal was Tuesday?

Work:

_____

_____

_____ **Answer:** _____

12. If Friday's score doubled, what would it be?

Work:

_____

_____

_____ **Answer:** _____

13. Difference between highest and second-highest day?

Work:

_____

_____

_____ **Answer:** _____

14. Order the days from lowest to highest score.

Work:

_____

_____

_____ **Answer:** _____

15. What fraction of total points came from Wednesday?

Work:

_____

_____

_____ **Answer:** _____

16. If every day had scored 45 points, what would week total be?

Work:

_____

_____

_____ **Answer:** _____

Section 3: Mean, Mode, and Range

⬛⬛ Key Definitions

Mean (Average): Add all values, divide by count
Mode: The value that appears most often
Range: Difference between highest and lowest values

✎ Worked Example: Finding the Mean Scores: 45, 52, 48, 52, 55 Step 1: Add all values: 45 + 52 + 48 + 52 + 55 = 252 Step 2: Count values: 5 Step 3: Divide: 252 ÷ 5 = 50.4 **Mean:** 50.4 points
✎ Worked Example: Finding the Mode Scores: 48, 52, 48, 55, 48, 52 48 appears 3 times (most frequent) 52 appears 2 times 55 appears 1 time **Mode:** 48
✎ Worked Example: Finding the Range Scores: 45, 52, 48, 52, 55 Highest: 55, Lowest: 45 Range: 55 - 45 = 10 **Range:** 10 points

⬛⬛ Practice: Statistics

1. Find the mean: 12, 15, 18, 15

Work:

_____

_____

_____ **Answer:** _____

2. Find the mean: 85, 90, 88, 92, 95

Work:

_____

_____

_____ **Answer:** _____

3. Find the mode: 24, 28, 24, 30, 24

Work:

_____

_____

_____ **Answer:** _____

4. Find the mean: 42, 38, 51, 45, 44

Work:

Answer: _____

5. Player scored 8, 12, 6, 10, 14 points in 5 games. Average?

Work:

Answer: _____

6. Find the range: 23, 45, 31, 28, 40

Work:

Answer: _____

7. Find the mode: 12, 14, 12, 15, 12, 13

Work:

Answer: _____

8. Test scores: 75, 82, 78, 85. Average?

Work:

Answer: _____

9. Find the mode: 5, 7, 5, 8, 5, 9, 7

Work:

Answer: _____

10. Find the range: 100, 85, 92, 78, 95

Work:

Answer: _____

11. Mean of 6 scores is 80. Sum of all scores?

Work:

Answer: _____

12. Scores: 90, 85, 90, 75, 90. What's the mode?

Work:

_____

_____

_____ **Answer:** _____

13. Find mean: 123, 145, 156, 132, 144

Work:

_____

_____

_____ **Answer:** _____

14. Range is 25, lowest is 60. What's the highest?

Work:

_____

_____

_____ **Answer:** _____

15. Find mode: 3, 5, 3, 7, 3, 5, 5, 3

Work:

_____

_____

_____ **Answer:** _____

16. Average of 4 tests is 88. Sum of all tests?

Work:

_____

_____

_____ **Answer:** _____

Section 4: Making Predictions from Data

✎ Worked Example: Using Average to Predict

Team averages 45 points per game.

Season has 20 games.

Predicted total: 45 × 20 = 900 points for the season

✎ Worked Example: Using Percentages to Predict

Team wins 60% of games. Playing 20 games total.

Predicted wins: 60% of 20 = 0.60 × 20 = 12 wins

?? Practice: Predictions

1. Average 3 goals per game. Predict total for 15-game season.

Work:

_____

_____

_____ **Answer:** _____

2. Scoring 8 points per game. Predict 25-game season total.

Work:

_____

_____

_____ **Answer:** _____

3. Average 250 attendance per game. Predict total for 12 home games.

Work:

_____

_____

_____ **Answer:** _____

4. Run a mile in 8 minutes. Predict time for 5 miles.

Work:

_____

_____

_____ **Answer:** _____

5. Win 60% of games. In 20 games, predict number of wins.

Work:

_____

_____

_____ **Answer:** _____

6. Scored 180 points in first 4 games. Predict total for 10 games.

Work:

_____

_____

_____ **Answer:** _____

7. Score 12 runs every 3 games. Predict runs in 9 games.

Work:

_____

_____

_____ **Answer:** _____

8. Sell 50 tickets per hour. Predict sales for 8 hours.

Work:

_____

_____

_____ **Answer:** _____

9. Average 15 points per game. Need 200 points. How many games?
Work:

Answer: _____

10. Win rate is 75%. In 24 games, predicted wins?
Work:

Answer: _____

11. Score 2.5 goals per game. Predict total for 18 games.
Work:

Answer: _____

12. Average $450 in sales per day. Predict weekly (7-day) sales.
Work:

Answer: _____

Chapter 6 Action Report: Season Summary

1. RECORD: Team has 12 wins, 6 losses, 2 ties. What fraction are wins?
Work:

Answer: _____

2. SCORING: Week's scores: 52, 48, 61, 55, 44. Find the average.
Work:

Answer: _____

3. RANGE: Highest score 78, lowest 42. What is the range?
Work:

Answer: _____

4. PREDICTION: Average 48 points/game. Predict 15-game season total.
Work:

Answer: _____

5. MODE: Game times (minutes): 15, 18, 15, 20, 15, 17. Find the mode.

Work:

Answer: _____

6. LEAGUE TOTAL: Four teams scored 45, 52, 38, 49. League total?

Work:

Answer: _____

7. COMPARISON: Team A averages 42, Team B averages 45. Difference over 10 games? Work:

Answer: _____

8. GOAL CHECK: Need 50+ average. Scores: 48, 52, 46, 55. Will they make it?

Work:

Answer: _____

CHAPTER 7

The Savings Account

Chapter Goal: Master decimals through banking, shopping, and money management.

Welcome to Junior Banking! You'll manage a savings account, compare prices at different stores, calculate discounts, and track your balance. Understanding decimals is essential for financial success—every cent counts!

Section 1: Decimal Place Value

✎ Worked Example: Understanding $42.75

4 is in the tens place = $40.00

2 is in the ones place = $2.00

7 is in the tenths place = $0.70 (70 cents)

5 is in the hundredths place = $0.05 (5 cents)

Total: $40 + $2 + $0.70 + $0.05 = $42.75

✎ Worked Example: Rounding Money

Round $34.67 to nearest dollar:

Look at tenths (6). Is it 5 or more? YES!

Round UP: $34.67 → $35.00

Round $8.943 to nearest cent:

Look at thousandths (3). Is it 5 or more? NO!

Round DOWN: $8.943 → $8.94

✎ Practice: Decimal Place Value

1. In 56.83, what is the value of the digit 8?

Work:

_____

_____

_____ **Answer:** _____

2. Write 23.45 in expanded form.

Work:

_____

_____

_____ **Answer:** _____

3. Write in standard form: 6 + 0.3 + 0.09

Work:

_____

_____

_____ **Answer:** _____

4. In $125.49, what is the value of the digit 4?

Work:

Answer: _____

5. Round $34.67 to the nearest dollar.

Work:

Answer: _____

6. Round $8.943 to the nearest cent.

Work:

Answer: _____

7. What digit is in the tenths place of 45.82?

Work:

Answer: _____

8. Write 7 dollars and 8 cents as a decimal.

Work:

Answer: _____

9. What digit is in the hundredths place of 123.45?

Work:

Answer: _____

10. Round $99.95 to the nearest dollar.

Work:

Answer: _____

11. Write in expanded form: $156.72

Work:

Answer: _____

12. Round $4.997 to the nearest cent.

Work:

Answer: _____

13. What is 0.5 as a fraction?

Work:

Answer: _____

14. Write 3 dollars 5 cents as a decimal.

Work:

Answer: _____

15. Round $199.49 to the nearest dollar.

Work:

Answer: _____

16. In 78.456, what is the value of the 5?

Work:

Answer: _____

Section 2: Comparing Decimals

✎ Worked Example: Comparing $24.95 and $24.59

Line up decimal points and compare left to right:

Ones: both have 24

Tenths: 9 vs 5 → 9 > 5

Answer: $24.95 > $24.59 (Store B is cheaper!)

✎ Worked Example: Ordering Decimals

Order from least to greatest: 5.6, 5.06, 5.60, 5.066

Rewrite with same decimal places: 5.600, 5.060, 5.600, 5.066

Order: 5.06, 5.066, 5.6 = 5.60

?? Practice: Comparing Decimals

1. Compare: 3.5 ___ 3.50

Work:

Answer: _____

2. Compare: 4.25 ___ 4.3

Work:

Answer: _____

3. Compare: 12.09 ___ 12.1

Work:

Answer: _____

4. Order least to greatest: 5.6, 5.06, 5.60, 5.066

Work:

Answer: _____

5. Which costs less: $15.99 or $15.90?

Work:

Answer: _____

6. Order greatest to least: 8.4, 8.04, 8.44, 8.404

Work:

Answer: _____

7. Compare: 0.5 ___ 0.50

Work:

Answer: _____

8. Which is the better deal: $29.99 or $30.00?

Work:

Answer: _____

9. Order least to greatest: 7.1, 7.01, 7.10, 7.001

Work:

Answer: _____

10. Compare: 6.789 ___ 6.79

Work:

Answer: _____

11. Which is more: 0.45 or 0.405?

Work:

Answer: _____

12. Order greatest to least: 3.03, 3.3, 3.033, 3.303

Work:

Answer: _____

13. Compare: 9.90 ___ 9.9

Work:

Answer: _____

14. Which is less: $45.09 or $45.90?

Work:

Answer: _____

15. Order: 0.25, 0.3, 0.205, 0.35 from least to greatest

Work:

Answer: _____

16. Compare: 15.050 ___ 15.05

Work:

Answer: _____

Section 3: Adding and Subtracting Decimals

✎ Worked Example: Adding: $45.67 + $23.45

Line up decimal points:

45.67

+ 23.45

Answer: $69.12

✎ Worked Example: Subtracting: $100.00 - $67.85

Line up decimal points:

100.00

- 67.85

Answer: $32.15

✍ Practice: Decimal Operations

1. Add: 45.67 + 23.45

Work:

_____

_____

_____ **Answer:** _____

2. Subtract: 100.00 - 67.85

Work:

_____

_____

_____ **Answer:** _____

3. Balance $234.56, deposit $45.00. New balance?

Work:

_____

_____

_____ **Answer:** _____

4. Add: 12.5 + 8.75 + 3.25

Work:

_____

_____

_____ **Answer:** _____

5. Had $50.00, spent $23.47. Remaining?

Work:

_____

_____

_____ **Answer:** _____

6. Add: 6.4 + 12.85 + 0.75

Work:

_____

_____

_____ **Answer:** _____

7. Subtract: 85.00 - 36.78

Work:

_____

_____

_____ **Answer:** _____

8. Check has $125.40. Spent $45.99, $32.50, $18.75. Remaining?

Work:

_____

_____

_____ **Answer:** _____

9. Add: 234.56 + 78.9 + 12.345

Work:

_____

_____

_____ **Answer:** _____

10. Subtract: $500.00 - $267.89

Work:

_____

_____

_____ **Answer:** _____

11. Balance $1,234.56. Withdraw $789.99. New balance?

Work:

_____

_____

_____ **Answer:** _____

12. Add: 0.5 + 0.75 + 1.25 + 0.5

Work:

_____

_____

_____ **Answer:** _____

13. Subtract: 50 - 12.75

Work:

_____

_____

_____ **Answer:** _____

14. Start $200, deposit $75.50, withdraw $48.25. Balance?

Work:

_____

_____

_____ **Answer:** _____

15. Add: 99.99 + 45.50 + 12.01

Work:

_____

_____

_____ **Answer:** _____

16. Subtract: 1,000 - 456.78

Work:

_____

_____

_____ **Answer:** _____

Section 4: Multiplying Decimals

✎ Worked Example: Multiplying: $2.45 × 6

Step 1: Multiply as whole numbers: 245 × 6 = 1,470

Step 2: Count decimal places in factors: 2 (from 2.45)

Step 3: Place decimal: 14.70

Answer: $14.70

✎ Worked Example: Multiplying Two Decimals: 1.5 × 2.5 15 × 25 = 375

Decimal places: 1 + 1 = 2

Answer: 3.75

✍ Practice: Multiplying Decimals

1. Multiply: 3.5 × 4

Work:

_____

_____

_____ **Answer:** _____

2. Multiply: 2.25 × 8

Work:

_____

_____

_____ **Answer:** _____

3. $4.99 × 3 items. Total?

Work:

_____

_____

_____ **Answer:** _____

4. Multiply: 1.5 × 2.5

Work:

Answer: _____

5. Gas costs $3.45 per gallon. 10 gallons costs?

Work:

Answer: _____

6. Multiply: 12.50 × 4

Work:

Answer: _____

7. Tickets are $8.50 each. 5 people costs?

Work:

Answer: _____

8. Multiply: 0.75 × 12

Work:

Answer: _____

9. $6.99 × 7 items. Total?

Work:

Answer: _____

10. Multiply: 2.5 × 3.5

Work:

Answer: _____

11. Hourly wage $15.50. Worked 8 hours. Earnings?

Work:

Answer: _____

12. Multiply: 4.25 × 6

Work:

Answer: _____

13. $12.75 per yard. 5 yards costs?

Work:

Answer: _____

14. Multiply: 0.5 × 0.5

Work:

Answer: _____

15. Tax is 8% ($0.08) on $25. Tax amount?

Work:

Answer: _____

16. Multiply: 3.14 × 10

Work:

Answer: _____

Chapter 7 Action Report: Banking Summary

1. BALANCE: Start $245.80, deposit $75.25, withdraw $50.00. Final balance?

Work:

Answer: _____

2. COMPARISON: Store A: $34.99. Store B: $35.09. Which is cheaper?

Work:

Answer: _____

3. SHOPPING: Items cost $12.45, $8.99, $5.50. Total?

Work:

Answer: _____

4. CHANGE: Pay $50.00 for $37.82 purchase. Change due?

Work:

Answer: _____

5. PURCHASE: 6 books × $8.95 each. Total cost?

Work:

Answer: _____

6. ORDERING: Arrange least to greatest: 3.45, 3.405, 3.5, 3.54

Work:

Answer: _____

7. ROUNDING: Round $156.847 to the nearest cent.

Work:

Answer: _____

8. SAVINGS: Save $12.50 per week × 8 weeks. Total saved?

Work:

Answer: _____

CHAPTER 8

The Delivery Driver

Chapter Goal: Calculate elapsed time, read schedules, and plan efficient routes.

Welcome to Express Delivery! Calculate how long deliveries take, read bus schedules, and make sure packages arrive on time. Time management is essential for keeping customers happy!

Section 1: Telling Time and Time Intervals

✎ Key Facts

Minutes and Hours: 60 minutes = 1 hour

Seconds and Minutes: 60 seconds = 1 minute

✎ Worked Example: Finding Time Intervals

From 9:20 to 9:45 = how many minutes?

Count: 9:20 → 9:45 = 25 minutes

Or subtract: 45 - 20 = 25 minutes

✎ Worked Example: Adding Time

45 minutes after 10:30 AM is what time?

10:30 + 30 min = 11:00

11:00 + 15 min = 11:15 AM

✎ Practice: Telling Time

1. 9:20 to 9:45 = ___ minutes

Work:

_____

_____

_____ **Answer:** _____

2. 2:30 PM to 3:00 PM = ___ minutes

Work:

_____

_____

_____ **Answer:** _____

3. 45 minutes after 10:30 AM is what time?

Work:

_____

_____

_____ **Answer:** _____

4. 20 minutes before 4:15 PM is what time?

Work:

_____

_____

_____ **Answer:** _____

5. 11:45 AM to 12:15 PM = how long?

Work:

_____

_____

_____ **Answer:** _____

6. 1 hour 15 minutes after 9:50 AM is what time?

Work:

_____

_____

_____ **Answer:** _____

7. 35 minutes after 7:40 PM is what time?

Work:

_____

_____

_____ **Answer:** _____

8. 50 minutes before 3:05 PM is what time?

Work:

_____

_____

_____ **Answer:** _____

9. 8:25 to 9:10 = ___ minutes

Work:

_____

_____

_____ **Answer:** _____

10. 2 hours 20 minutes after 6:45 AM is what time?

Work:

_____

_____

_____ **Answer:** _____

11. 7:55 to 8:30 = ___ minutes

Work:

_____

_____

_____ **Answer:** _____

12. 1 hour 45 minutes before 2:30 PM is what time?

Work:

Answer: _____

13. 10:40 to 11:25 = ___ minutes

Work:

Answer: _____

14. 55 minutes after 11:35 PM is what time?

Work:

Answer: _____

15. 3:15 to 5:00 = ___ hours ___ minutes

Work:

Answer: _____

16. 25 minutes before 12:10 PM is what time?

Work:

Answer: _____

Section 2: Elapsed Time

✎ Worked Example: 10:45 AM to 2:20 PM

Method: Count in chunks

10:45 AM → 11:00 AM = 15 minutes

11:00 AM → 2:00 PM = 3 hours

2:00 PM → 2:20 PM = 20 minutes

Total: 3 hours 35 minutes

✎ Worked Example: Finding End Time

Start: 2:45 PM. Duration: 2 hours 35 minutes

2:45 + 2 hours = 4:45 PM

4:45 + 35 minutes = 5:20 PM

End time: 5:20 PM

⁂ Practice: Elapsed Time

1. 8:30 AM to 11:45 AM = ?
Work:

_____

_____

_____ **Answer:** _____

2. 1:15 PM to 4:30 PM = ?
Work:

_____

_____

_____ **Answer:** _____

3. Movie starts 7:45 PM, ends 10:10 PM. Length?
Work:

_____

_____

_____ **Answer:** _____

4. Flight departs 6:30 AM, arrives 9:15 AM. Duration?
Work:

_____

_____

_____ **Answer:** _____

5. Work 8:00 AM to 4:30 PM. Total hours?
Work:

_____

_____

_____ **Answer:** _____

6. Game starts 2:45 PM, lasts 2 hr 35 min. End time?
Work:

_____

_____

_____ **Answer:** _____

7. School 8:15 AM to 3:30 PM. Total hours?
Work:

_____

_____

_____ **Answer:** _____

8. Show starts 7:30 PM, ends 11:00 PM. Length?
Work:

_____

_____

_____ **Answer:** _____

9. Practice 3:45 PM to 6:00 PM. Duration?

Work:

Answer: _____

10. Leave home 7:20 AM, arrive 9:05 AM. Travel time?

Work:

Answer: _____

11. Meeting 10:30 AM, lasts 1 hr 45 min. End time?

Work:

Answer: _____

12. Party 4:00 PM to 7:30 PM. Duration?

Work:

Answer: _____

13. Train departs 5:55 PM, journey 3 hr 20 min. Arrival?

Work:

Answer: _____

14. Store hours 9:00 AM to 9:00 PM. Open how long?

Work:

Answer: _____

y

15. Baking starts 2:15 PM, takes 1 hr 50 min. Done when?

Work:

Answer: _____

16. Event 11:30 AM to 3:45 PM. Duration?

Work:

Answer: _____

Section 3: Planning with Schedules

✎ Worked Example: Route Planning

5 deliveries × 25 minutes each = 125 minutes

125 minutes = 2 hours 5 minutes

Start 9:00 AM → Finish 11:05 AM

✎ Worked Example: Working Backward

Must arrive by 3:00 PM. Trip takes 45 minutes.

3:00 PM - 45 minutes = 2:15 PM

Leave by: 2:15 PM at latest

✎ Practice: Schedules

1. 3 stops × 20 minutes each. Total time?

Work:

_____

_____

_____ **Answer:** _____

2. Start 8:30 AM, 4 deliveries × 15 min each. Finish time?

Work:

_____

_____

_____ **Answer:** _____

3. Must arrive by 3:00 PM. Trip takes 45 min. Latest departure?

Work:

_____

_____

_____ **Answer:** _____

4. 8 deliveries × 30 min = ___ hours

Work:

_____

_____

_____ **Answer:** _____

5. Work 10:00 AM to 12:00 PM, break, 12:30 PM to 3:00 PM. Total work time? Work:

_____

_____

_____ **Answer:** _____

6. Need 4 hr 30 min for task. Start 7:45 AM. End time?

Work:

_____

_____

_____ **Answer:** _____

7. 6 stops × 25 min each. Start 10:00 AM. Finish?

Work:

Answer: _____

8. Due 5:00 PM. Takes 2 hr 15 min. Latest start?

Work:

Answer: _____

9. Bus every 20 min starting 6:00 AM. Third bus arrives?

Work:

Answer: _____

10. 5 tasks: 45, 30, 60, 25, 40 min. Total time?

Work:

Answer: _____

11. Start 9:15 AM. Tasks: 1 hr 20 min, 45 min, 1 hr 10 min. End?

Work:

Answer: _____

12. Need to finish by 4:30 PM. Tasks total 3 hr 45 min. Latest start?

Work:

Answer: _____

Section 4: Time Conversions

✎ Worked Example: 185 minutes = ? hours ? minutes

Divide by 60: 185 ÷ 60 = 3 remainder 5

Answer: 3 hours 5 minutes

✎ Worked Example: 2 hr 45 min = ? minutes

2 hours = 2 × 60 = 120 minutes

120 + 45 = 165 minutes

Answer: 165 minutes

⭐ Practice: Time Conversions

1. 150 min = ___ hr ___ min

Work:

Answer: _____

2. 2 hr 45 min = ___ minutes

Work:

Answer: _____

3. 200 min = ___ hr ___ min

Work:

Answer: _____

4. 3.5 hours = ___ minutes

Work:

Answer: _____

5. 90 seconds = ___ min ___ sec

Work:

Answer: _____

6. 4 hr 20 min = ___ minutes total

Work:

Answer: _____

7. 275 min = ___ hr ___ min

Work:

Answer: _____

8. 5.25 hours = ___ hr ___ min

Work:

Answer: _____

9. 180 seconds = ___ minutes
Work:

_____

_____

_____ **Answer:** _____

10. 6 hr 15 min = ___ minutes
Work:

_____

_____

_____ **Answer:** _____

11. 320 min = ___ hr ___ min
Work:

_____

_____

_____ **Answer:** _____

12. 1.75 hours = ___ minutes
Work:

_____

_____

_____ **Answer:** _____

Chapter 8 Action Report: Delivery Day Summary

1. ROUTE: Left depot 7:45 AM, returned 2:15 PM. Time on route?
Work:

_____

_____

_____ **Answer:** _____

2. DELIVERIES: 6 stops × 35 min each. Start 9:00 AM. Finish time?
Work:

_____

_____

_____ **Answer:** _____

3. CONVERSION: Route took 255 min. Express in hours and minutes.
Work:

_____

_____

_____ **Answer:** _____

4. DEADLINE: Package due 4:30 PM. Delivery takes 1 hr 45 min. Latest pickup? Work:

_____

_____

_____ **Answer:** _____

5. TOTAL: Morning 2 hr 15 min, afternoon 3 hr 40 min. Total work time?

Work:

_____

_____

_____ **Answer:** _____

6. WORK DAY: Shift 8 AM to 5 PM with 45-min lunch. Hours worked?

Work:

_____

_____

_____ **Answer:** _____

CHAPTER 9

The Garden Designer

Chapter Goal: Use patterns, variables, and equations to plan beautiful gardens.

Welcome to Green Thumb Landscapes! You'll discover patterns in plant arrangements, use variables to write formulas, and solve equations to figure out how many supplies to order. Algebra starts here!

Section 1: Number Patterns

✎ Worked Example: Finding the Pattern: 4, 7, 10, 13...

Look at differences between numbers:

7-4=3, 10-7=3, 13-10=3

Rule: Add 3 each time

Next number: 13 + 3 = 16

Row 10: Start at 4, add 3 nine times = 4 + 27 = 31

✎ Worked Example: Geometric Pattern: 3, 6, 12, 24...

Look at relationships:

6÷3=2, 12÷6=2, 24÷12=2

Rule: Multiply by 2 each time

Next: 24 × 2 = 48

✎ Practice: Patterns

1. 2, 5, 8, 11, ___. What's next?

Work:

_____

_____

_____ **Answer:** _____

2. 3, 6, 12, 24, ___. What's next?
Work:

_____

_____

_____ **Answer:** _____

3. 100, 90, 80, 70, ___. What's next?
Work:

_____

_____

_____ **Answer:** _____

4. Row 1: 5 plants, Row 2: 8, Row 3: 11. Row 5?
Work:

_____

_____

_____ **Answer:** _____

5. 1, 4, 9, 16, ___. What's next? (Hint: Square numbers!)
Work:

_____

_____

_____ **Answer:** _____

6. Fence posts: 4, 7, 10, 13. Section 8?
Work:

_____

_____

_____ **Answer:** _____

7. 2, 6, 18, 54, ___. What's next?
Work:

_____

_____

_____ **Answer:** _____

8. 50, 45, 40, 35, ___. What's next?
Work:

_____

_____

_____ **Answer:** _____

9. 1, 1, 2, 3, 5, 8, ___. What's next? (Fibonacci!)
Work:

_____

_____

_____ **Answer:** _____

10. 64, 32, 16, 8, ___. What's next?

Work:

Answer: _____

11. Pattern +4: First term is 3. What's the 6th term?

Work:

Answer: _____

12. Tiles: 1, 3, 6, 10, ___. What's next? (Triangular numbers)

Work:

Answer: _____

13. 5, 10, 20, 40, ___. What's next?

Work:

Answer: _____

14. Pattern: 7, 14, 21, 28. What's the 10th term?

Work:

Answer: _____

15. 81, 27, 9, 3, ___. What's next?

Work:

Answer: _____

16. Flowers: Row 1 has 6. Each row adds 4 more. Row 8?

Work:

Answer: _____

Section 2: Understanding Variables

A variable is a letter that represents an unknown number. We use variables to write general rules.

✎ Worked Example: Using Variables

Each flower needs w gallons of water.

12 flowers need: 12 × w gallons

If w = 2: 12 × 2 = 24 gallons needed

✎ Worked Example: Evaluating Expressions

Evaluate 3n + 2 when n = 4

Substitute: 3(4) + 2 = 12 + 2 = 14

Answer: 14

✎ Practice: Variables

1. Write an expression: 8 more than n

Work:

_____

_____

_____ **Answer:** _____

2. Write an expression: 5 times x

Work:

_____

_____

_____ **Answer:** _____

3. Evaluate: 3n + 2 when n = 4

Work:

_____

_____

_____ **Answer:** _____

4. Evaluate: 2x - 5 when x = 10

Work:

_____

_____

_____ **Answer:** _____

5. Cost = 6p. If p = 15, what is the cost?

Work:

_____

_____

_____ **Answer:** _____

6. Area = s × s. If s = 7, what is the area?

Work:

_____

_____

_____ **Answer:** _____

7. Evaluate: 4n + 3n when n = 5

Work:

_____

_____

_____ **Answer:** _____

8. Perimeter = 4s. If P = 36, what is s?

Work:

_____

_____

_____ **Answer:** _____

9. Evaluate: 5x - 3 when x = 8

Work:

_____

_____

_____ **Answer:** _____

10. Distance = 60t. If t = 3 hours, what is distance?

Work:

_____

_____

_____ **Answer:** _____

11. Write expression: n divided by 4

Work:

_____

_____

_____ **Answer:** _____

12. Evaluate: 2a + 3b when a = 5 and b = 4

Work:

_____

_____

_____ **Answer:** _____

13. Write expression: 7 less than twice x

Work:

_____

_____

_____ **Answer:** _____

14. Evaluate: $n^2 + 5$ when $n = 6$

Work:

_____

_____

_____ **Answer:** _____

15. If $y = 3x + 1$ and $x = 5$, find y.

Work:

_____

_____

_____ **Answer:** _____

16. Cost = 4.50n. Find cost when n = 8.

Work:

_____

_____

_____ **Answer:** _____

Section 3: Writing and Solving Equations

✎ Worked Example: Solving n + 5 = 18

What number plus 5 equals 18?

Think: 18 - 5 = 13

Answer: n = 13

Check: 13 + 5 = 18 ✓

✎ Worked Example: Solving 3n = 24

What number times 3 equals 24?

Think: 24 ÷ 3 = 8

Answer: n = 8

Check: 3 × 8 = 24 ✓

✎ Practice: Equations

1. Solve: n + 7 = 15

Work:

_____

_____

_____ **Answer:** _____

2. Solve: x - 4 = 12

Work:

_____

_____

_____ **Answer:** _____

3. Solve: 3n = 24

Work:

_____

_____

_____ **Answer:** _____

4. Solve: n + 12 = 30

Work:

_____

_____

_____ **Answer:** _____

5. Solve: 5x = 45

Work:

_____

_____

_____ **Answer:** _____

6. Solve: n - 8 = 25

Work:

_____

_____

_____ **Answer:** _____

7. Write and solve: A number plus 9 equals 21.

Work:

_____

_____

_____ **Answer:** _____

8. Write and solve: 4 times a number equals 32.

Work:

_____

_____

_____ **Answer:** _____

9. Solve: 2n + 3 = 11

Work:

_____

_____

_____ **Answer:** _____

10. Solve: n ÷ 4 = 8

Work:

_____

_____

_____ **Answer:** _____

11. Solve: 15 - n = 7

Work:

_____

_____

_____ **Answer:** _____

12. Solve: 6x = 54

Work:

_____

_____

_____ **Answer:** _____

13. Write and solve: A number minus 15 equals 23.

Work:

_____

_____

_____ **Answer:** _____

14. Solve: n + n + n = 27

Work:

_____

_____

_____ **Answer:** _____

15. Solve: 4n - 5 = 19

Work:

_____

_____

_____ **Answer:** _____

16. Solve: 100 ÷ n = 25

Work:

_____

_____

_____ **Answer:** _____

Section 4: Input-Output Tables

✎ Worked Example: Finding the Rule

Pots: 1 → $3, 2 → $6, 3 → $9, 4 → $12

Pattern: Each output is 3 times the input

Rule: Cost = 3 × Pots (or y = 3x)

?? Practice: Input-Output Tables

1. Rule: ×4. Input 5. Output?
Work:

_____

_____

_____ **Answer:** _____

2. Rule: +6. Input 12. Output?
Work:

_____

_____

_____ **Answer:** _____

3. In: 2,4,6,8. Out: 7,9,11,13. What's the rule?
Work:

_____

_____

_____ **Answer:** _____

4. In: 1,2,3,4. Out: 5,10,15,20. What's the rule?
Work:

_____

_____

_____ **Answer:** _____

5. y = 2x + 1. If x = 6, what is y?
Work:

_____

_____

_____ **Answer:** _____

6. y = 3x - 2. If y = 10, what is x?
Work:

_____

_____

_____ **Answer:** _____

7. In: 3,5,7,9. Out: 9,15,21,27. What's the rule?
Work:

_____

_____

_____ **Answer:** _____

8. y = 4x. If y = 36, what is x?
Work:

_____

_____

_____ **Answer:** _____

9. Rule: ×3 then -1. Input 7. Output?
Work:

Answer:

10. In: 10,20,30,40. Out: 2,4,6,8. What's the rule?
Work:

Answer:

11. y = x + 8. Complete: If x = 15, y = ?
Work:

Answer:

12. In: 2,4,6,8. Out: 1,2,3,4. What's the rule?
Work:

Answer:

Chapter 9 Action Report: Garden Planning

1. PATTERN: Sections have 6, 10, 14, 18 flowers. What's next?
Work:

Answer:

2. VARIABLE: Each garden bed needs b bags of soil. 8 beds need how many? Work:

Answer:

3. EXPRESSION: Plants = 4n + 2. If n = 7, how many plants?
Work:

Answer:

4. EQUATION: Started with some plants, added 12, now have 35. How many at start?
Work:

Answer:

5. SOLVE: 6n = 42

Work:

Answer: _____

6. RULE: In: 3,5,7,9. Out: 12,20,28,36. What's the rule?

Work:

Answer: _____

7. PREDICT: Pattern adds 5 each row. Row 1 has 8. Row 12 has?

Work:

Answer: _____

8. COST: Shrubs cost $15 each. Write cost equation. Find cost of 9 shrubs.

Work:

Answer: _____

CHAPTER 10

The Business Plan

Chapter Goal: Apply ALL your mathematical skills to create and analyze a real business.

Congratulations! You've learned place value, operations, fractions, decimals, measurement, data analysis, time management, and algebraic thinking. Now you'll use EVERYTHING to create your very own Lemonade Stand business!

Part 1: Startup Costs (Decimals & Operations)

Supplies needed: Cups $12.50, Lemons $18.75, Sugar $8.25, Pitcher $15.99 **1.** What is the total startup cost?

Work:

_____

_____

_____ **Answer:** _____

2. You have $75.00 saved. After buying supplies, how much remains?

Work:

_____

_____

_____ **Answer:** _____

3. If cups cost $2.50 more, what would new total be?

Work:

_____

_____

_____ **Answer:** _____

Part 2: Recipe Scaling (Fractions)

One batch (makes 8 cups): 1 1/2 cups lemon juice, 3/4 cup sugar, 6 cups water **4.** Triple the recipe: How much lemon juice needed?

Work:

_____

_____

_____ **Answer:** _____

5. Triple the recipe: How much sugar needed?

Work:

_____

_____

_____ **Answer:** _____

6. Triple batch makes how many cups of lemonade?

Work:

Answer: _____

7. Half batch: How much lemon juice?

Work:

Answer: _____

Part 3: Pricing & Profit (Multiplication)

Selling price: $2.00 per cup. Cost to make: $0.50 per cup.

8. What is the profit per cup (price minus cost)?

Work:

Answer: _____

9. Revenue from selling 45 cups?

Work:

Answer: _____

10. Total profit from 45 cups?

Work:

Answer: _____

11. How many cups to earn $60 profit?

Work:

Answer: _____

Part 4: Time Management (Elapsed Time)

Stand hours: 10:00 AM to 2:00 PM

12. How many hours is the stand open?

Work:

Answer: _____

13. 45 cups in 4 hours. Average cups per hour?

Work:

_____

_____

_____ **Answer:** _____

14. 2 minutes per customer. Customers per hour?

Work:

_____

_____

_____ **Answer:** _____

15. If you start setup at 9:15 AM and need 45 min, when do you finish?

Work:

_____

_____

_____ **Answer:** _____

Part 5: Data Analysis (Statistics)

Week 1 sales: Mon 38, Tue 42, Wed 45, Thu 52, Fri 48

16. Total cups sold this week?

Work:

_____

_____

_____ **Answer:** _____

17. Average daily sales?

Work:

_____

_____

_____ **Answer:** _____

18. Range of daily sales?

Work:

_____

_____

_____ **Answer:** _____

19. If Saturday sells 20% more than average, how many cups?

Work:

_____

_____

_____ **Answer:** _____

Part 6: Growth Patterns (Algebra)

Sales growth: Week 1: 225, Week 2: 270, Week 3: 315, Week 4: 360

20. What is the pattern (how many cups added each week)?

Work:

Answer: _____

21. Predict Week 5 sales.

Work:

Answer: _____

22. Write an equation for the pattern (let w = week number).

Work:

Answer: _____

Part 7: Stand Layout (Geometry)

Stand space: 8 ft × 6 ft. Table: 4 ft × 2 ft. Cooler: 2 ft × 2 ft.

23. What is the total area of your stand space?

Work:

Answer: _____

24. What is the perimeter (for decorative ribbon)?

Work:

Answer: _____

25. Area remaining after placing table and cooler?

Work:

Answer: _____

Part 8: Final Business Report (All Skills)

26. Week 1 Revenue: 225 cups × $2.00 = ?

Work:

_____

_____

_____ **Answer:** _____

27. Week 1 Costs: 225 cups × $0.50 = ?

Work:

_____

_____

_____ **Answer:** _____

28. Week 1 Net Profit: Revenue minus Costs = ?

Work:

_____

_____

_____ **Answer:** _____

29. If you save 1/2 of profit and reinvest 1/2, how much each?

Work:

_____

_____

_____ **Answer:** _____

30. Goal: $500 profit. At $1.50 profit per cup, how many cups needed?

Work:

_____

_____

_____ **Answer:** _____

Congratulations, Fourth Grade Mathematician!

You've completed an entire year of real-world mathematics! You can now:

✓ Work with numbers to millions and decimals to hundredths
✓ Add, subtract, multiply, and divide with confidence
✓ Use fractions in recipes, measurements, and comparisons
✓ Calculate area, perimeter, and convert between units
✓ Analyze data, find averages, and make predictions
✓ Manage time and plan schedules
✓ Recognize patterns and write algebraic equations
✓ Apply mathematics to real business decisions

You're ready for fifth grade and beyond. Great work!

About Global Sovereign University

"Building a Bridge to Freedom Through Education—Not Handouts"

Global Sovereign University is a 501(c)(3) educational foundation with a simple mission: We believe every person deserves access to quality education that builds real capabilities—not temporary fixes.

This textbook is provided FREE to students because learning should never be limited by economics. When you master mathematics, you gain tools for independence and success that no one can take away.

For more free educational resources, visit:

www.globalsovereignuniversity.org

Teachers: A separate Teacher's Guide with complete answer keys, lesson plans, pacing guides, and assessment rubrics is available for purchase to support your instruction.

About the Author

Author | Historian | Educator | Visionary

His work with GSU focuses on ending economic poverty through capability-building education delivered by retired professional mentors called "Civilization Builders."

His other works include the "History of the Americans" series (6 volumes), the "Teach a Man to Fish" trilogy, the "Survival in an AI World" series (4 volumes), and numerous guides on mathematics education, personal development, and relationship psychology. He hosts the "Voice of Sovereignty" podcast, which reaches global audiences in ten languages.

Dr. Constant believes that every human being bears the image of God and possesses untapped potential waiting to be awakened. This theological conviction drives his life's work of helping people move from dependency to sovereignty, from poverty to flourishing, and from ignorance to capability.

Dr. Gene A Constant, DBA, is a prolific American author and the founder of the Foundation for Global Instruction. With more than 100 published titles ranging from civic education to self-help, business, leadership, and history, Dr. Constant's mission is to empower individuals through knowledge, legacy, and personal transformation.

A veteran of both the United States Navy and the United States Marine Corps, he combines firsthand experience in service and discipline with decades of scholarship. His honors include being inducted into the Phi Theta Kappa Honor Society (1983) and his gubernatorial appointment as Honorary Lieutenant Colonel Aide-de-camp in the Alabama National Guard (1975).

Raised in Springfield, Illinois—just blocks from the legacy of Abraham Lincoln—Dr. Constant carries forward the American tradition of principled leadership. His writing speaks to parents, teachers, dreamers, and defenders of liberty, blending patriotic themes with personal testimony and historical insight. His most notable works include

There Can Be a Better Life, The Second American Civil War (2024), Digital Farm, and Guardian Angel of the American Spirit.

He is also the visionary behind “Legacy Learning for the Common Man,” a global adult education initiative that champions traditional values, multilingual instruction, and practical knowledge for all.

Multilingual Closing:

中文: 我的作品是献给全世界读者的。 (My works are dedicated to readers around the world.)

हिंदी: मेरी पुस्तकों का उद्देश्य सबको सशक्त और प्रेरित करना है। (The purpose of my books is to empower and inspire everyone.)

العربية: كتبي تهدف إلى نشر المعرفة والأمل بين الناس جميعاً. (My books aim to spread knowledge and hope among all people.)

For more information about Global Sovereign University and the Civilization Builder program, visit GlobalSovereignUniversity.org