

TABLE OF CONTENTS

About Finish Line PA Core Math **5**

UNIT 1: Big Ideas from Grade 3 **7**

LESSON 1 CC.2.1.3.B.1 **Adding and Subtracting** [connects to CC.2.1.4.B.2] **8**

LESSON 2 CC.2.2.3.A.1, 2 **Multiplying and Dividing** [connects to CC.2.1.4.B.2] **15**

LESSON 3 CC.2.1.3.C.1 **Understanding Fractions** [connects to CC.2.1.4.C.1] **21**

LESSON 4 CC.2.4.3.A.5 **Understanding Area** [connects to CC.2.4.4.A.1] **28**

UNIT 1 REVIEW **34**

UNIT 2: Operations and Algebraic Thinking **38**

LESSON 5 CC.2.2.4.A.1 **Understanding Multiplication as Comparison** **39**

LESSON 6 CC.2.2.4.A.1 **Multiplication and Division Word Problems** **45**

LESSON 7 CC.2.2.4.A.1 **Representing Multistep Word Problems** **51**

LESSON 8 CC.2.2.4.A.1 **Solving Multistep Word Problems** **57**

LESSON 9 CC.2.2.4.A.2 **Factors, Multiples, and Prime and Composite Numbers** **64**

LESSON 10 CC.2.2.4.A.4 **Number Patterns** **72**

LESSON 11 CC.2.2.4.A.4 **Shape Patterns** **78**

LESSON 12 CC.2.2.4.A.4 **Functions** **84**

UNIT 2 REVIEW **90**

UNIT 3: Number and Operations in Base Ten **95**

LESSON 13 CC.2.1.4.B.1 **Whole-Number Place Value** **96**

LESSON 14 CC.2.1.4.B.1 **Reading and Writing Whole Numbers** **103**

LESSON 15 CC.2.1.4.B.1 **Comparing Whole Numbers** **110**

LESSON 16 CC.2.1.4.B.1 **Rounding Whole Numbers** **116**

LESSON 17 CC.2.1.4.B.2 **Adding and Subtracting Whole Numbers** **122**

LESSON 18 CC.2.1.4.B.2 **Multiplying Whole Numbers** **128**

LESSON 19 CC.2.1.4.B.2 **Dividing Whole Numbers** **135**

UNIT 3 REVIEW **141**

Word Problems with Multiplication of Fractions and Whole Numbers

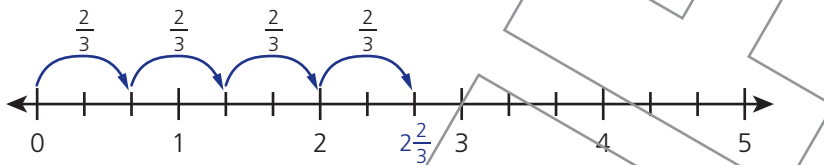
PART 1

Introduction

Some word problems are solved by multiplying fractions and whole numbers. You can solve these problems in different ways. You can use number lines, models, or equations to find the answer.

A baker makes 4 cakes. She uses $\frac{2}{3}$ cup of milk to make each cake. How many cups of milk does she use in all?

Use a number line. Draw a number line with each whole number divided into thirds. Then mark 4 jumps of $\frac{2}{3}$.



Multiplication is repeated addition.

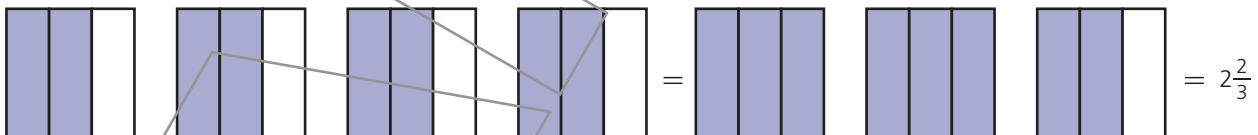
$$\frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} = \frac{8}{3} = 2\frac{2}{3}$$

This number line shows that $4 \times \frac{2}{3}$ is $2\frac{2}{3}$.

Use a rectangular model. In this model, each square equals 1 so draw 4 squares.

Divide the squares into thirds. Shade $\frac{2}{3}$ of each one. Then combine the thirds.

There are $\frac{8}{3}$ in all, or $2\frac{2}{3}$.



Write an equation. The whole number is 4, for 4 cakes. The fraction $\frac{2}{3}$ is the amount of a cup of milk used in each cake. So write a multiplication equation using these numbers and solve it.

$$4 \times \frac{2}{3} = \frac{4}{1} \times \frac{2}{3} = \frac{4 \times 2}{1 \times 3} = \frac{8}{3} = 2\frac{2}{3}$$

The total amount of milk the baker used is $2\frac{2}{3}$ cups.

Think About It

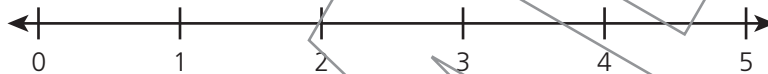
Which method would you use to solve the problem on the previous page? Why?



Focused Instruction

When you use a number line to multiply fractions and whole numbers, be careful to make the jumps the correct fractional size.

- ▶ Min has 4 tomato plants. Once a week, she gives each plant $\frac{2}{5}$ ounce of plant food. How many total ounces of plant food does Min give her tomato plants each week? Use the number line to find the answer.



Tick marks between whole numbers on a number line stand for fractions.

How many spaces should be between whole-number marks on the number line? _____ Mark them on the number line above.

How many spaces represent the amount of food one plant gets? _____

Draw one jump on the number line to show the amount of food one plant gets.

What does one jump represent? _____

How many plants does Min feed? _____

Draw enough jumps to show the total amount of plant food Min gives to the tomato plants. Label each jump with the amount of food.

How many total ounces of plant food does Min give her tomato plants each week? _____

When you use models to multiply fractions and whole numbers, be sure to show the correct fractional parts on each whole.

- ▶ In a turtle race, the fastest turtle travels at a speed of about $\frac{1}{4}$ mile per hour. If a racing turtle could actually keep up this speed for 6 hours, how far would it travel? Complete the models to solve the problem.

The word *per* means "in one." So $\frac{1}{4}$ mile per hour means $\frac{1}{4}$ mile in one hour.



Each square should be divided into parts. What tells you how many parts to give each square? _____

What tells you how many parts to shade in each square?

Why are there 6 squares? _____

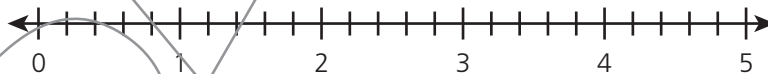
Complete the model above and find the answer.

Write and solve an equation that shows the same thing as the model.

How many miles would the racing turtle travel in 6 hours? _____

Use what you know about multiplying fractions and whole numbers to solve word problems to answer these questions.

- 1 Six people each ate $\frac{2}{5}$ pint of ice cream. Mark and label the point on this number line that shows how many pints of ice cream were eaten in all.



- 2 Manuel feeds his cat $\frac{3}{4}$ can of cat food every day. How many cans of cat food will his cat eat in one 7-day week?

Solve the following problems.

- 1 Rajiv exercises at a gym for $\frac{4}{5}$ hour a day, 4 days every week. How many hours does Rajiv exercise each week? Express your answer as a mixed number. Use an equation to solve the problem and show your work.

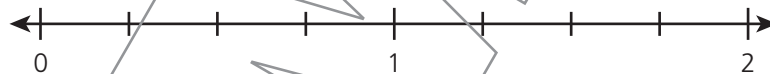
Change the whole number to a fraction, and multiply two fractions.

Answer _____ hours

- 2 Heidi knows that the distance across her four fingers is $\frac{1}{4}$ foot. She used this fact to measure the length of her cat's tail. She found the tail was 5 times the distance across her fingers. How many feet long is her cat's tail?



Part A Mark and label a point on this number line for the length of the cat's tail.



Each division on the line stands for $\frac{1}{4}$.

Part B Use the squares below to make a fraction model to find the length of Heidi's cat's tail.



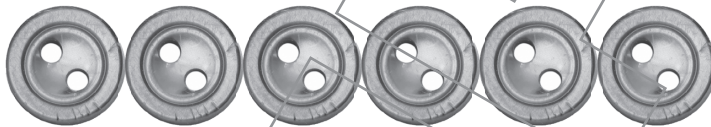
Answer _____ feet

Solve the following problems.

- 1 A scientist does an experiment with 12 plants. He gives each plant exactly the same amount of water, $\frac{1}{5}$ liter. How much water does he give the plants in all?

- A $\frac{1}{60}$ liter
 B $1\frac{2}{5}$ liters
 C $2\frac{2}{5}$ liters
 D 12 liters

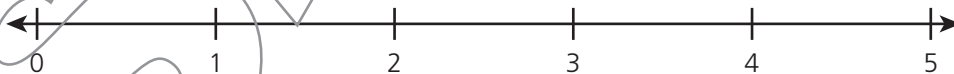
- 2 Jordan places 6 buttons in a row, as shown here



If each button is $\frac{5}{8}$ -inch wide, how long is the row of buttons? Use an equation to solve the problem and show your work.

Answer _____ inches

- 3 Karen walks a total of $\frac{3}{4}$ mile to and from school each day. How many miles does Karen walk to and from school in a week of 5 days? Draw and label a model on this number line to show this.



- 4 There are 25 bottles of energy drink on a shelf. Each bottle holds $\frac{3}{8}$ quart of energy drink. Rita wrote and solved this equation to find the total amount of energy drink in the bottles.

$$25 \times \frac{3}{8} = \frac{25}{8} = 3\frac{1}{8}$$

Part A What mistake did Rita make?

Part B Find the correct answer. Show your work.

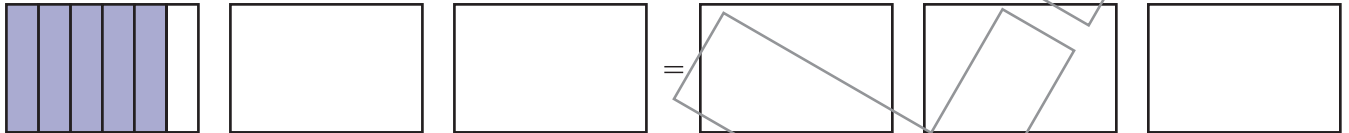
Answer _____ quarts

- 5 Tauno makes 5 pecan pies. He uses $\frac{2}{3}$ cup brown sugar in each one. How much brown sugar does he use altogether?
- A** $\frac{10}{15}$ cup
- B** $2\frac{1}{3}$ cups
- C** $3\frac{1}{3}$ cups
- D** $5\frac{2}{3}$ cups

- 6** The distance around the block where Boris lives is $\frac{5}{6}$ mile. Boris wrote this equation to find how far he would run if he ran around the block 3 times.

$$3 \times \frac{5}{6} = \square$$

Part A Boris began to draw a model to solve the problem. Complete Boris's model.



Part B Solve the equation for this problem. Show your work. Write the answer as a mixed number in lowest terms.

Answer _____ miles