Scope and Sequence

Unit	Objectives
Unit 1 Order of Operations, Exponents, and Prime Factors	• Use exponents to express repeated multiplication • Memorize square numbers from 1^2 to 12^2 • Use exponents to express powers of 10 • Use the order of operations to evaluate expressions with exponents • Use a dot to represent multiplication and use a fraction bar to represent division • Use the distributive property or cancelling to simplify and evaluate expressions • Identify prime and composite numbers to 100 • Use factor trees to find all prime factors of a number and write the number's prime factorization • Use two numbers' prime factorizations to find their greatest common factor (GCF)
Unit 2 Review Fractions	• Review equivalent fractions, mixed numbers, improper fractions, and simplest form • Use cancelling to simplify fractions • Use common denominators to compare three fractions with different denominators • Use common denominators to add and subtract three fractions or mixed numbers with different denominators • Review how to find the number of objects in a fractional part of a set • Use bar models to solve multi-step word problems that involve fractional parts of sets, including find-a-part, find-the-whole, and comparison problems
Unit 3 Area of Parallelograms and Triangles	• Review the formulas for the perimeter or area of a rectangle • Multiply or divide measurement units • Use formulas to find the area of a parallelogram or triangle • Split shapes into triangles, parallelograms, or rectangles and add or subtract to find total area
Unit 4 Ratios	• Write ratios to describe relationships between quantities • Simplify ratios and tell whether ratios are equivalent • Understand that combinations with equivalent ratios are proportional to each other • Use the ratio between two quantities along with one of the quantities to find the other quantity • Use the ratio between two quantities to scale the quantities in proportion to each other • Use ratios to find fractions of a whole amount and vice versa • Use ratios and fractions to solve comparison problems • Use the ratio between two quantities and the sum of the quantities (or the difference between the quantities) to find each quantity
Unit 5 Multiply Fractions and Mixed Numbers	• Multiply fractions, whole numbers, and mixed numbers • Use cancelling to simplify fraction multiplication problems before solving • Multiply 3 or more fractions • Use fraction multiplication to solve real-world problems that involve finding a fraction of a quantity or equal groups of a quantity • Use fraction multiplication to find the area of rectangles, parallelograms, or triangles with fractional dimensions

Unit	Objectives
Unit 6 Positive and Negative Numbers on the Number Line and Coordinate Plane	• Use positive and negative numbers to describe real-life situations • Compare positive and negative numbers and find distances between them on the number line • Find the absolute values or opposites of positive and negative numbers • Identify and plot points on the coordinate plane with both positive and negative coordinates • Find the horizontal or vertical distance between points on the coordinate plane • Find the perimeter or area of shapes on the coordinate plane
Unit 7 Divide Fractions and Mixed Numbers	• Find reciprocals and understand that the reciprocal of a number tells how many times the number "goes into" one whole • Use reciprocals to rewrite fraction division problems as multiplication problems and solve • Divide fractions and mixed numbers • Use the relationship between the dividend and divisor to predict whether a quotient will be greater than, less than, or equal to one whole • Solve division word problems that involve fractions, whole numbers, and mixed numbers
Unit 8 Review Decimals	• Extend decimal place value to the ten-thousandths-place • Review how to add and subtract decimals • Use equivalent fractions with base-ten denominators (like 10 or 100) to convert fractions to decimals • Use common fractions (like ½ or ⅕) to compare fractions and decimals • Review how to multiply and divide decimals by 10, 100, or 1,000 • Review how to multiply decimals by whole numbers • Review how to divide decimals by whole numbers and round the quotient to a given decimal place
Unit 9 Expressions	• Write expressions with one or two variables to describe real-life situations • Evaluate expressions for given values of the variables • Identify terms, coefficients, variables, and constants in expressions • Combine like terms or use multiplication properties to simplify expressions with one or two variables
Unit 10 Percentages	• Use percentages to represent parts of a whole • Convert percentages to decimals (and vice versa) • Use equivalent fractions with 100 as the denominator to convert fractions to percentages (and vice versa) • Memorize percent equivalents for common fractions • Use mental math and fraction multiplication to calculate a percentage of an amount • Find a whole amount, given a percentage of the amount • Solve percentage word problems, including problems that involve a percent increase or decrease

Unit	Objectives
Unit 11 Equations	• Write inequalities and equations with variables to describe real-world situations • Graph inequalities on the number line and find values of the variable that make an inequality true • Use substitution to check whether a value of a variable is a solution to an equation • Solve simple addition or multiplication equations with one variable • Write equations with two variables that show the relationship between the variables • Create a chart that shows solutions to an equation with two variables and use the chart to graph the equation on the coordinate plane • Use the graph of an equation to find solutions to the equation
Unit 12 Volume	• Review how to use volume formulas (length × width × height or base area × height) to find volume • Divide to find the base area or height of a rectangular prism • Multiply and cancel units in volume problems • Use fractions and mixed numbers to find volume • Convert measurement units to the same unit before finding volume • Solve multi-step volume word problems
Unit 13 Surface Area	• Identify 3-D solids and recognize their nets • Find the surface area of 3-D solids (rectangular prisms, cubes, triangular prisms, and pyramids) • Solve real-world problems that involve surface area and volume
Unit 14 Rate and Speed	• Understand that a rate compares two quantities with different units • Divide to find unit rates • Solve rate problems • Use the correct units for rate problems • Solve problems involving speed, time, and distance • Solve multi-step word problems involving unit prices or speed
Unit 15 Multiply and Divide Decimals by Decimals	• Use mental math and decimal multiplication to find percentages of whole numbers and decimals • Multiply and divide decimals by decimals with mental math • Multiply decimals by decimals with the written algorithm • Use long division to divide decimals by decimals and round the quotient to a given number of decimal digits • Solve decimal multiplication and division word problems • Solve unit price problems with decimals • Use a calculator to multiply or divide decimals
Unit 16 Data and Statistics	• Find the mean, median, and mode for a data set and understand that these statistics describe the center of the data set • Describe the shape of a data set as right-skewed, left-skewed, or symmetric and use words like *gap*, *peak*, and *outlier* to describe its features • Create and interpret dot plots, histograms, and box plots • Find the range, mean absolute deviation, quartiles, and interquartile range for a data set and understand that these statistics describe the spread of the data set • Use statistics to analyze data, compare two data sets, and draw conclusions

Materials List

What You'll Need in Your Math Kit

You'll use the following materials regularly in *Sixth Grade Math with Confidence*. Stash them in a box or basket, and always keep them ready for your next lesson. (See page 8 in the Introduction for more detailed descriptions of each item.)

- 30 small counters (15 each of two different colors)
- Two packs of playing cards
- Two dice
- 1-foot (or 30-centimeter) ruler
- Highlighter
- Scrap paper
- Pencils

Other Supplies

Besides your Math Kit, you'll also need the following household items. You'll only need most of them once or twice, so you don't need to gather them ahead of time or store them separately. Check the unit overviews for the specific household items you'll need for each unit.

Items marked with an asterisk are needed for the optional enrichment lessons at the end of each unit.

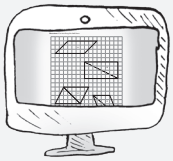
- 5 dice
- 25 slips of paper
- *3 small packs of multi-colored candy, such as Skittles, M&Ms, or Smarties
- Scissors
- *Tape measure or ruler
- *Two bottles of liquid food coloring (red, yellow, or blue)
- *Water
- *6-8 small clear bowls or glasses
- *6-8 sticky notes or slips of paper
- *Holiday recipe with fractions and mixed numbers
- *Internet access, optional
- *Hot cocoa ingredients, optional
- Screw, nut, bolt, and hinge, optional
- 4 grains of rice, optional
- Base-ten blocks, optional
- *Kitchen scale
- *Several produce items of the same type (for example, 5 apples or 7 carrots)
- Colored pencils or markers
- Paper clip
- *Wad of paper and trash can, or basketball and basketball hoop
- Two pieces of paper
- Two cardboard boxes, each with at least one dimension longer than 1 foot

- *3 fruits or vegetables (like apples, oranges, or cucumbers)
- *Container large enough to hold each fruit or vegetable
- *Large, shallow baking dish
- *Large measuring cup
- Tape
- *Small box (with all dimensions less than 12 inches or 30 centimeters)
- *Aluminum foil or wrapping paper
- Timer or timer app
- *Distance tracking app, map, or map app, optional
- Calculator or calculator app
- *Sales flyer or online access to a favorite store
- 3 writing utensils or craft sticks
- Chair

Guide to the Blackline Masters

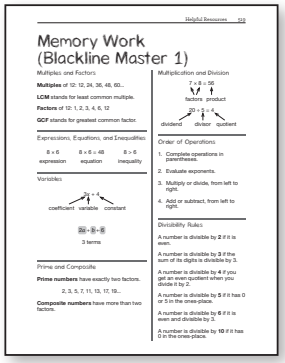
Digital Copies of Blackline Masters

Prefer to print the Blackline Masters rather than copy them from the book? **Download digital copies of all Math with Confidence Blackline Masters at welltrainedmind.com/mwc.**



Reference Blackline Masters

Families often find it helpful to have the Memory Work pages (Blackline Master 1) available for easy reference. If possible, post these pages near your lesson area to help your child gradually memorize the items over the course of the year.


Helpful Resources 519

Memory Work
(Blackline Master 1)

Multiples and Factors

Multiples of 12: 12, 24, 36, 48, 60...

LCM stands for least common multiple.

Factors of 12: 1, 2, 3, 4, 6, 12

GCF stands for greatest common factor.

Expressions, Equations, and Inequalities

8 × 6	8 × 6 = 48	8 > 6
expression	equation	inequality

Variables

$2x + 4$

coefficient · variable · constant

$2x + 3 - 5$

3 terms

Prime and Composite

Prime numbers have exactly two factors.

2, 3, 5, 7, 11, 13, 17, 19...

Composite numbers have more than two factors.

Multiplication and Division

$7 \times 5 = 35$

factors · product

$20 \div 5 = 4$

dividend · divisor · quotient

Order of Operations

1. Complete operations in parentheses.
2. Evaluate exponents.
3. Multiply or divide, from left to right.
4. Add or subtract, from left to right.

Divisibility Rules

A number is divisible by **2** if it is even.

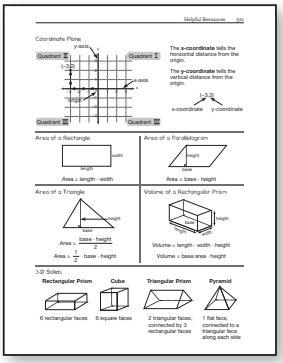
A number is divisible by **3** if the sum of its digits is divisible by 3.

A number is divisible by **4** if you get an even quotient when you divide it by 2.

A number is divisible by **5** if it has 0 or 5 in the ones-place.

A number is divisible by **6** if it is even and divisible by 3.

A number is divisible by **10** if it has 0 in the ones-place.


Helpful Resources 521

Coordinate Plane

Quadrant II · Quadrant I · Quadrant III · Quadrant IV · y-axis · x-axis · origin

The **x-coordinate** tells the horizontal distance from the origin.

The **y-coordinate** tells the vertical distance from the origin.

(2, 3)

x-coordinate · y-coordinate

Area of a Rectangle

length · width

Area = length · width

Area of a Parallelogram

height · base

Area = base · height

Area of a Triangle

height · base

$\text{Area} = \frac{\text{base} \cdot \text{height}}{2}$

$\text{Area} = \frac{1}{2} \cdot \text{base} \cdot \text{height}$

Volume of a Rectangular Prism

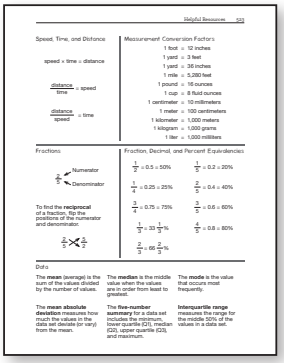
height · length · width

Volume = length · width · height

Volume = base area · height

3-D Solids

Rectangular Prism	Cube	Triangular Prism	Pyramid
6 rectangular faces	6 square faces	2 triangular faces, connected by 3 rectangular faces	1 flat face, connected to a triangular face along each side


Helpful Resources 523

Speed, Time, and Distance

speed × time = distance

$\frac{\text{distance}}{\text{time}} = \text{speed}$

$\frac{\text{distance}}{\text{speed}} = \text{time}$

Measurement Conversion Factors

1 foot	= 12 inches
1 yard	= 3 feet
1 yard	= 36 inches
1 mile	= 5,280 feet
1 pound	= 16 ounces
1 cup	= 8 fluid ounces
1 centimeter	= 10 millimeters
1 meter	= 100 centimeters
1 kilometer	= 1,000 meters
1 kilogram	= 1,000 grams
1 liter	= 1,000 milliliters

Fractions

$\frac{2}{5}$ — Numerator · Denominator

To find the **reciprocal** of a fraction, flip the positions of the numerator and denominator.

$\frac{2}{5} \times \frac{5}{2}$

Fraction, Decimal, and Percent Equivalencies

$\frac{1}{2} = 0.5 = 50\%$	$\frac{1}{5} = 0.2 = 20\%$
$\frac{1}{4} = 0.25 = 25\%$	$\frac{2}{5} = 0.4 = 40\%$
$\frac{3}{4} = 0.75 = 75\%$	$\frac{3}{5} = 0.6 = 60\%$
$\frac{1}{3} = .33\frac{1}{3}\%$	$\frac{4}{5} = 0.8 = 80\%$
$\frac{2}{3} = .66\frac{2}{3}\%$	

Data

The **mean** (average) is the sum of the values divided by the number of values.

The **median** is the middle value when the values are in order from least to greatest.

The **mode** is the value that occurs most frequently.

The **mean absolute deviation** measures how much the values in the data set deviate (or vary) from the mean.

The **five-number summary** for a data set includes the minimum, lower quartile (Q1), median (Q2), upper quartile (Q3), and maximum.

Interquartile range measures the range for the middle 50% of the values in a data set.

Short-Term-Use Blackline Masters

You will use these Blackline Masters for only a few lessons. You do not need to save them after you finish the corresponding unit.

- Paper Shapes (Blackline Master 2), used in Unit 3 only
- Paper Fraction Circles (Blackline Master 3), used in Unit 7 only
- Percent Square (Blackline Master 4), used in Unit 10 only
- Nets (Blackline Master 5), used in Unit 13 only
- Rectangular Prisms (Blackline Master 6), used in Unit 13 only

Optional Blackline Masters

The lessons in Units 8, 10, and 15 occasionally suggest using base-ten blocks to model percentage and decimal concepts. The following Blackline Master is provided in case you want to use these suggestions and do not own real base-ten blocks.

- Base-Ten Blocks (Blackline Master 7)

Memory Work (Blackline Master 1)

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Multiples of 12: 12, 24, 36, 48, 60...

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Factors of 12: 1, 2, 3, 4, 6, 12

GCF stands for greatest common factor.

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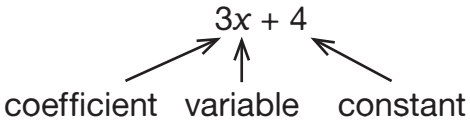
8×6	$8 \times 6 = 48$	$8 > 6$
expression	equation	inequality

Variables



$2a + b + 6$

3 terms

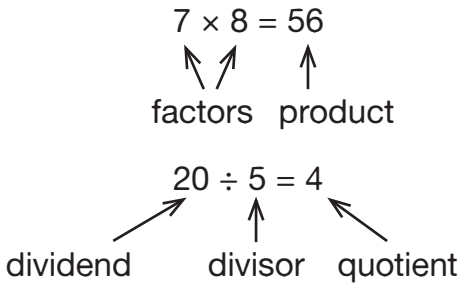
Prime and Composite

Prime numbers have exactly two factors.

2, 3, 5, 7, 11, 13, 17, 19...

Composite numbers have more than two factors.

Multiplication and Division



Order of Operations

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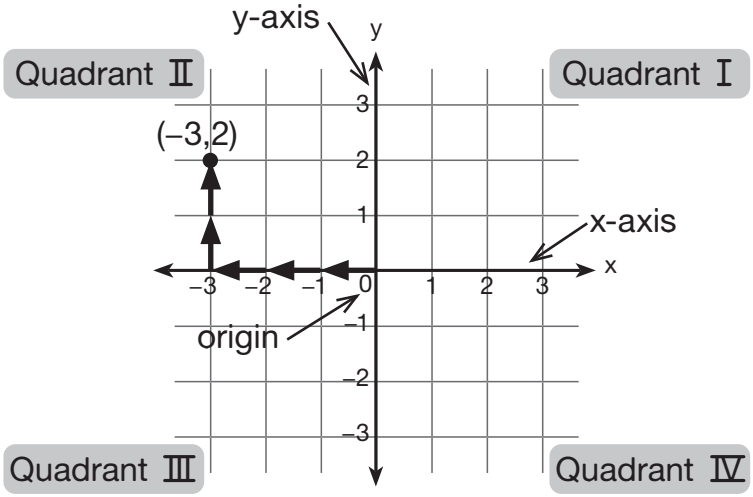
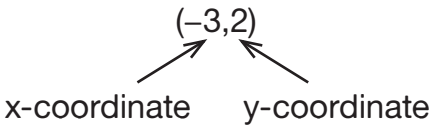
Coordinate Plane

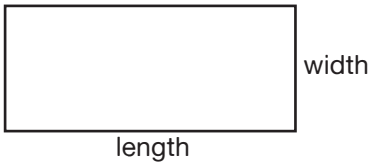


The **x-coordinate** tells the horizontal distance from the origin.

The **y-coordinate** tells the vertical distance from the origin.

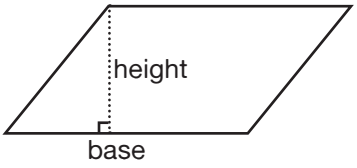


Area of a Rectangle



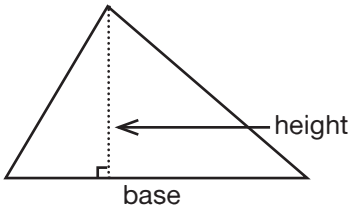
Area = length · width

Area of a Parallelogram



Area = base · height

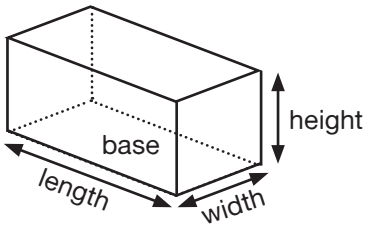
Area of a Triangle



$$\text{Area} = \frac{\text{base} \cdot \text{height}}{2}$$

$$\text{Area} = \frac{1}{2} \cdot \text{base} \cdot \text{height}$$

Volume of a Rectangular Prism

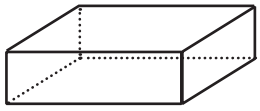


Volume = length · width · height

Volume = base area · height

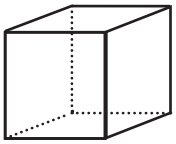
3-D Solids

Rectangular Prism



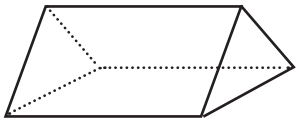
6 rectangular faces

Cube



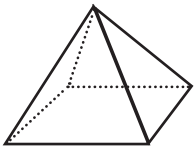
6 square faces

Triangular Prism



2 triangular faces, connected by 3 rectangular faces

Pyramid



1 flat face, connected to a triangular face along each side

Speed, Time, and Distance

$$\text{speed} \times \text{time} = \text{distance}$$

$$\frac{\text{distance}}{\text{time}} = \text{speed}$$

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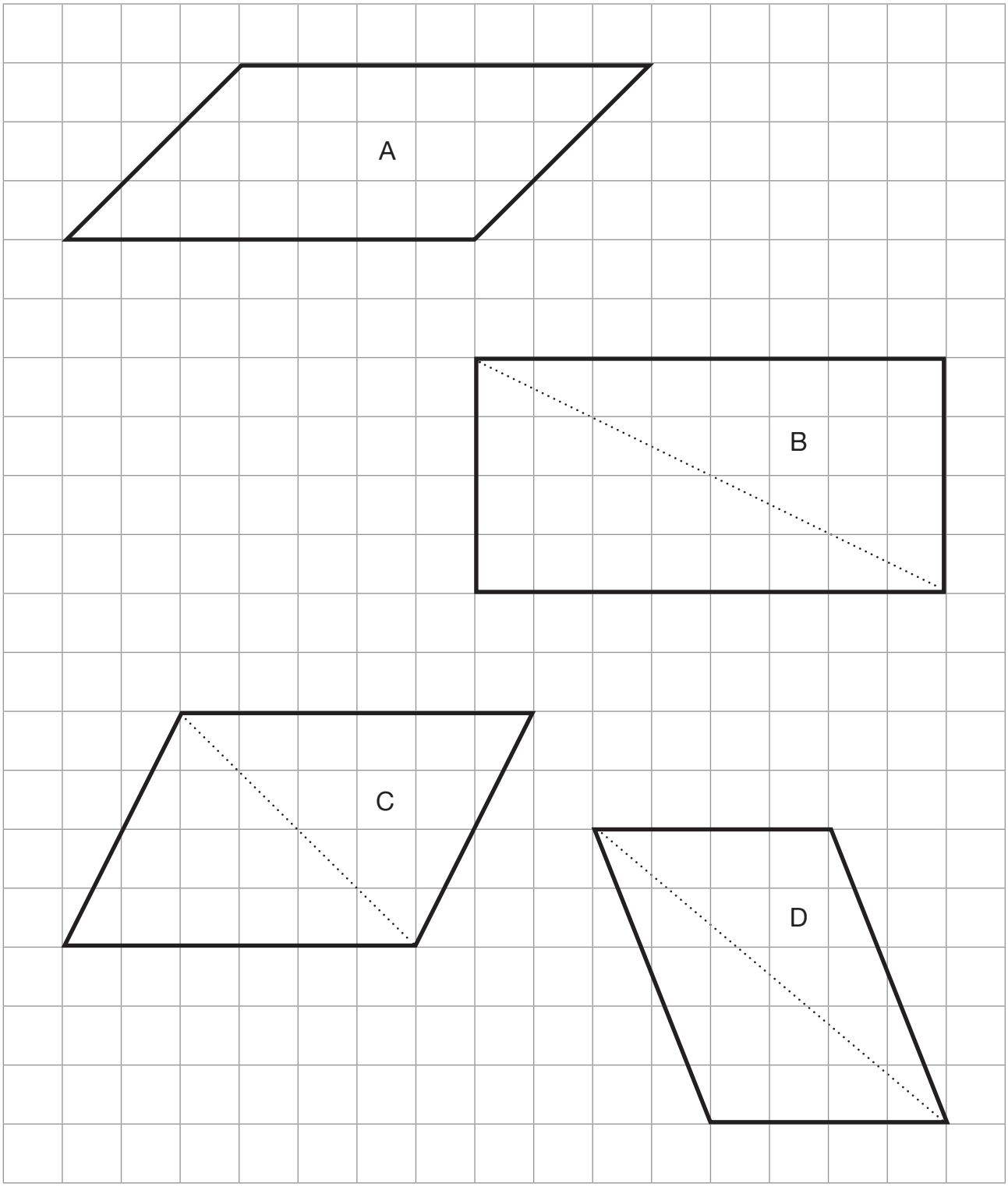
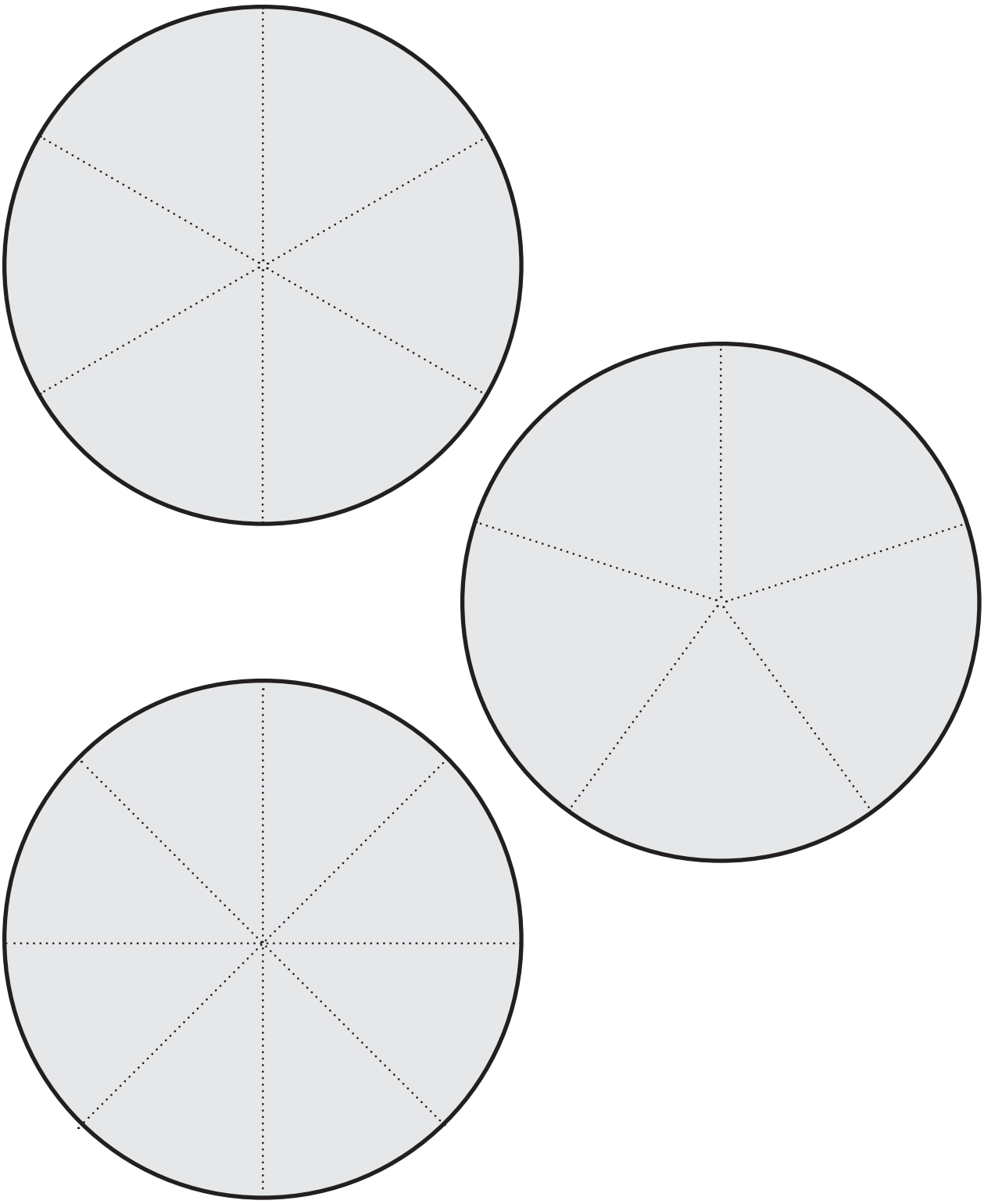
Paper Shapes (Blackline Master 2)

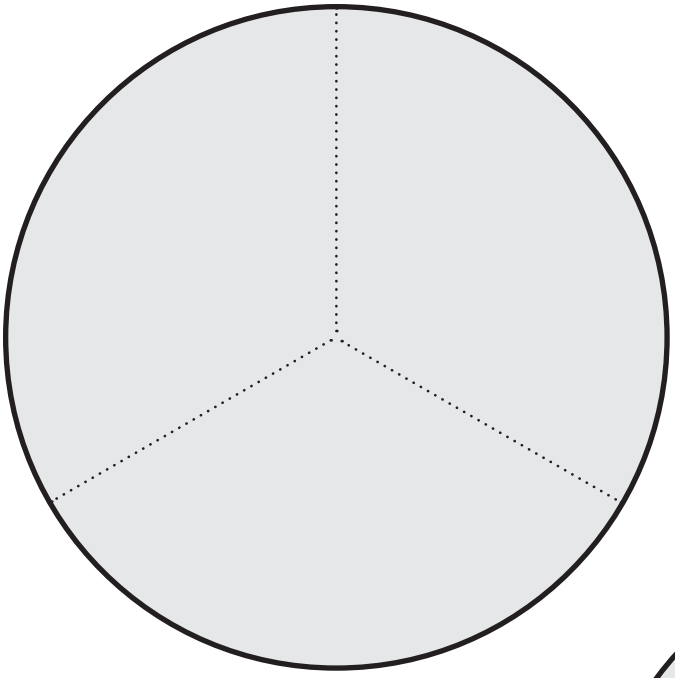
Directions: Cut out along the dark lines.

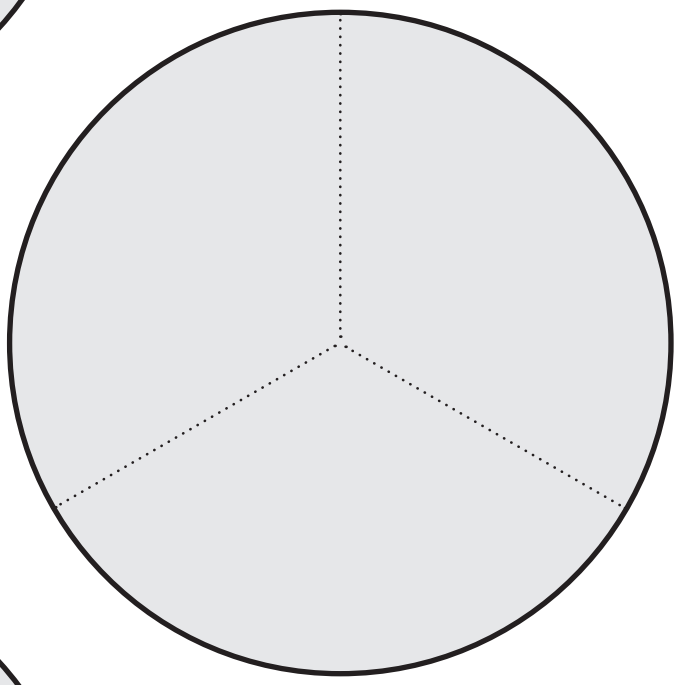


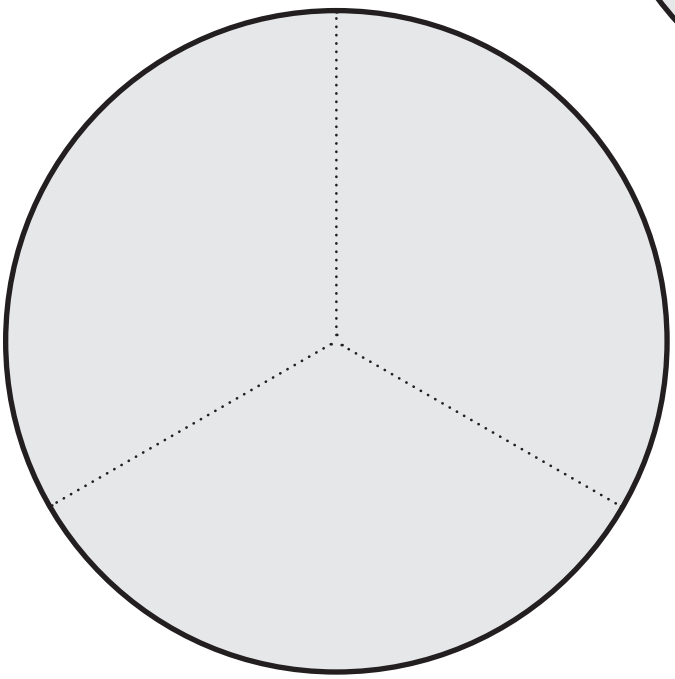
Paper Fraction Circles (Blackline Master 3)

Directions: Cut out the circles on the solid lines.

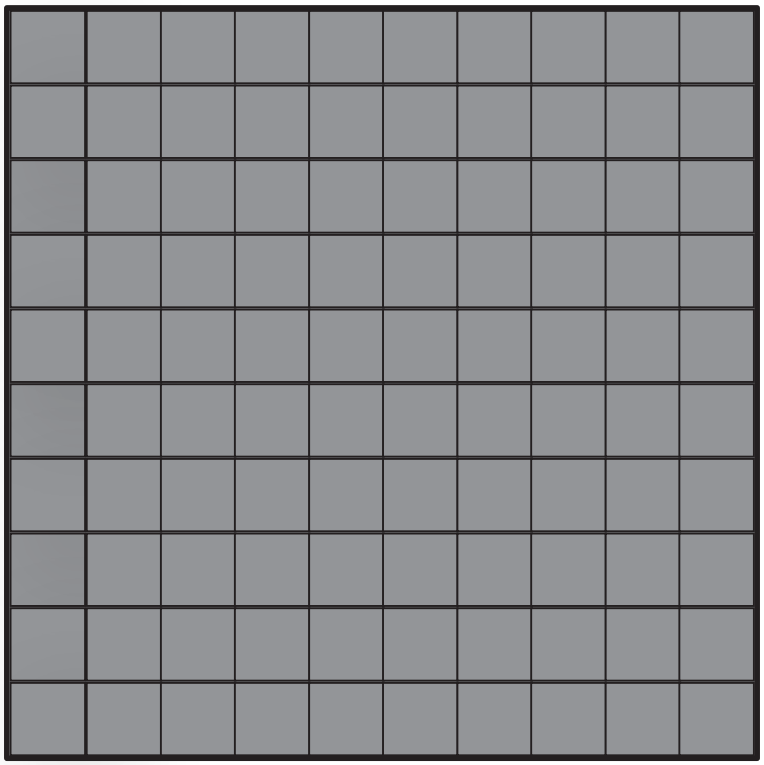






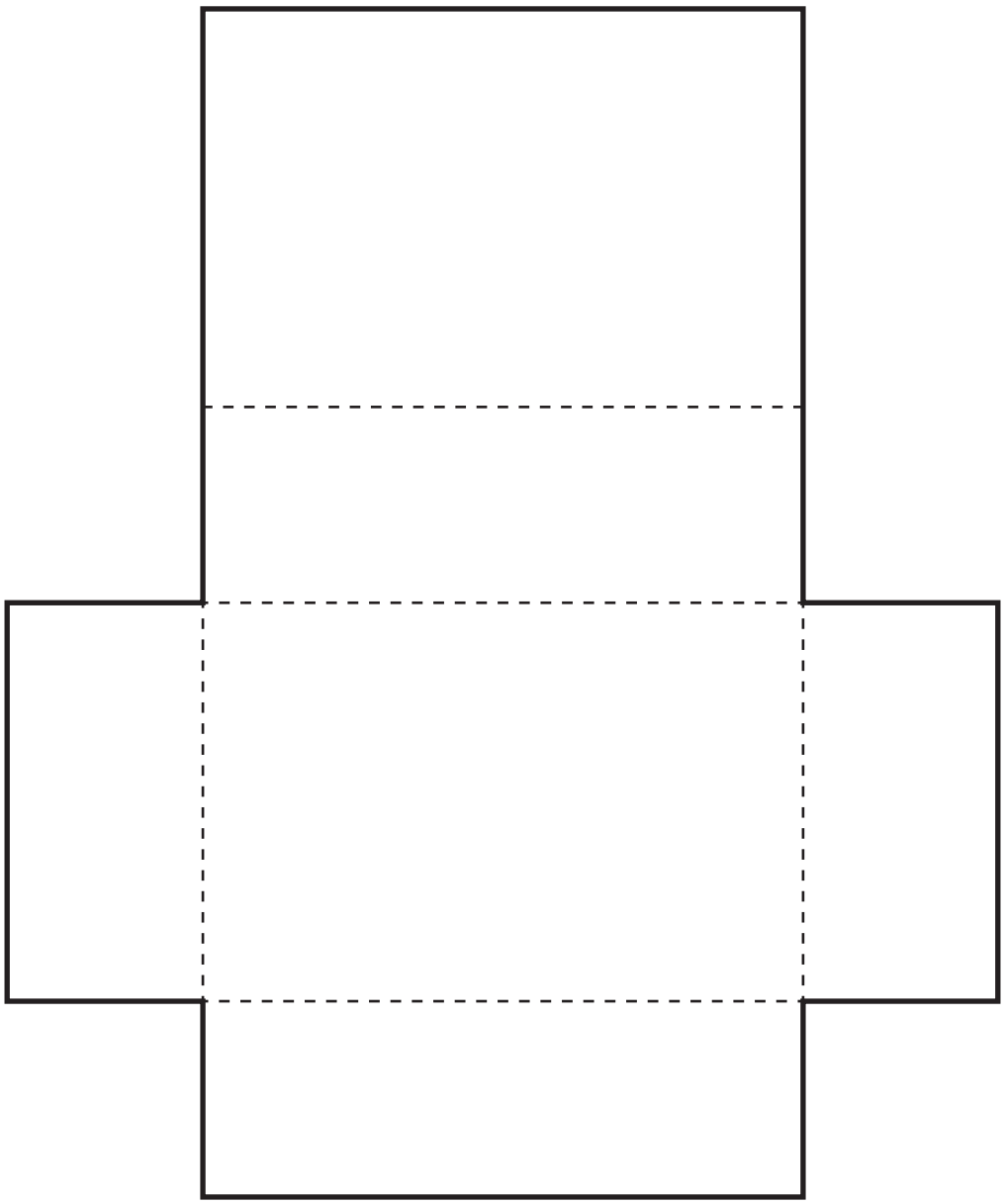


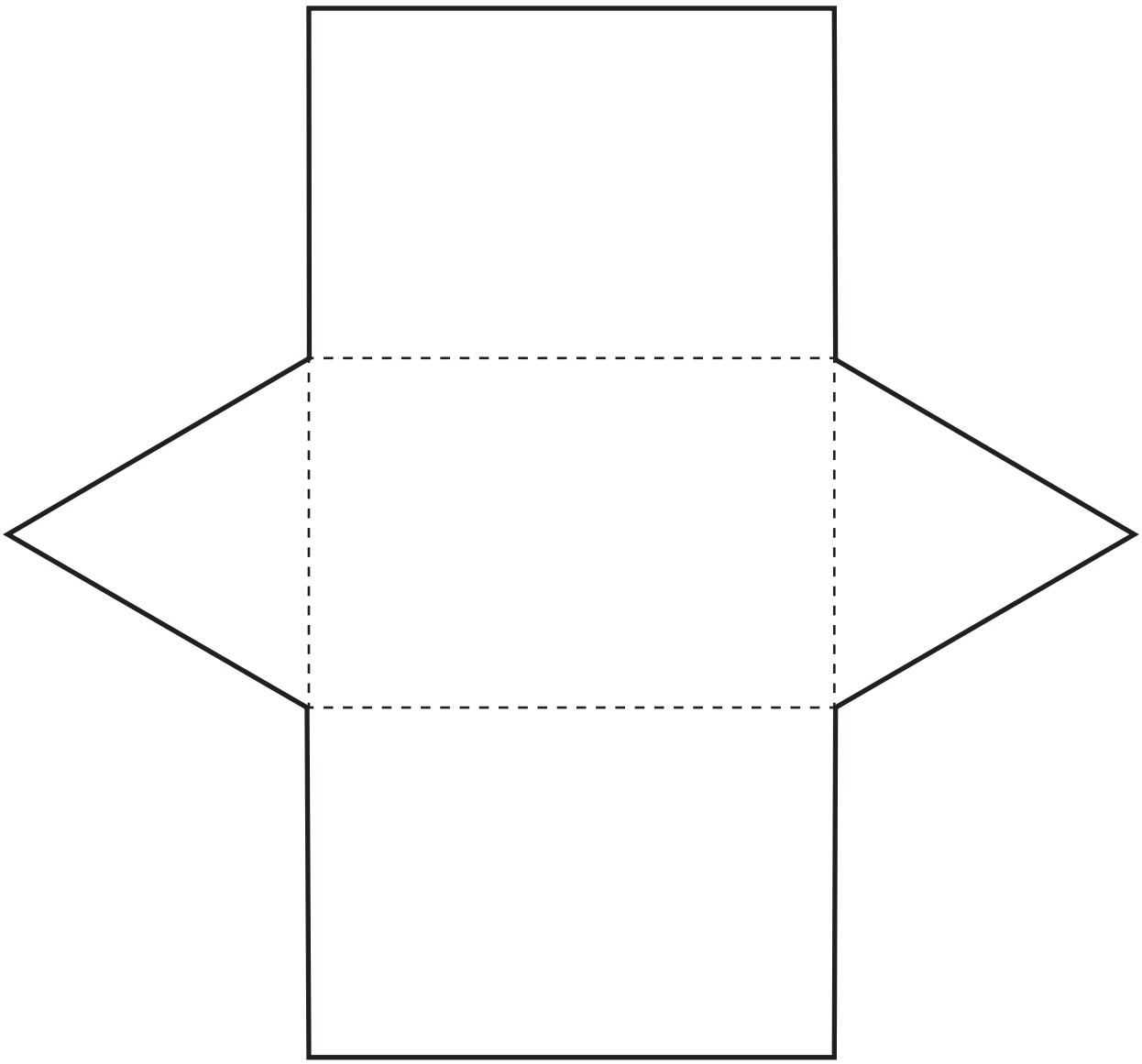
Percent Square (Blackline Master 4)

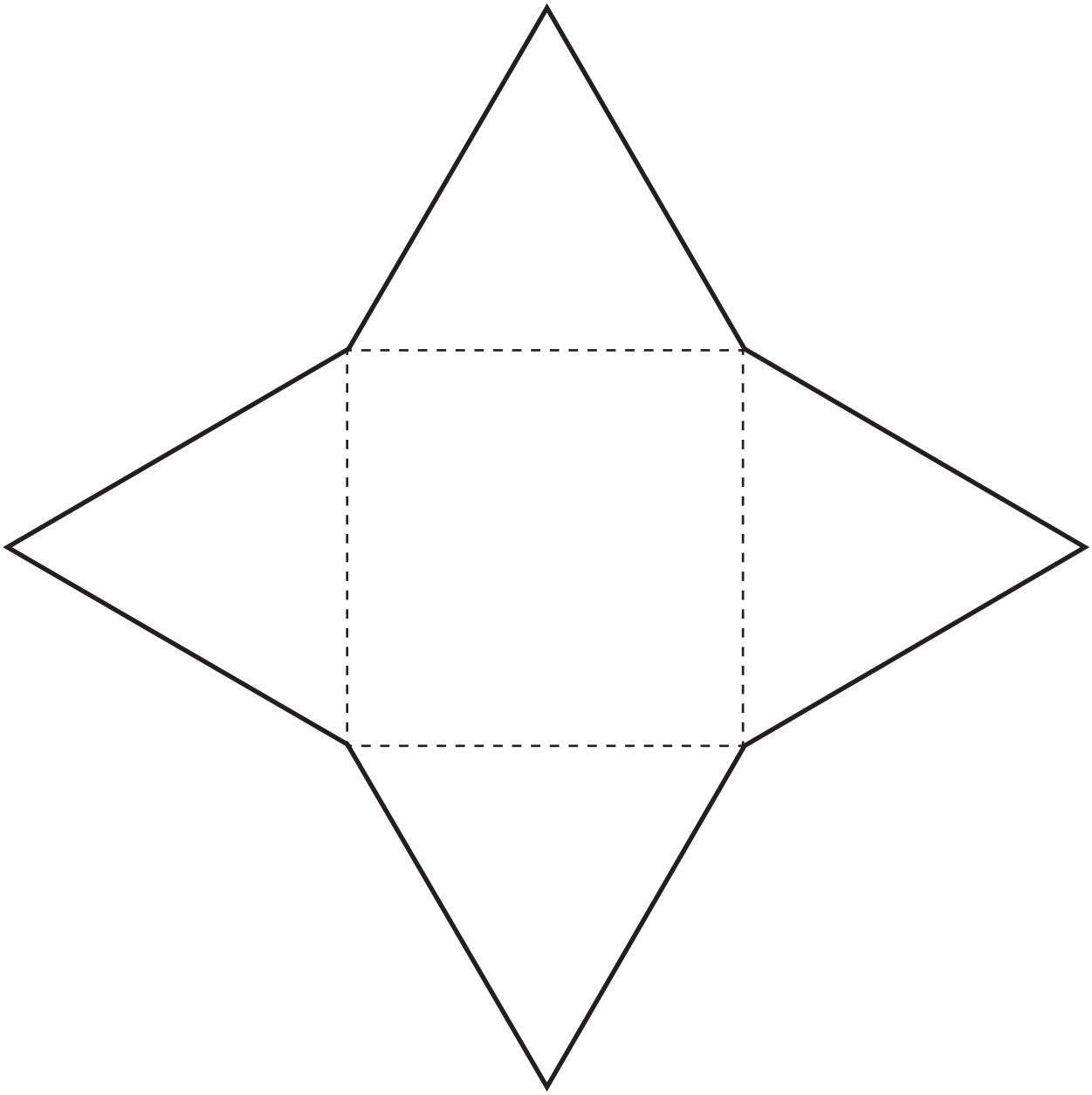


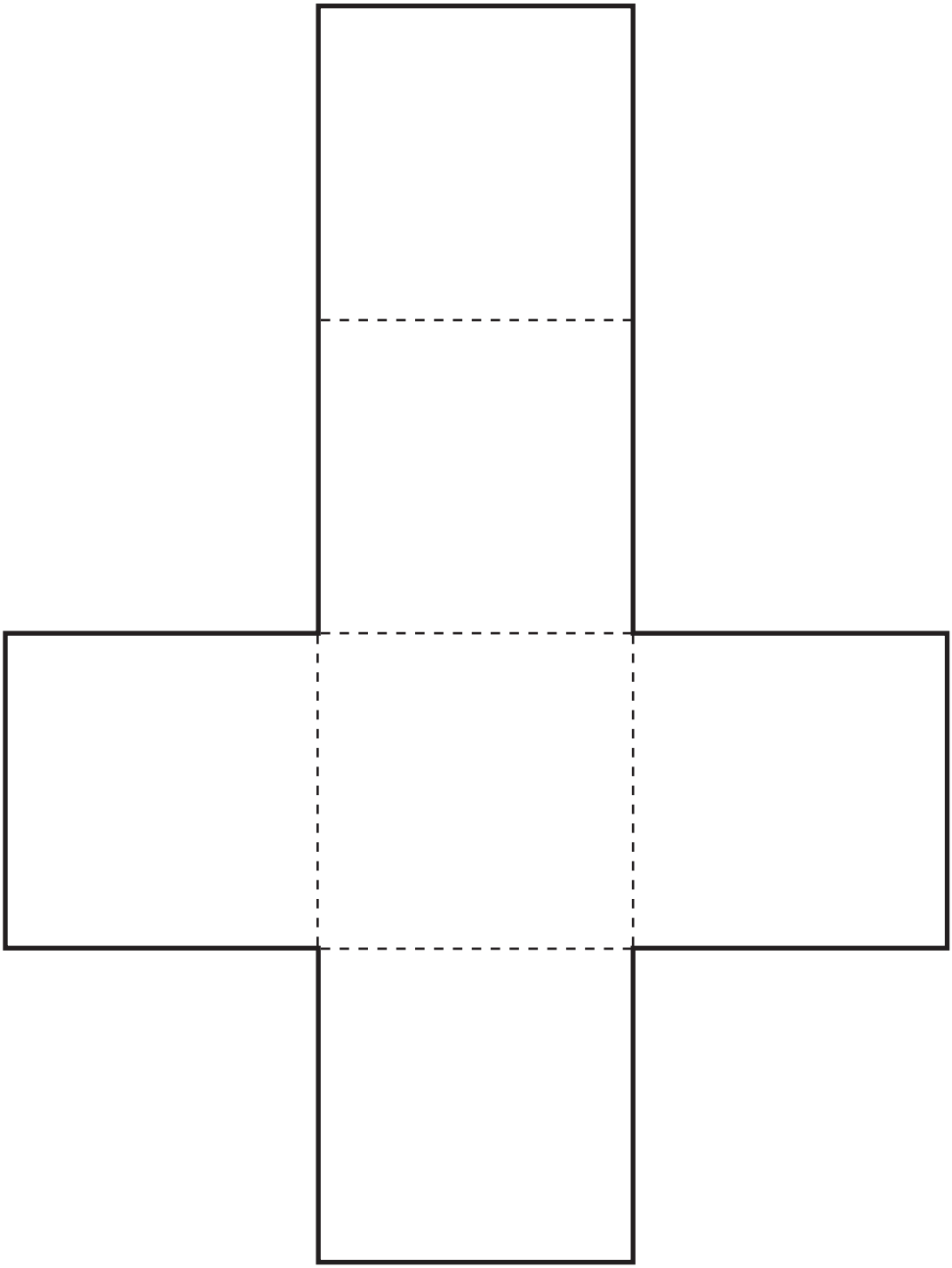
Nets (Blackline Master 5)

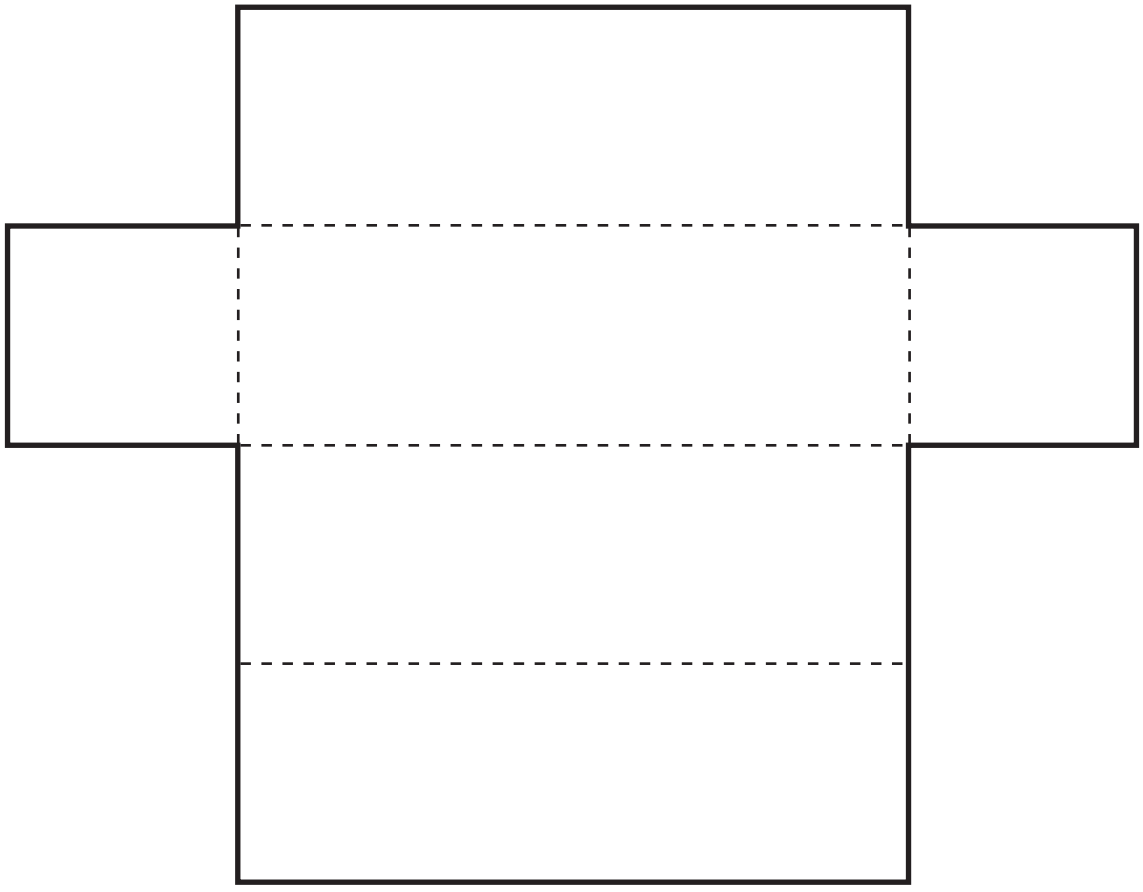
Directions: Copy these pages onto sturdy paper. Cut out along the solid lines.





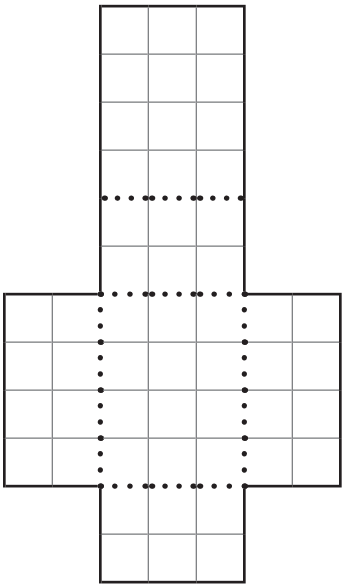


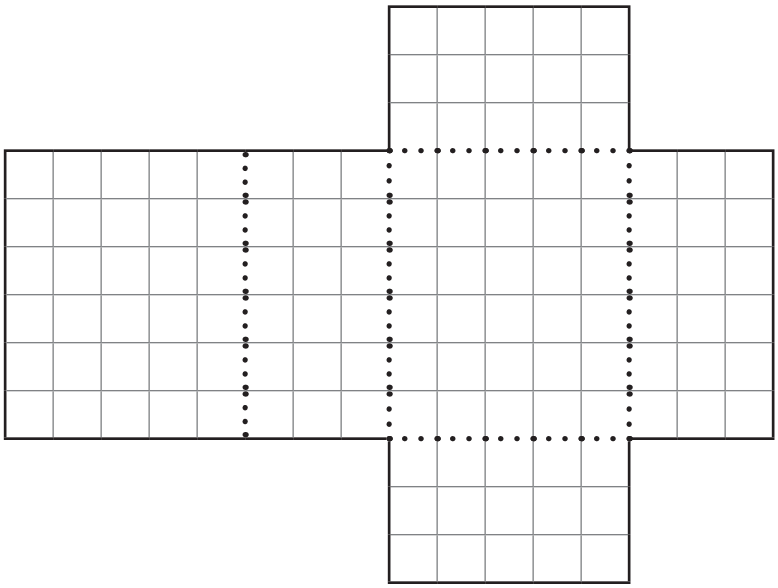


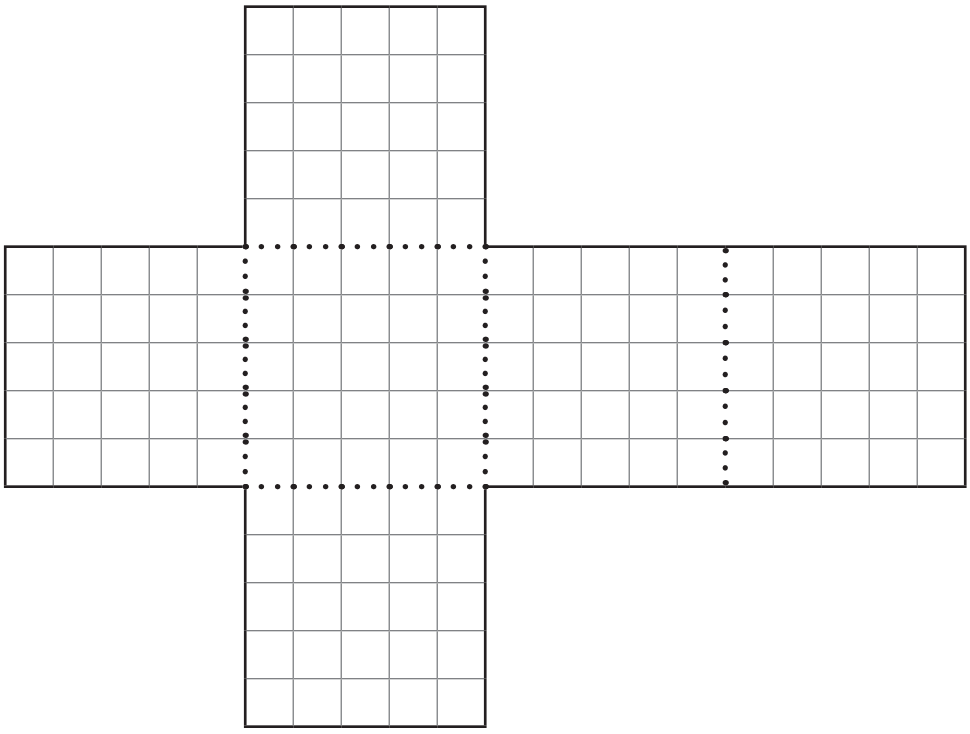


Rectangular Prisms (Blackline Master 6)

Directions: Copy onto sturdy paper. Cut out along the solid lines.







Base-Ten Blocks (Blackline Master 7)

Optional. See page 518 for more details about whether you need this page.

Directions: Make 3 copies of this page on sturdy paper. Cut out the blocks along the dark lines.