

# Roman Numerals



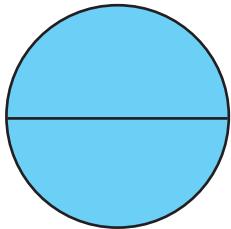
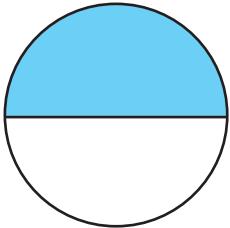
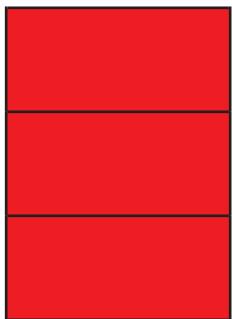
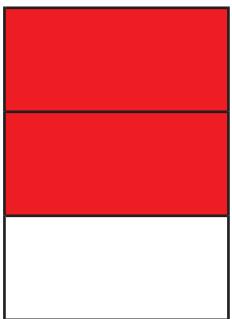
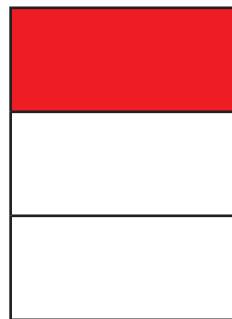
Arabic Number	Roman Numeral	Think
1	I	1
2	II	$1 + 1$
3	III	$1 + 1 + 1$
4	IV	$5 - 1$
5	V	5
6	VI	$5 + 1$
7	VII	$5 + 1 + 1$
8	VIII	$5 + 1 + 1 + 1$
9	IX	$10 - 1$
10	X	10

50	L
100	C

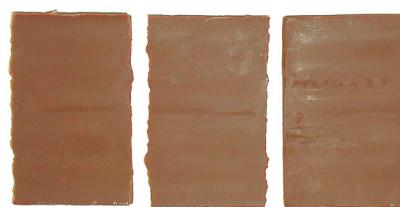
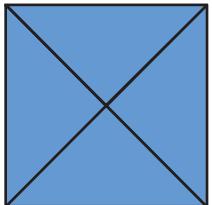
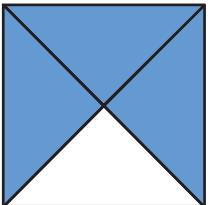
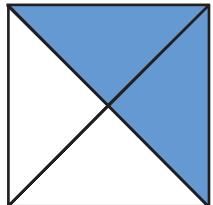
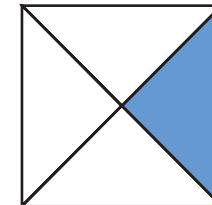
500	D
1,000	M

1. A symbol may be used only 3 times in a row.
2. When a lesser symbol comes *before* a greater symbol, the lesser symbol is *subtracted* from the greater symbol.
3. When a lesser symbol comes *after* a greater symbol, the lesser symbol is *added* to the greater symbol.

# Halves

 $\frac{2}{2}$  $\frac{1}{2}$  $\frac{3}{3}$  $\frac{3}{2}$  $\frac{3}{1}$ 

# Thirds

 $\frac{4}{4}$  $\frac{3}{4}$  $\frac{2}{4}$  $\frac{1}{4}$ 

# Fourths



# Sixths

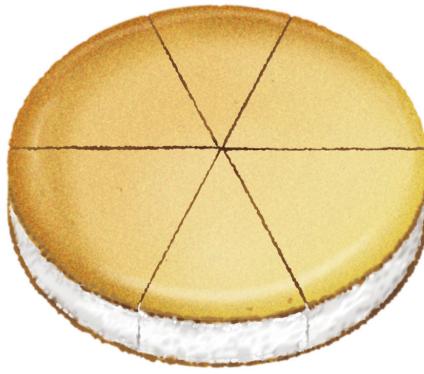
$$\frac{3}{6}$$



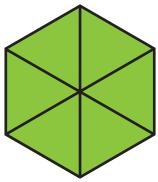
$$\frac{2}{6}$$



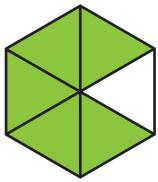
$$\frac{1}{6}$$



$$\frac{6}{6}$$



$$\frac{5}{6}$$



$$\frac{4}{6}$$



$$\frac{4}{8}$$



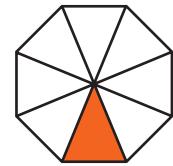
$$\frac{3}{8}$$



$$\frac{2}{8}$$



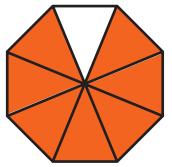
$$\frac{1}{8}$$



$$\frac{8}{8}$$



$$\frac{7}{8}$$



$$\frac{6}{8}$$

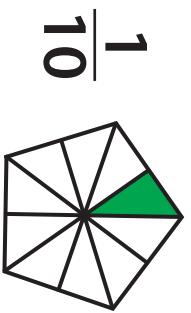
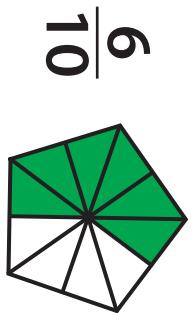
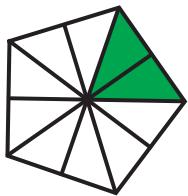


$$\frac{5}{8}$$

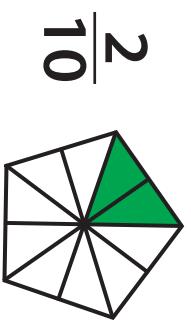


# Eighths

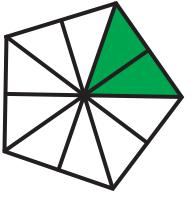
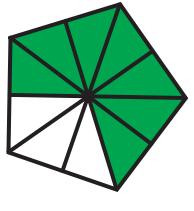
# Tenths



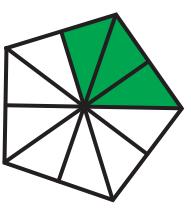
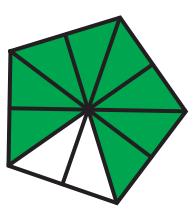
$$\frac{2}{10}$$



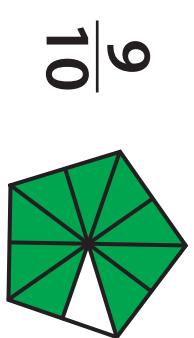
$$\frac{7}{10}$$



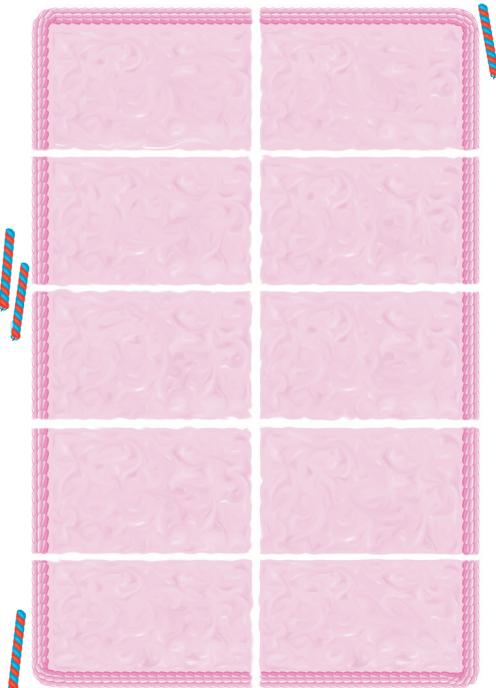
$$\frac{8}{10}$$



$$\frac{9}{10}$$

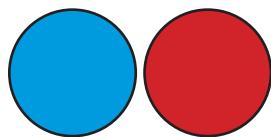


$$\frac{10}{10}$$

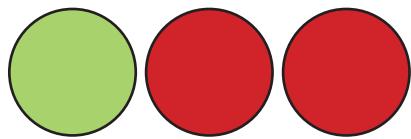


# Part of a Set

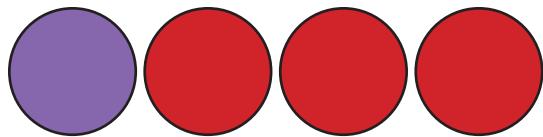
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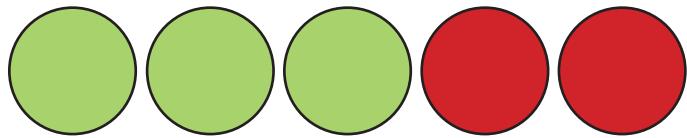
$$\frac{1}{2} \quad \frac{1}{2}$$



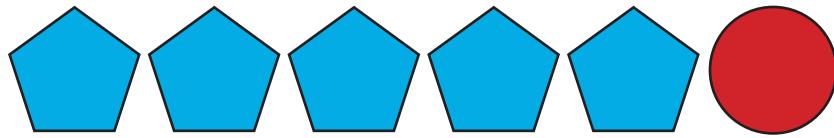
$$\frac{1}{3} \quad \frac{2}{3}$$



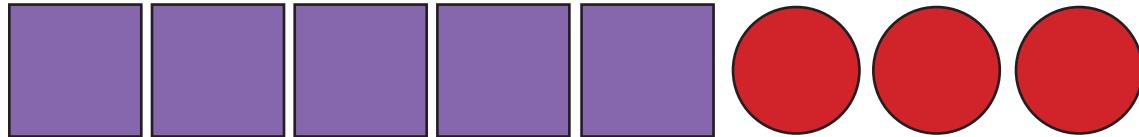
$$\frac{1}{4} \quad \frac{3}{4}$$



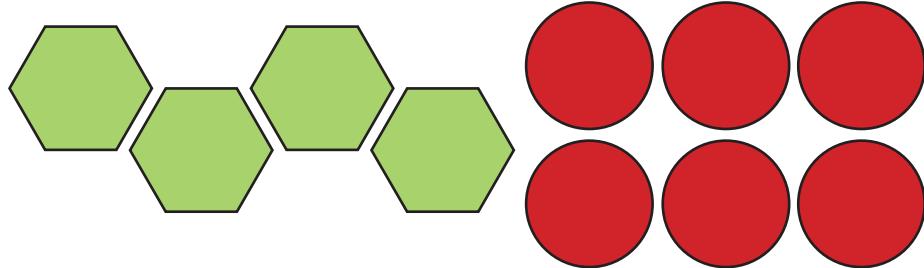
$$\frac{3}{5} \quad \frac{2}{5}$$



$$\frac{5}{6} \quad \frac{1}{6}$$



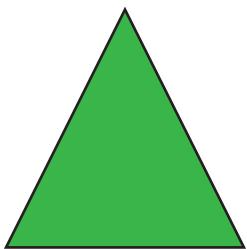
$$\frac{5}{8} \quad \frac{3}{8}$$



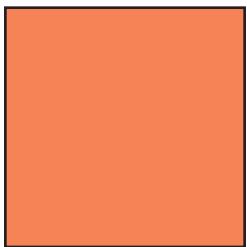
$$\frac{4}{10} \quad \frac{6}{10}$$

# Polygons

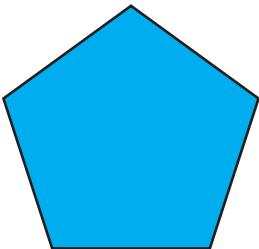
## Regular



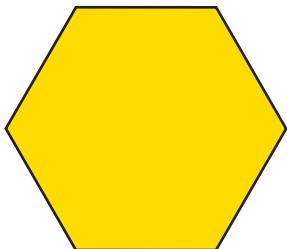
**Triangle**  
**3 sides**  
**3 angles**



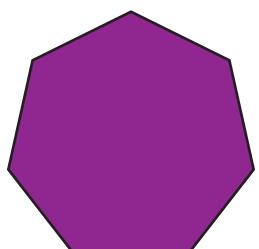
**Quadrilateral**  
**4 sides**  
**4 angles**



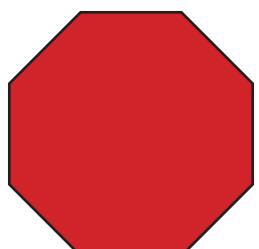
**Pentagon**  
**5 sides**  
**5 angles**



**Hexagon**  
**6 sides**  
**6 angles**

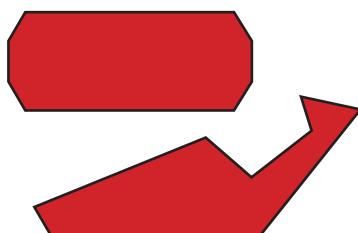
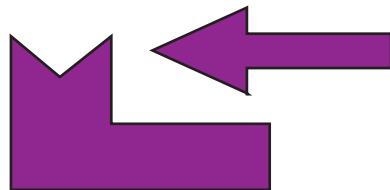
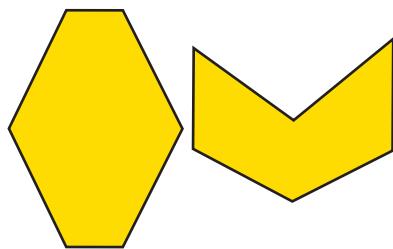
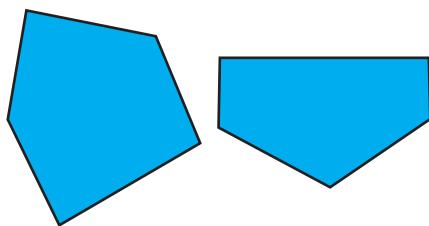
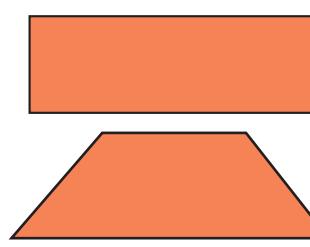
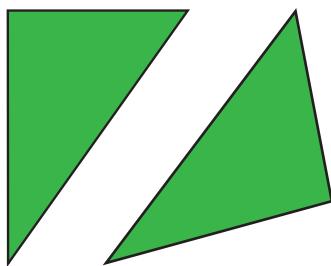


**Heptagon**  
**7 sides**  
**7 angles**



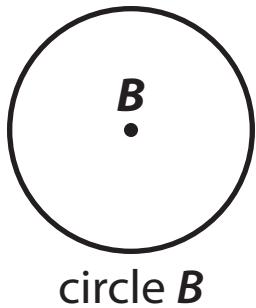
**Octagon**  
**8 sides**  
**8 angles**

## Irregular

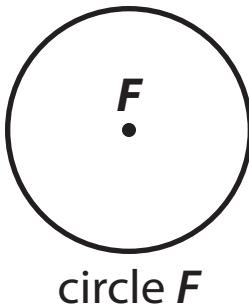


# Center Points, Radii & Diameters

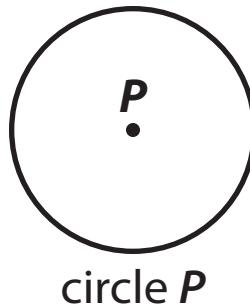
**Center Point**—A circle is named by its center point.



circle *B*

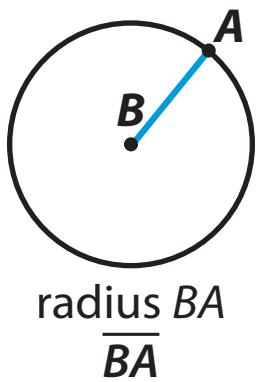


circle *F*

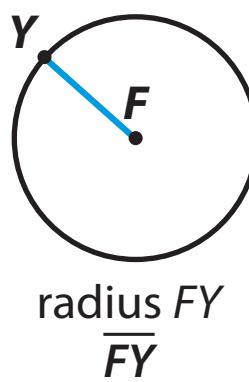


circle *P*

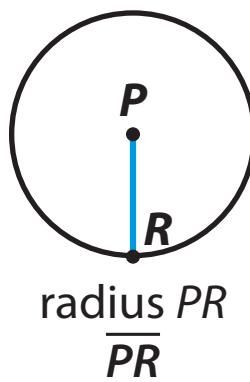
**Radius**—a line segment that connects the center point with a point on the circle



radius  $\overline{BA}$

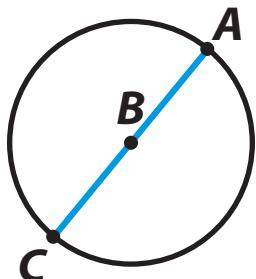


radius  $\overline{FY}$

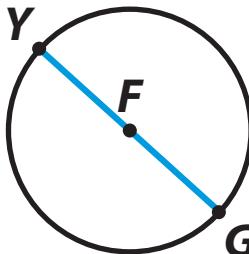


radius  $\overline{PR}$

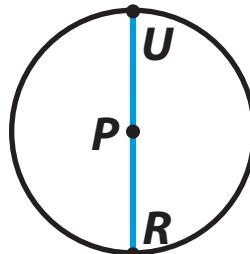
**Diameter**—a line segment that connects two points on the circle and passes through the center point



diameter  $AC$  or  
diameter  $CA$   
 $\overline{AC}$  or  $\overline{CA}$



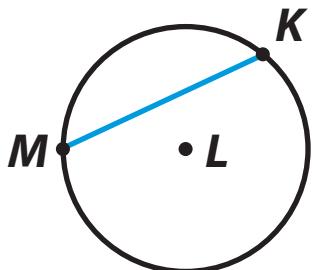
diameter  $YG$  or  
diameter  $GY$   
 $\overline{YG}$  or  $\overline{GY}$



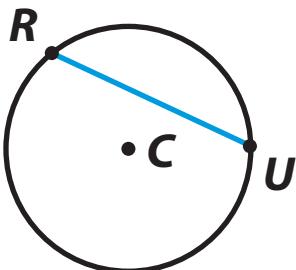
diameter  $RU$  or  
diameter  $UR$   
 $\overline{RU}$  or  $\overline{UR}$

# Chords & Central Angles

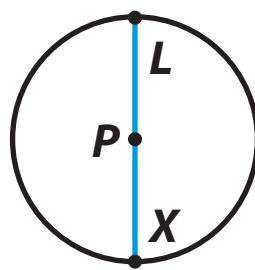
**Chord**—A line segment that connects two points on a circle. A diameter is also a chord.



chord  $KM$  or  
chord  $MK$   
 $\overline{KM}$  or  $\overline{MK}$



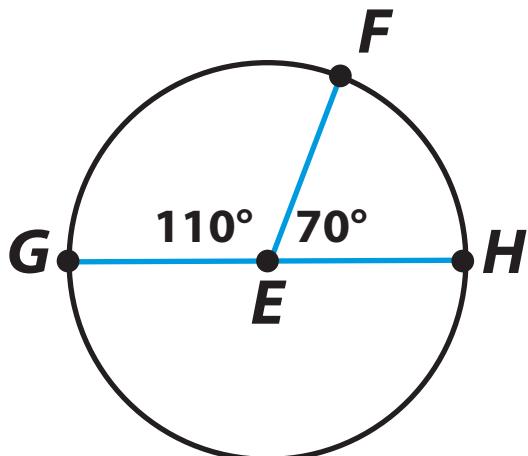
chord  $RU$  or  
chord  $UR$   
 $\overline{RU}$  or  $\overline{UR}$



chord  $LX$  or  
chord  $XL$   
 $\overline{LX}$  or  $\overline{XL}$

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**Central Angle**—an angle with its vertex in the center of the circle



**Central Angles**

$\angle GEF$   
 $\angle FEH$   
 $\angle HEG$

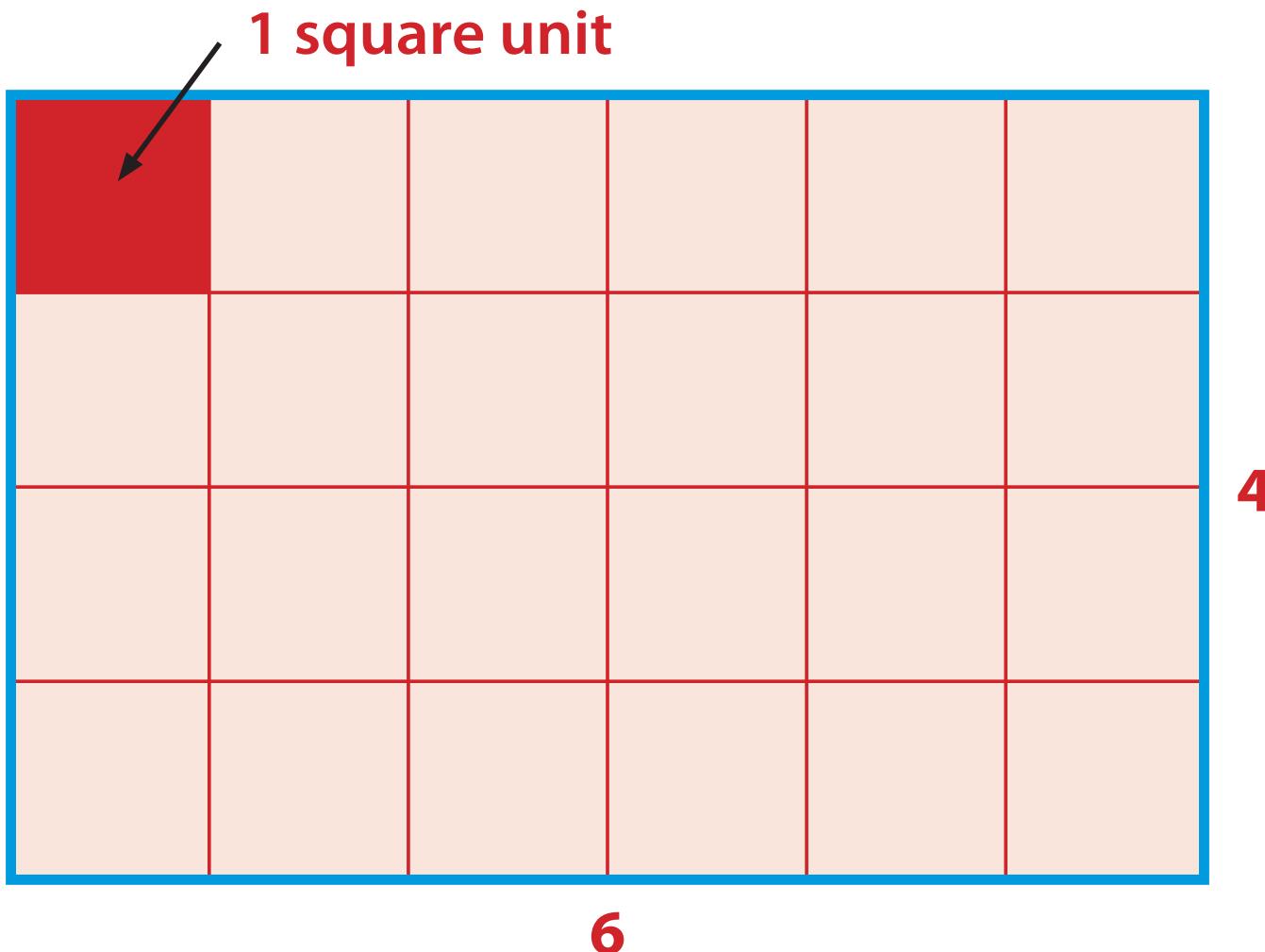
The sum of the measures of the central angles of a circle is  $360^\circ$ .

$$110^\circ + 70^\circ + 180^\circ = 360^\circ$$

# Area

**Area** is the space within a region (figure).

**Area** is measured in **square units**.



$$\text{Area} = \text{length} \times \text{width} \quad A = l \times w$$

$$6 \text{ units} \times 4 \text{ units} = 24 \text{ square units} \\ = 24 \text{ units}^2$$

# Customary Measurement

## Linear



**1 foot (ft) = 12 inches (in.)**  
**1 yard (yd) = 3 feet**  
**1 yard = 36 inches**  
**1 mile (mi) = 5,280 feet**  
**1 mile = 1,760 yards**

## Weight



**1 pound (lb) = 16 ounces (oz)**  
**1 ton (tn) = 2,000 pounds**

## Capacity

**1 cup (c) = 8 fluid ounces (fl oz)**  
**1 pint (pt) = 2 cups**  
**1 quart (qt) = 2 pints**  
**1 gallon (gal) = 4 quarts**

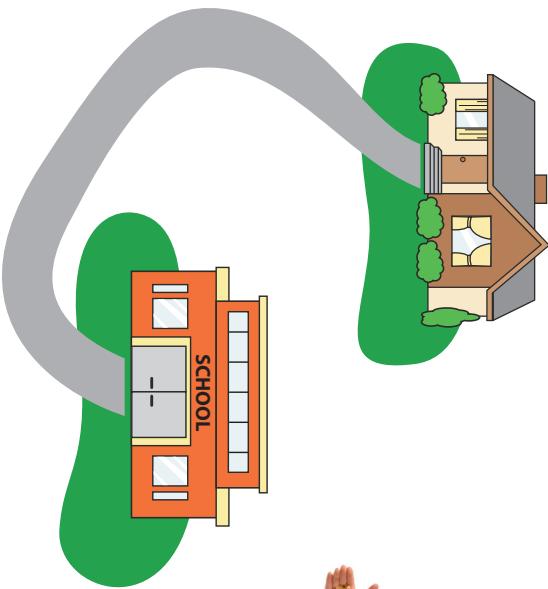


# Metric Measurement

# Metric Measurement: Length & Distance

<b>kilometer</b>	<b>hectometer</b>	<b>dekameter</b>	<b>meter</b>	<b>decimeter</b>	<b>centimeter</b>	<b>millimeter</b>
1000 m km	100 m hm	10 m dkm	1 m m	0.1 m dm	0.01 m cm	0.001 m mm

**kilometer**



**1000 m = 1 km**

**meter**



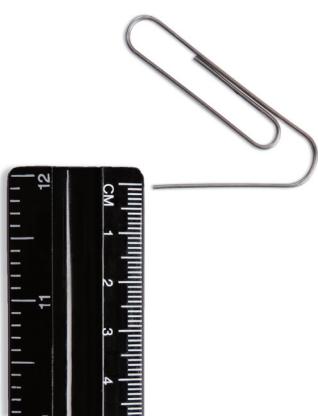
**1 m**

**centimeter**



**100 cm = 1 m**

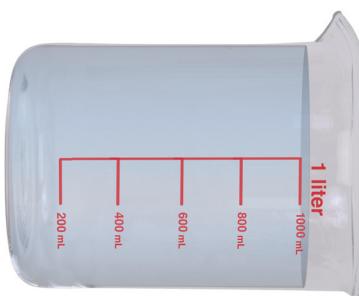
**millimeter**



**1000 mm = 1 m**

# Metric Measurement: Capacity

**1000 milliliters = 1 liter**



**1 liter  
(L)**



**1 mL  
(mL)**



**1 liter**



**2 liters**



**about 150 liters**

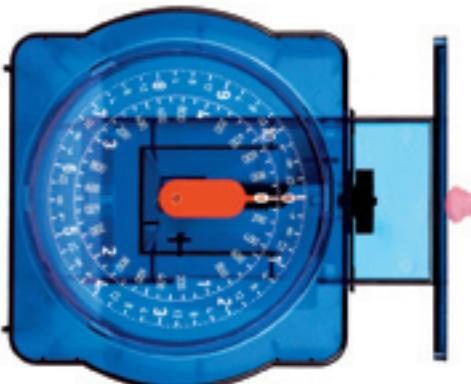
# Metric Measurement: Mass

milligram



1 crystal of salt  
1 mg

gram



1 small candy  
1 g

kilogram



1,000 small candies  
1 kg

$$1000 \text{ mg} = 1 \text{ g}$$

$$1000 \text{ g} = 1 \text{ kg}$$

# Customary & Metric Conversions

Length	Capacity	Weight or Mass
1 in. $\approx$ 2.5 cm	1 fl oz $\approx$ 30 mL	1 oz $\approx$ 30 g
1 ft $\approx$ 30 cm	1 L $\approx$ 1 qt	1 kg $\approx$ 2.2 lb
1 mi $\approx$ 1.6 km	1 m $\approx$ 39 in.	

# Time Measurement

**1 minute (min) = 60 seconds (sec)**

**1 hour (hr) = 60 minutes**

**1 day (d) = 24 hours**

**1 week (wk) = 7 days**

**1 month (mo) = 28–31 days**

**1 year (yr) = 12 months**

**1 year = 52 weeks**

**1 year = 365 days**

**1 leap year = 366 days**

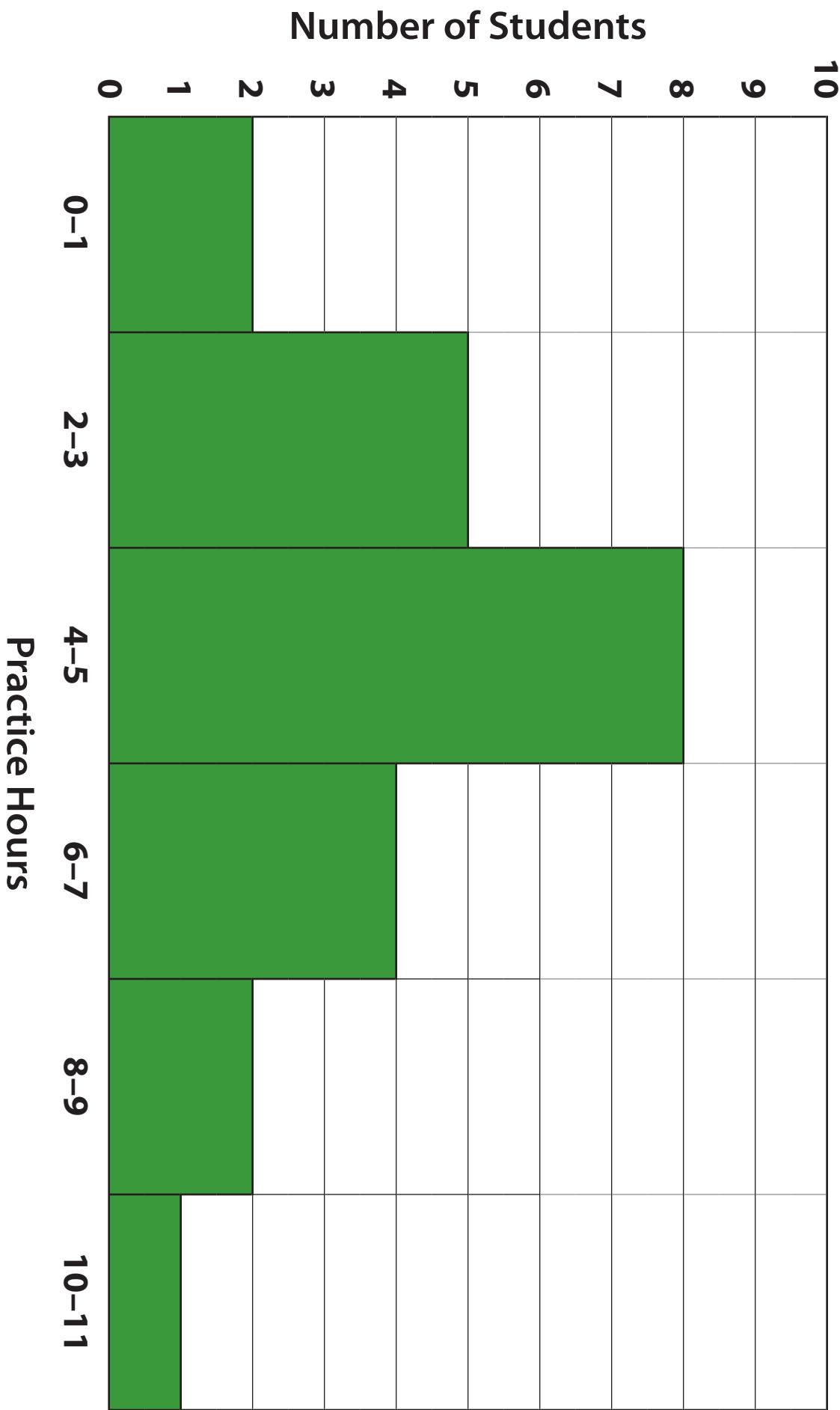
**1 decade = 10 years**

**1 century = 100 years**

**1 millennium = 1,000 years**

# Histogram

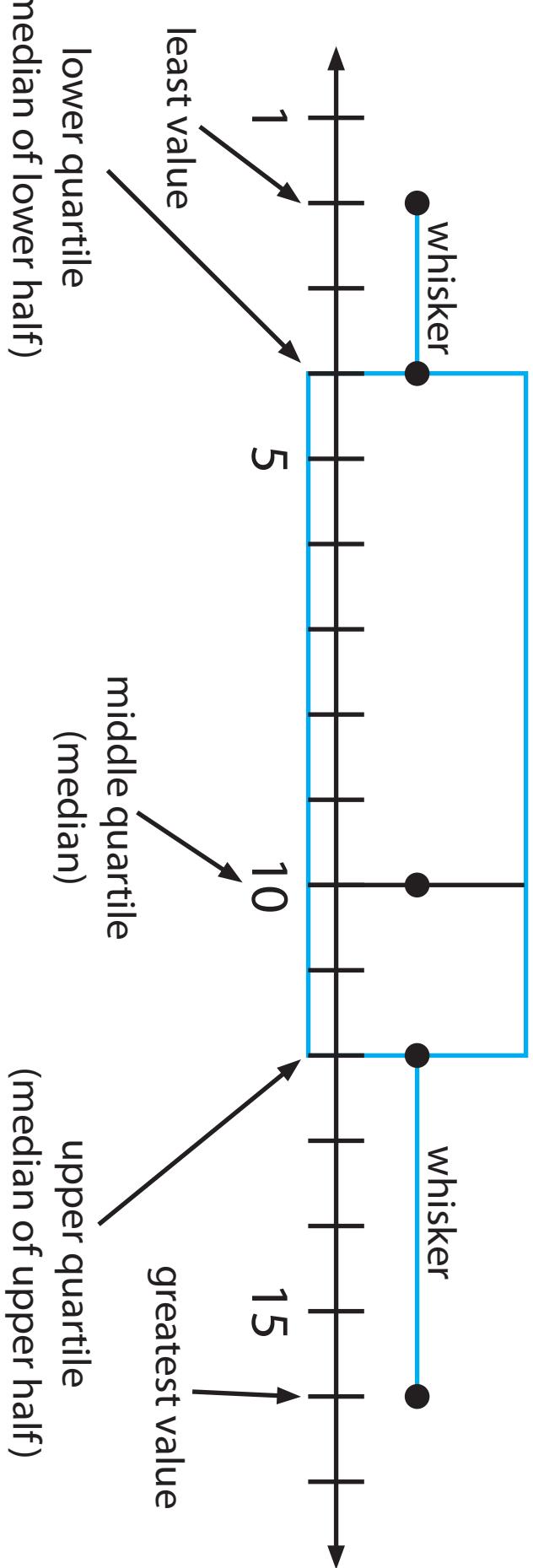
## Piano Students' Weekly Practice



# Box-and-Whisker Plot

Number of points Joel scored per basketball game: 7, 10, 12, 16, 4, 11, 2

Ordered list of data: 2, 4, 7, 10, 11, 12, 16



# Problem-Solving Plan

## Read

What is the question asking you to find?

## Analyze

What information is given?

## Plan

What strategy can you use?

What equation can you write?

## Solve

Apply your plan to solve the problem.

## Check

Does your answer make sense?

# Adjust the Quotient (higher)

Divide.

$$\begin{array}{r} 20 \qquad 3 \\ 15 ) \overline{65} \\ -45 \\ \hline 20 \end{array}$$
$$\begin{array}{r} 4 \text{ r}5 \\ 15 ) \overline{65} \\ -60 \\ \hline 5 \end{array}$$

Adjust to a *higher* quotient.

# Adjust the Quotient (lower)

Divide.

70

8

$$\begin{array}{r} 73 \\ ) 562 \end{array}$$

$$\begin{array}{r} 584 \\ ) 562 \end{array}$$

$$\begin{array}{r} 7 \\ ) 562 \\ - 511 \\ \hline 51 \end{array}$$

7 r51

Adjust to a  
lower quotient.

# Points, Lines & Planes

**Point**

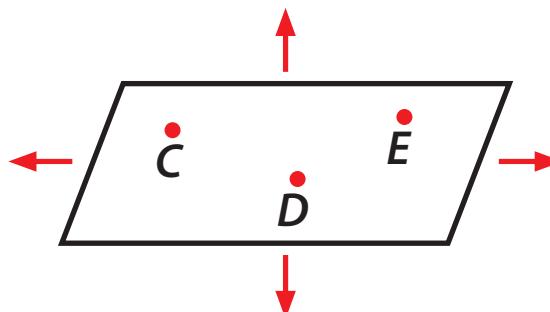


**point A**

**Line**



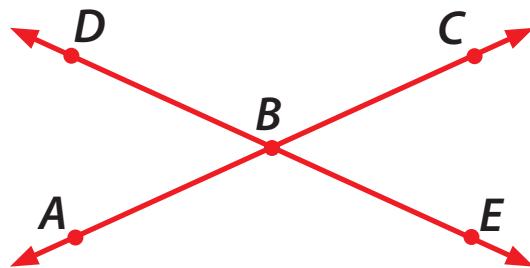
**Plane**



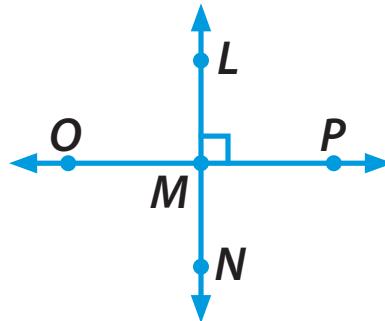
**Parallel Lines**



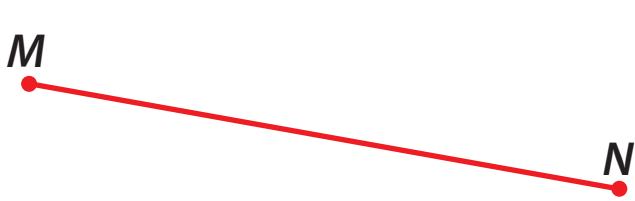
**Intersecting Lines**



**Perpendicular Lines**



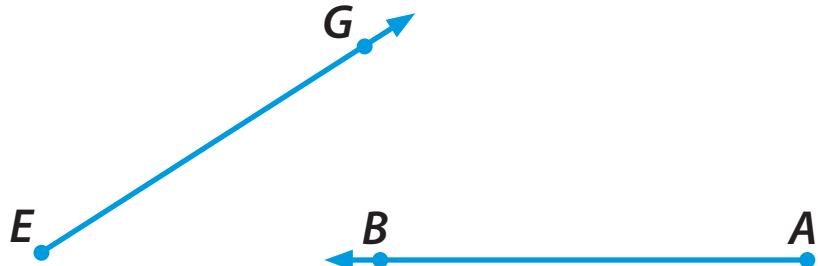
# Line Segments, Rays & Angles



$\overline{MN}$   
 $\overline{NM}$   
 $\overline{PQ}$   
 $\overline{QP}$

**Line Segment**

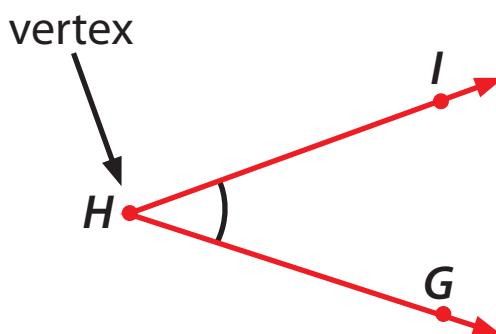
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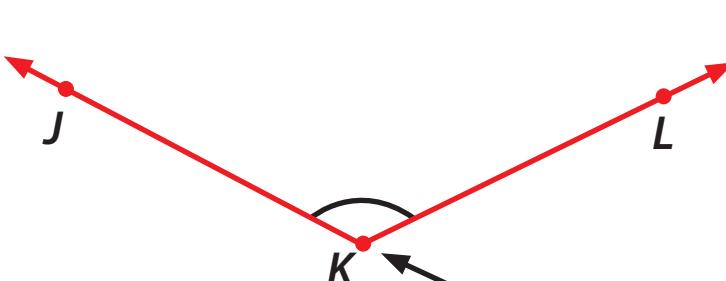
$\overrightarrow{EG}$   
 $\overrightarrow{AB}$

**Ray**

---



$\angle H$   
 $\angle IHG$   
 $\angle GHI$

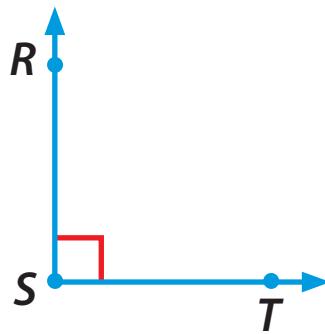


$\angle K$   
 $\angle JKL$   
 $\angle LKJ$

**Angle**

---

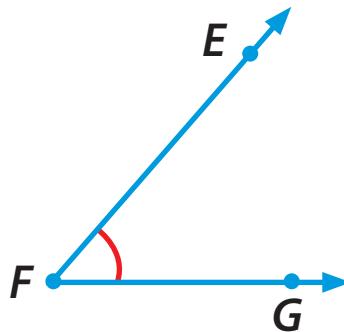
# Angles



$\angle S$   
 $\angle RST$   
 $\angle TSR$

**Right Angle =  $90^\circ$**

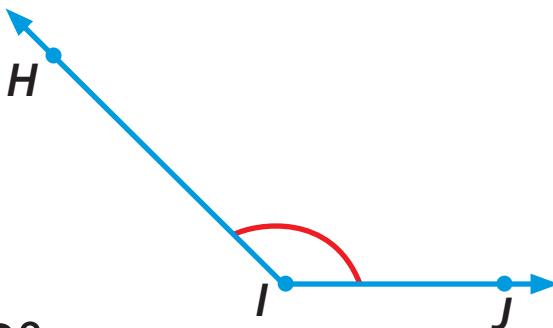
---



$\angle F$   
 $\angle EFG$   
 $\angle GFE$

**Acute Angle  $< 90^\circ$**

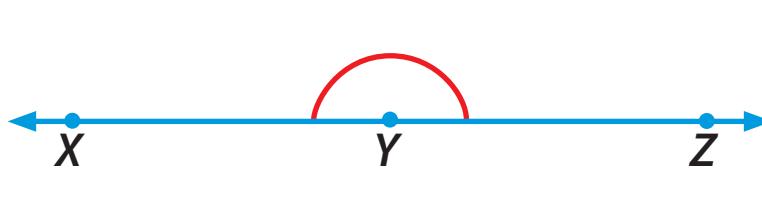
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$\angle I$   
 $\angle HIJ$   
 $\angle JIH$

**Obtuse Angle  $> 90^\circ$**

---



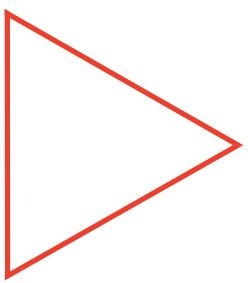
$\angle Y$   
 $\angle XYZ$   
 $\angle ZYX$

**Straight Angle =  $180^\circ$**

---

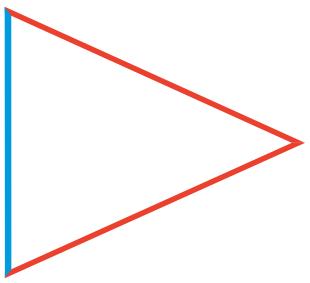
# Triangles

Triangles can be classified by their *angles* or by their *sides*.



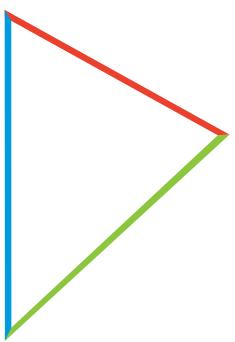
## Equilateral

All sides are the same length.



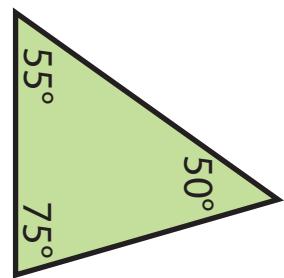
## Isosceles

At least two sides are the same length.



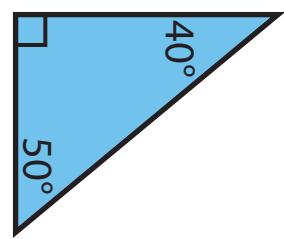
## Scalene

No two sides are the same length.



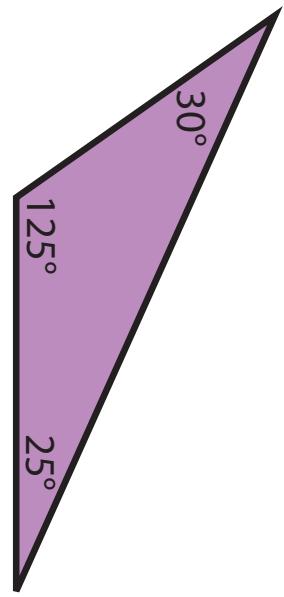
## Acute

All angles are  $< 90^\circ$ .



## Right

One angle =  $90^\circ$ .



## Obtuse

One angle is  $> 90^\circ$ .

# Quadrilaterals

---

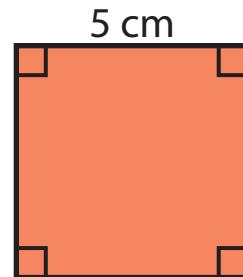
## Rectangle

- opposite sides are parallel
- opposite sides are equal
- 4 right angles



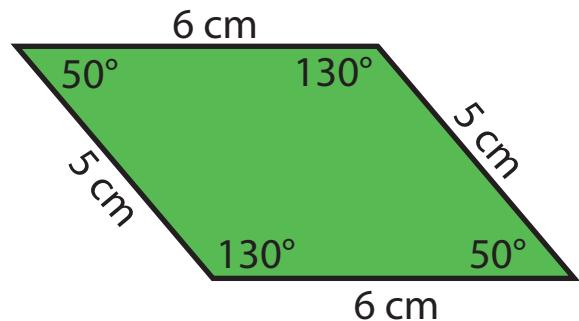
## Square

- opposite sides are parallel
- 4 equal sides
- 4 right angles



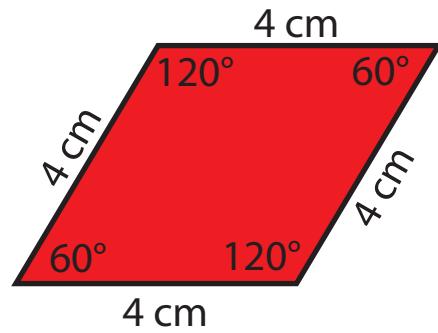
## Parallelogram

- opposite sides are parallel
- opposite sides are equal



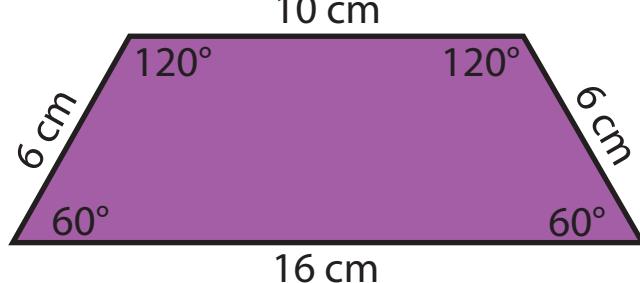
## Rhombus

- opposite sides are parallel
- 4 equal sides



## Trapezoid

- at least one pair of opposite sides is parallel



# Similar, Congruent & Symmetrical

## Similar

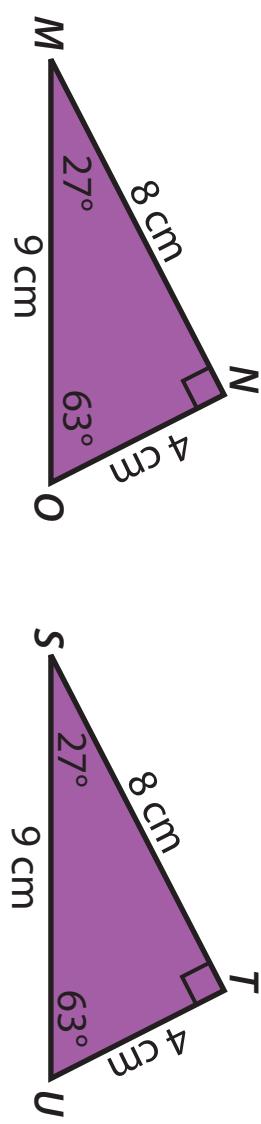
- exactly the same shape
- not necessarily the same size



ABCD is similar to MNOP.  
 $ABCD \sim MNOP$

## Congruent

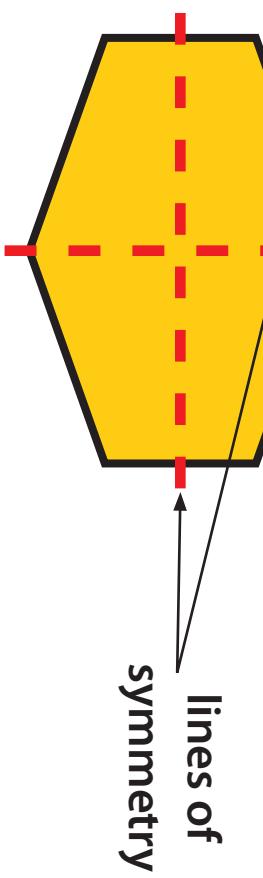
- the same size and shape



$\triangle MNO$  is congruent to  $\triangle STU$ .  
 $\triangle MNO \cong \triangle STU$

## Symmetrical

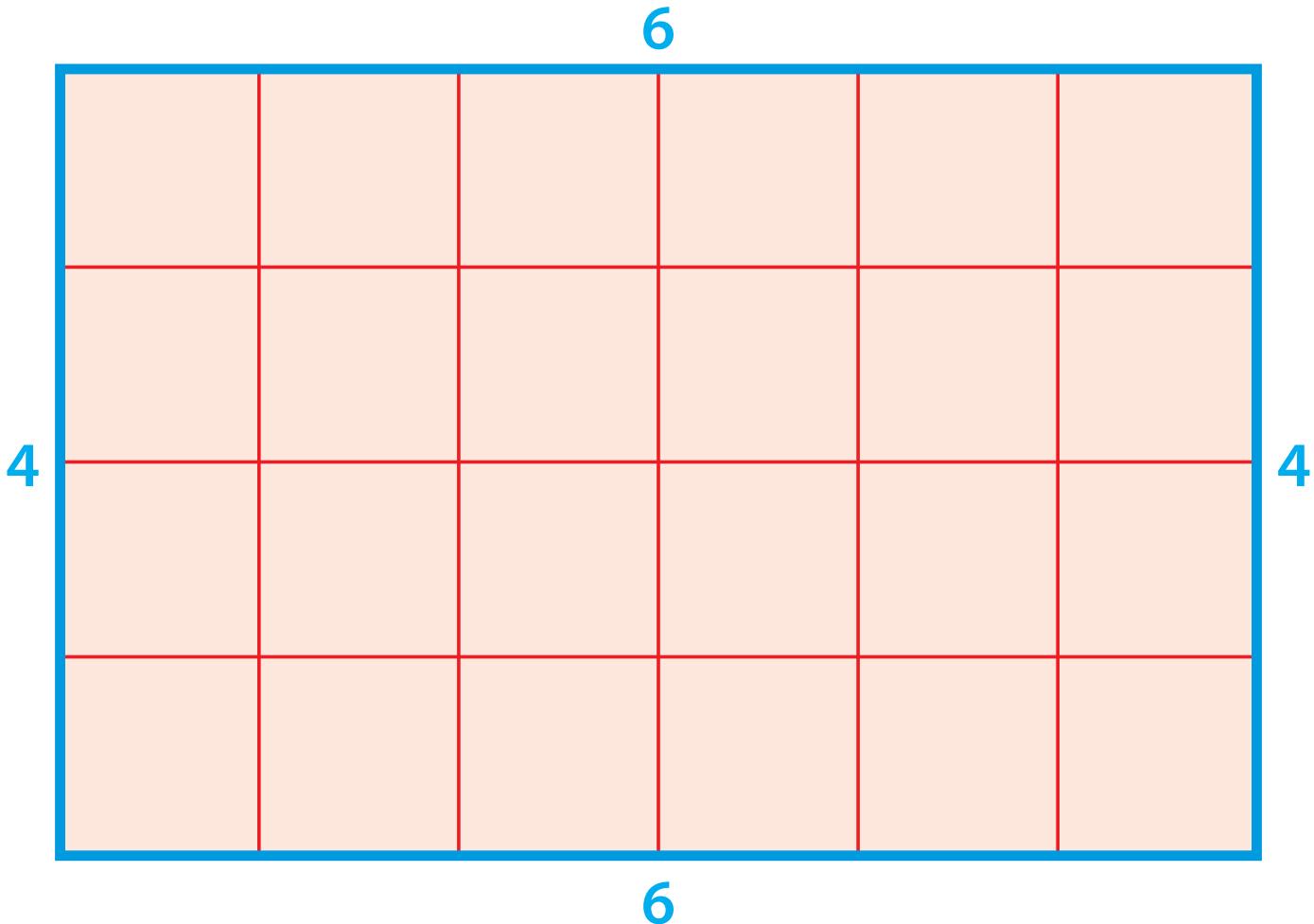
- when folded, both halves match



# Perimeter

**Perimeter** is the distance around a figure.

**Perimeter** = the sum of the lengths of the sides

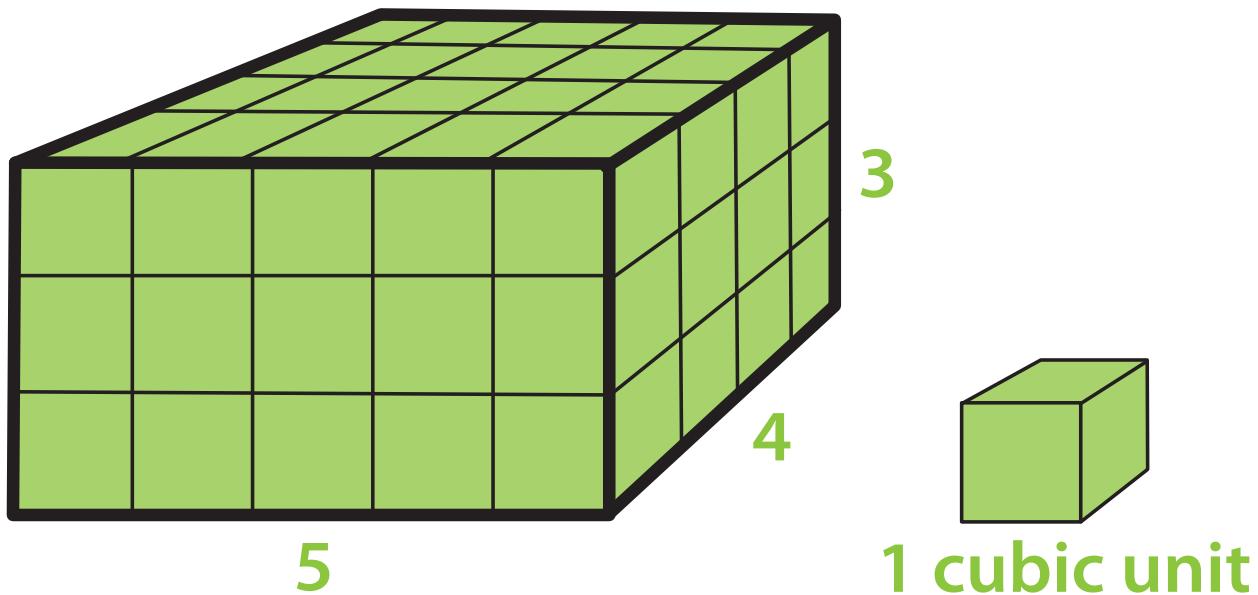


$$6 \text{ units} + 4 \text{ units} + 6 \text{ units} + 4 \text{ units} = 20 \text{ units}$$

# Volume

**Volume** is the space contained in a three-dimensional figure.

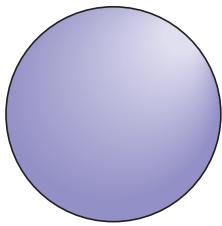
**Volume** is measured in **cubic units**.



$$\text{Volume} = \text{length} \times \text{width} \times \text{height}$$

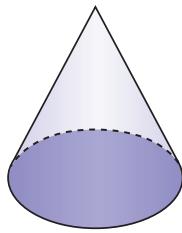
$$\begin{aligned}5 \text{ units} \times 4 \text{ units} \times 3 \text{ units} &= 60 \text{ units}^3 \\&= 60 \text{ cubic units}\end{aligned}$$

# 3-Dimensional Figures



**sphere**

**1** curved surface

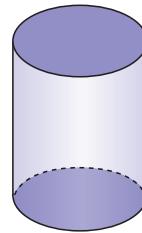


**cone**

**1** curved surface

**1** face

**1** vertex

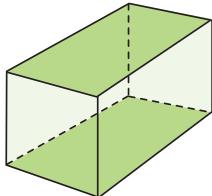


**cylinder**

**1** curved surface

**2** faces

## Prisms

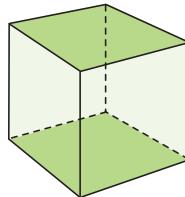


**rectangular  
prism**

**6** faces

**12** edges

**8** vertices

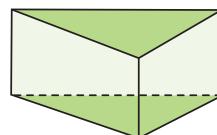


**square prism  
(cube)**

**6** faces

**12** edges

**8** vertices



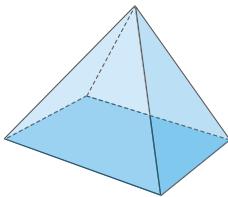
**triangular  
prism**

**5** faces

**9** edges

**6** vertices

## Pyramids

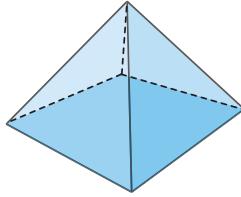


**rectangular  
pyramid**

**5** faces

**8** edges

**5** vertices

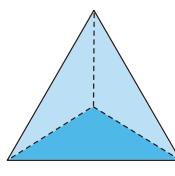


**square  
pyramid**

**5** faces

**8** edges

**5** vertices



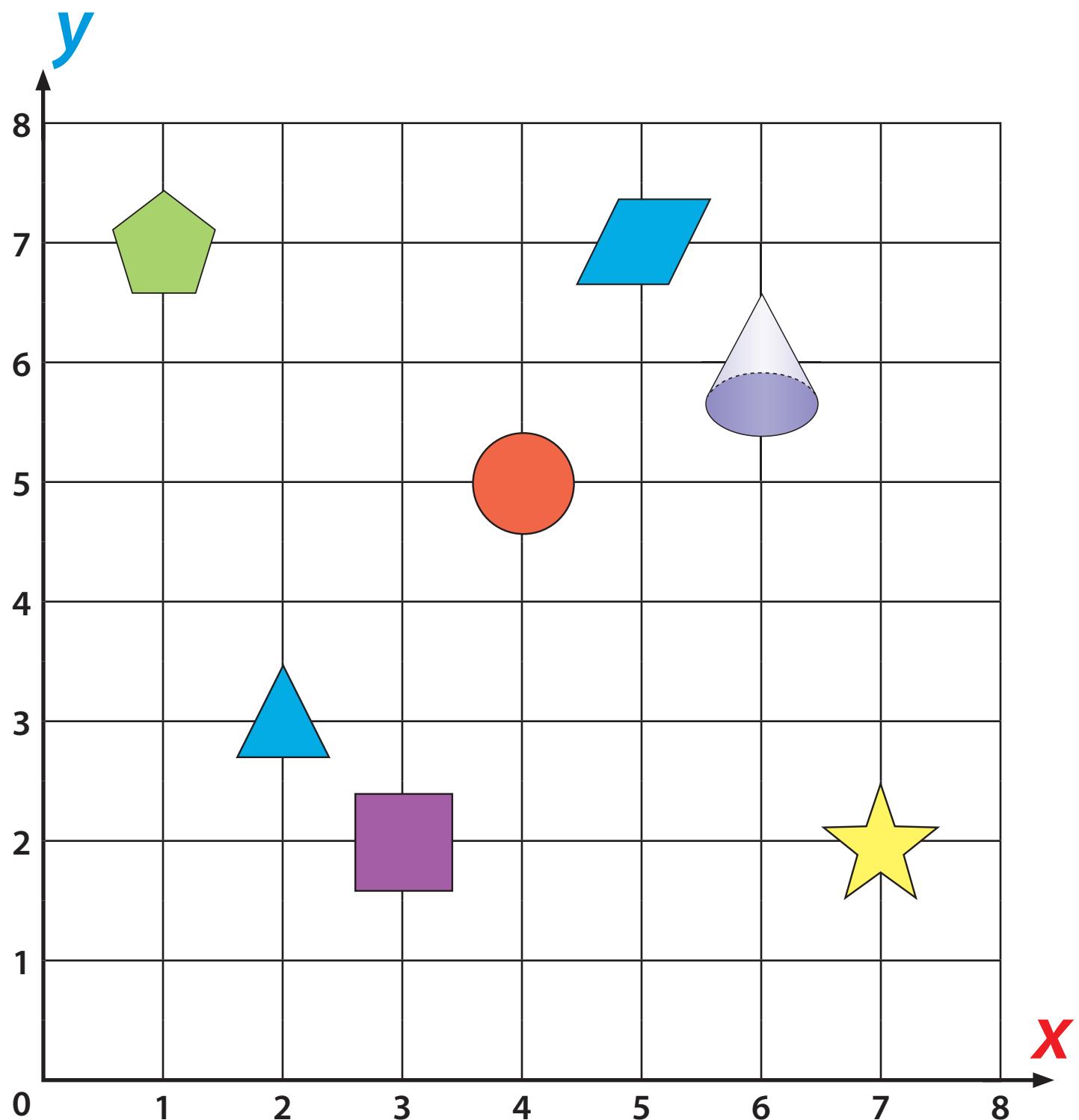
**triangular  
pyramid**

**4** faces

**6** edges

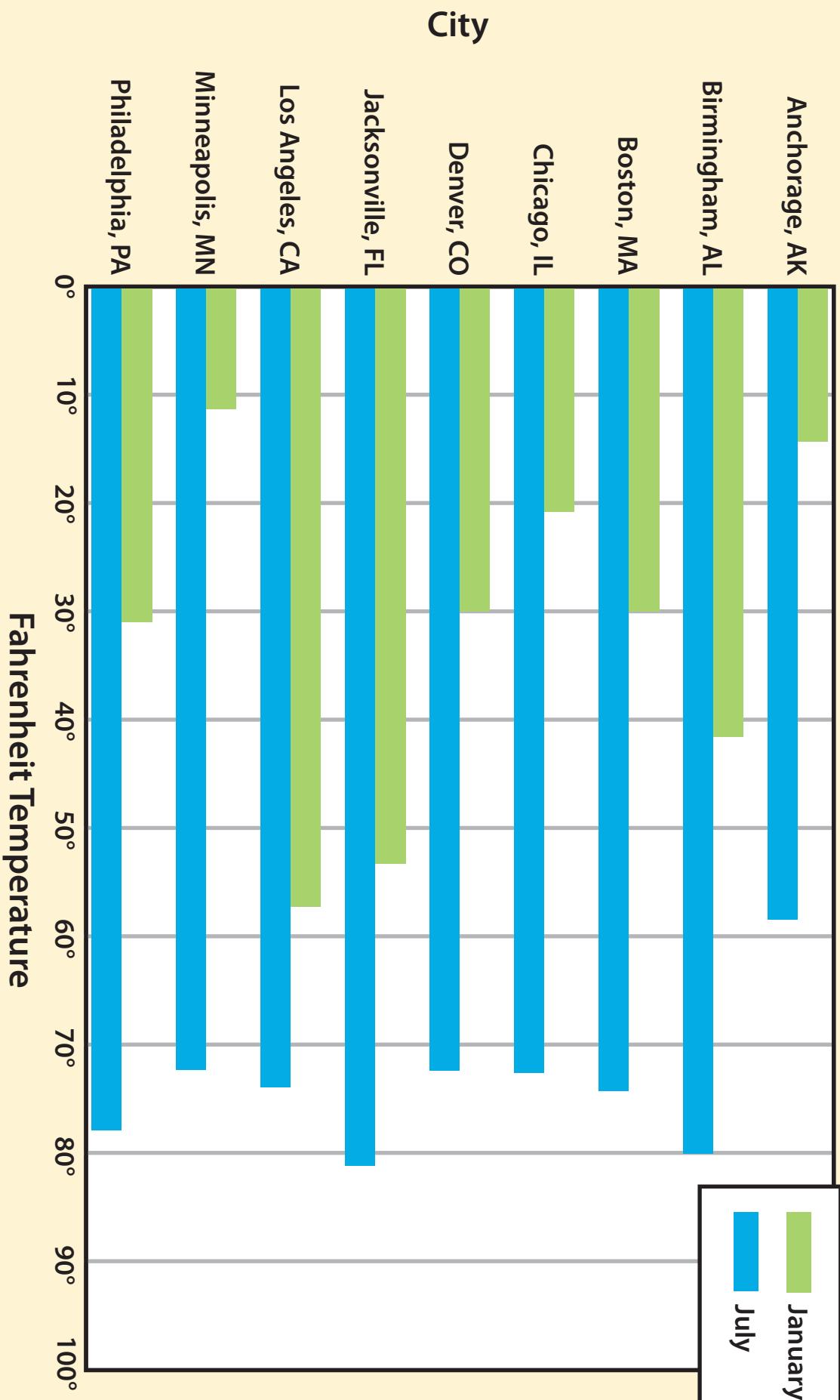
**4** vertices

# Coordinate Plane



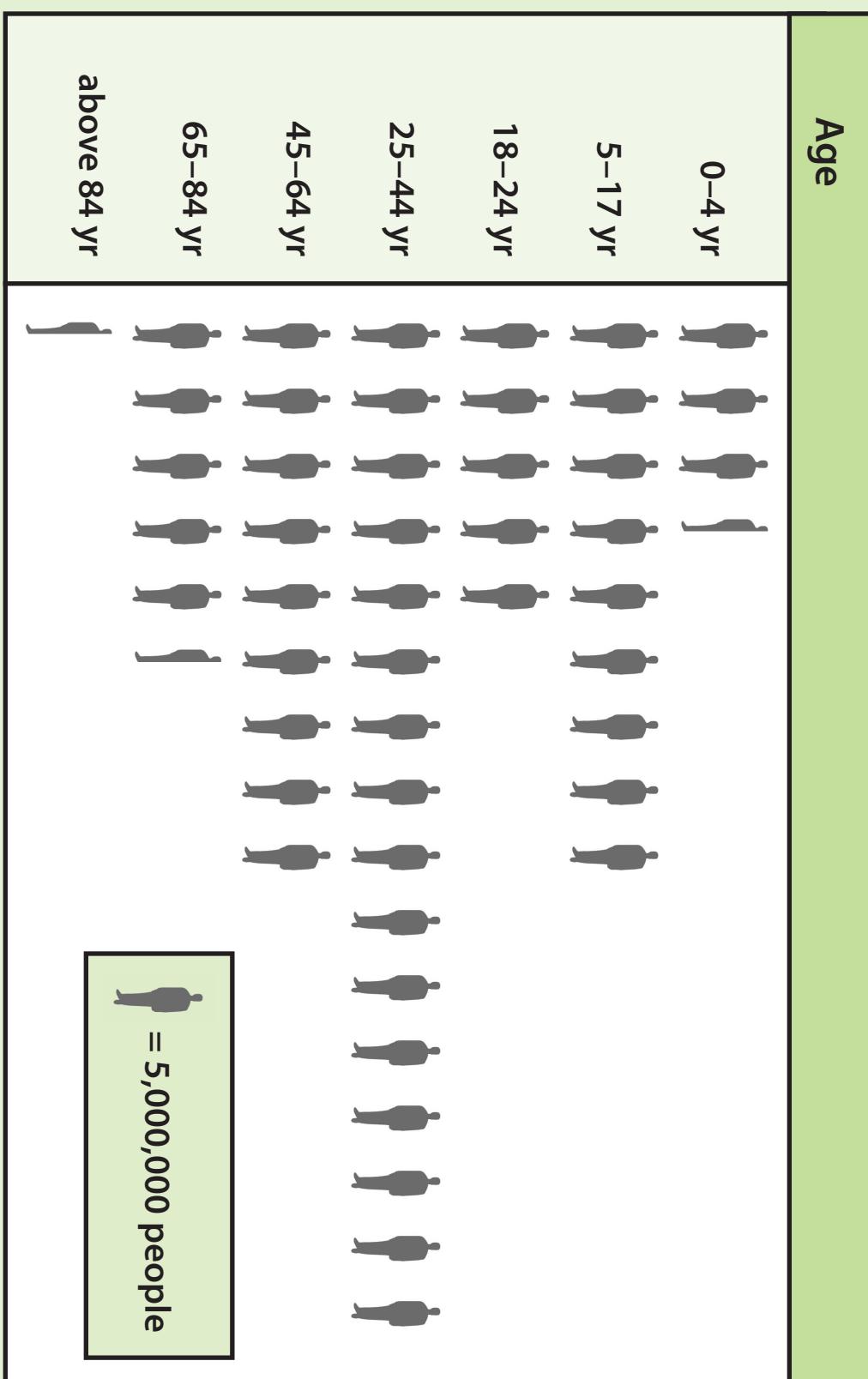
# Double Bar Graph

## Average Temperatures in January and July



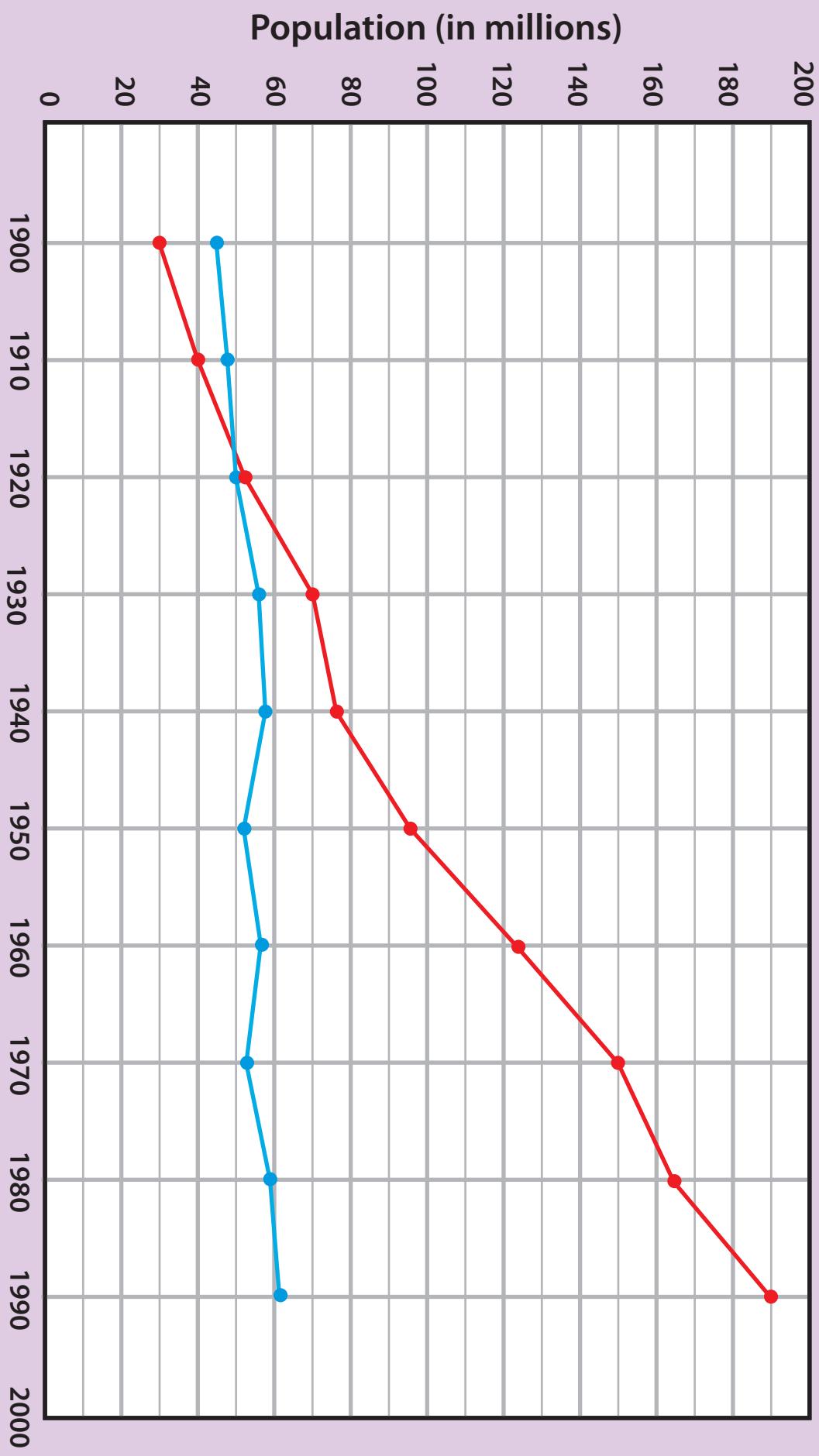
# Pictograph

## U.S. Population: 1990



# Double Line Graph

## U.S. Urban-Rural Population: 1900–1990

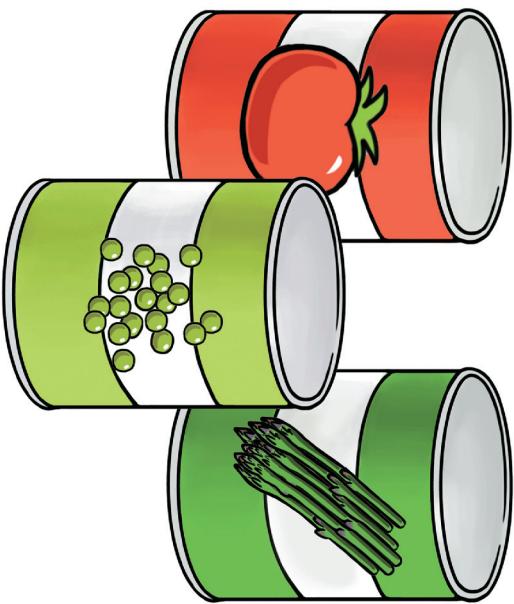


# Stem-and-Leaf Plot

Miss Cooper's sixth-grade class collected canned food items to donate to the local food pantry. The students recorded the number of cans they collected each day.

Cans of Food Collected	
Stem	Leaf
0	4 8
1	2 5 9
2	3 7 7
3	0 1

**Key** | 7 = 27 cans



## Statistics:

Set of data:

4, 8, 12, 15, 19, 23, 27, 27, 30, 31 (10 leaves = 10 pieces of data)

Range:  $31 - 4 = 27$

Median:  $(19 + 23) \div 2 = 21$

Mode: 27

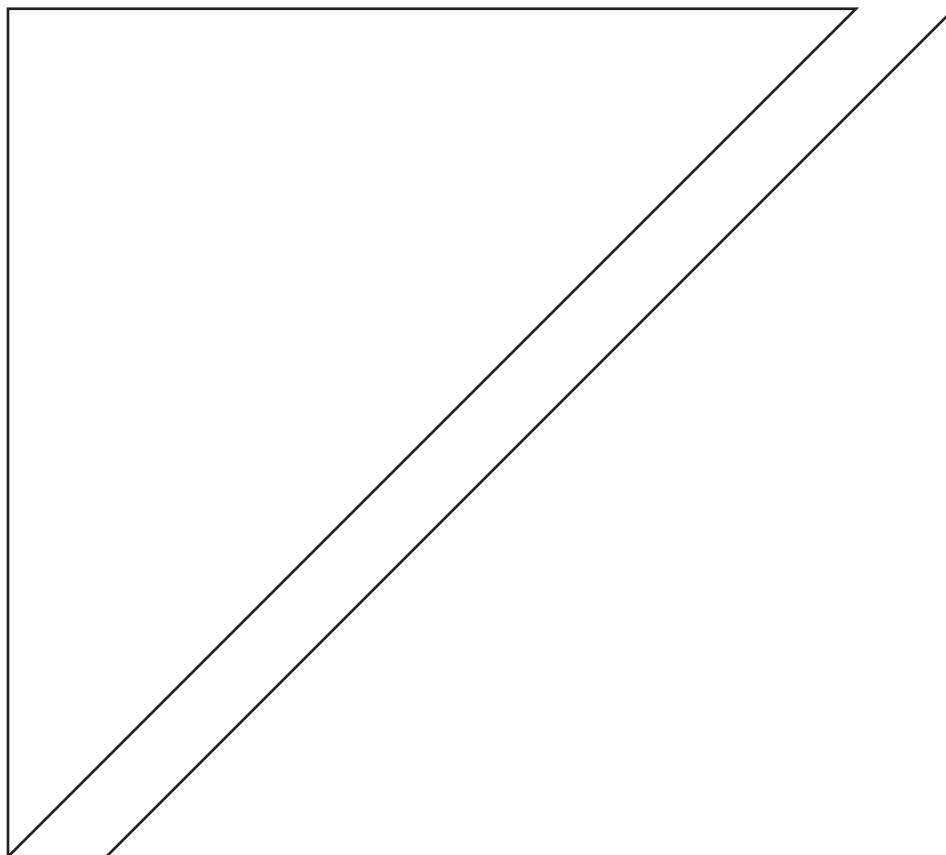
Mean:  $(4 + 8 + 12 + 15 + 19 + 23 + 27 + 27 + 30 + 31) \div 10 = 196 \div 10 = 19.6$  cans per day

## **Introduction**

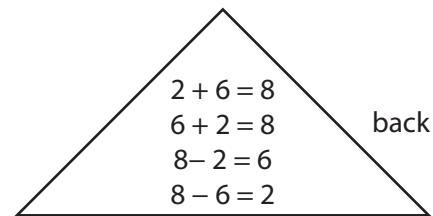
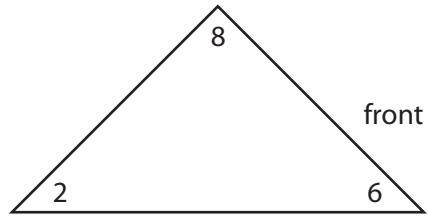
When teaching a large group of students, use the manipulatives in the *MATH 4–6 Teacher Manipulatives Packet*. When teaching one student or a small group of students, use the manipulatives in the *MATH 4–6 Student Manipulatives Packet*. Since several manipulatives that you will need are not found in the Student Manipulatives Packet, those manipulatives are found in this section of the CD.

## **Fact Family Flashcard Pattern**

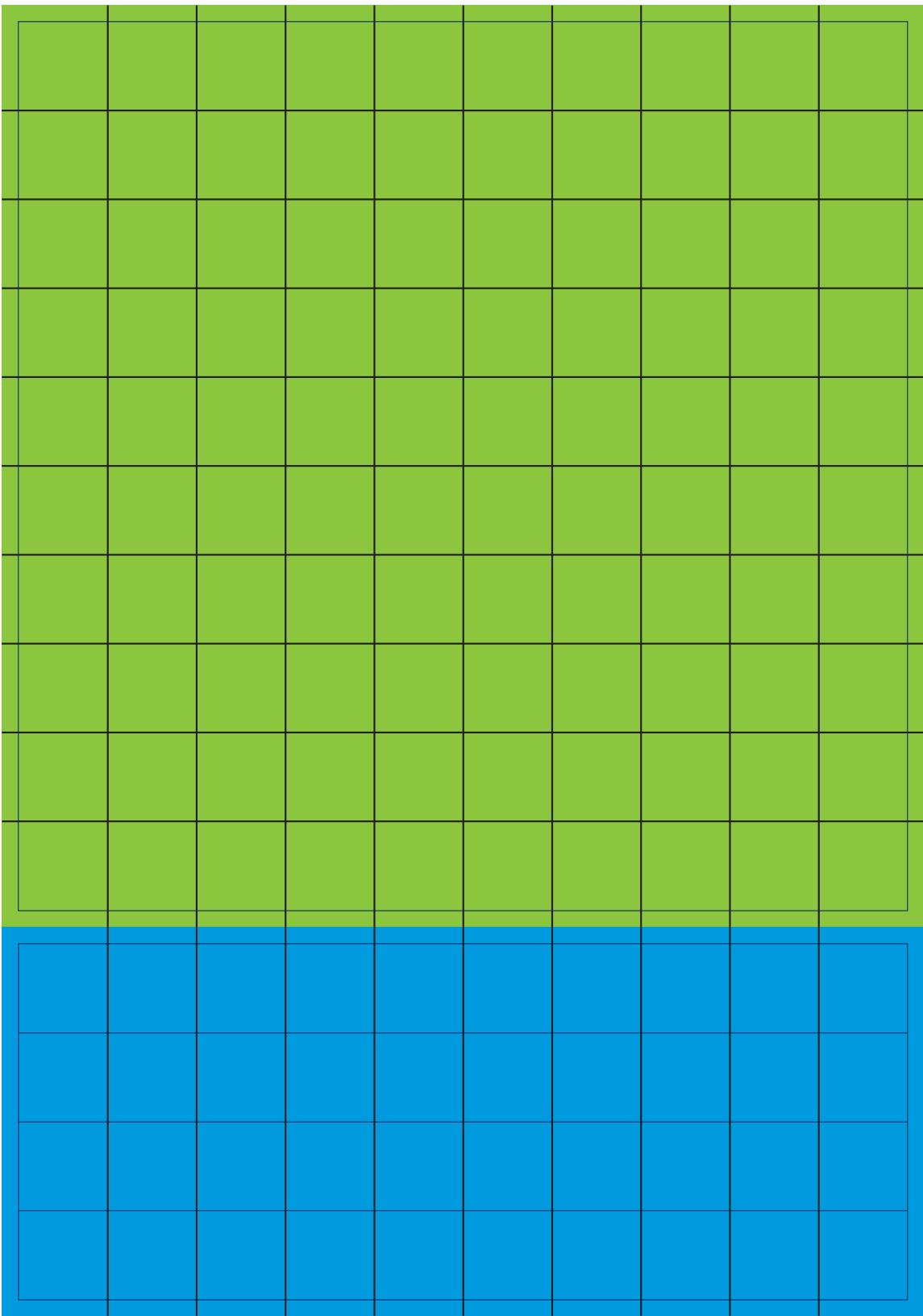
To make Fact Family Flashcards, copy these patterns onto card stock. You will need a triangle for each fact family. A list of the math facts may be found on the *MATH 6 Teacher's Toolkit CD*. Write the fact family numbers on the corners of the triangle flashcard. The largest number is written at the top of the triangle, and the smallest number is written on the left corner of the triangle. You may want to copy the family facts onto the back of the card.



**Example**



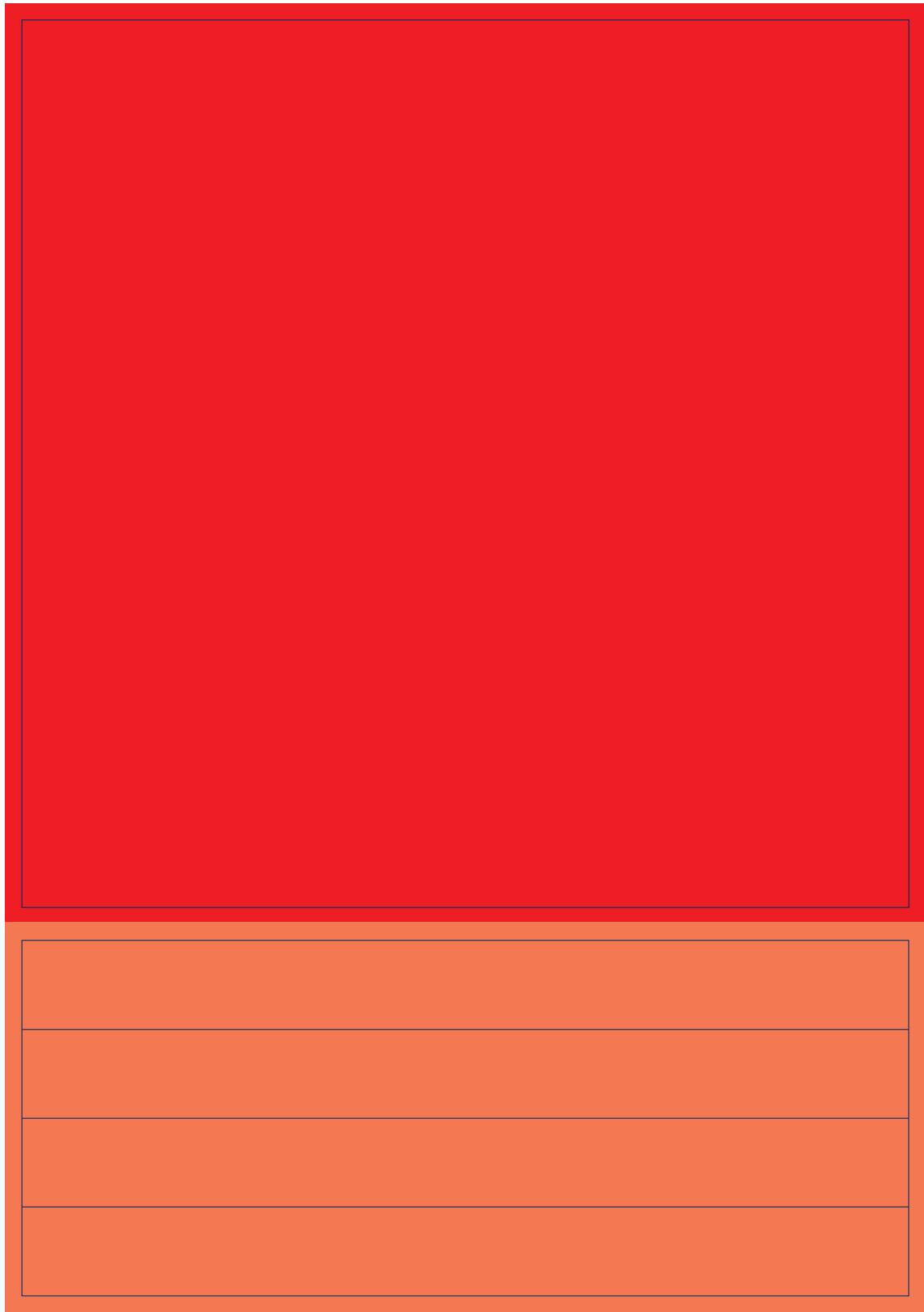
**Hundred Square**



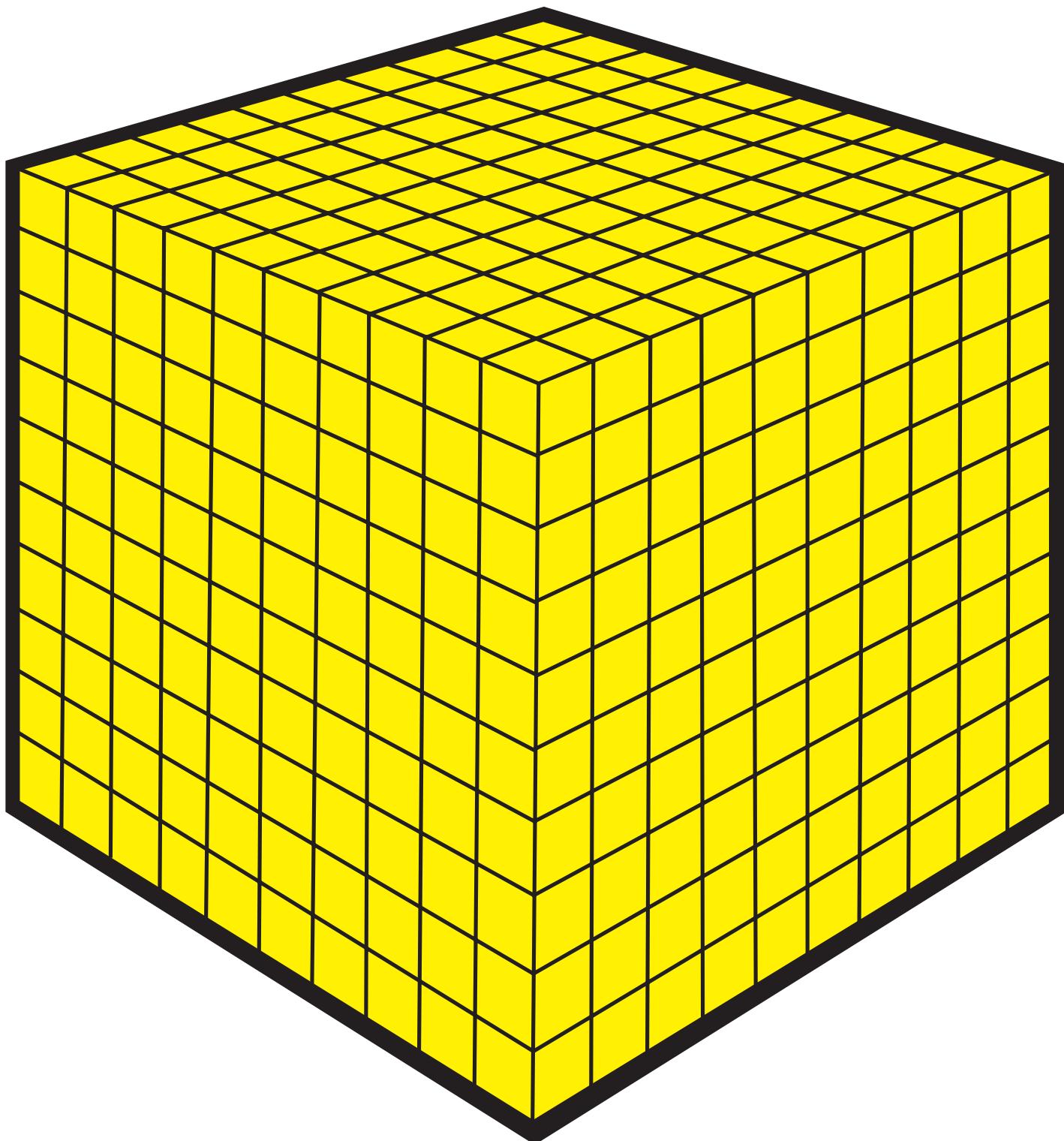
**Ten Strips**

**Red One**

**Tenths**



## One Thousand Cube

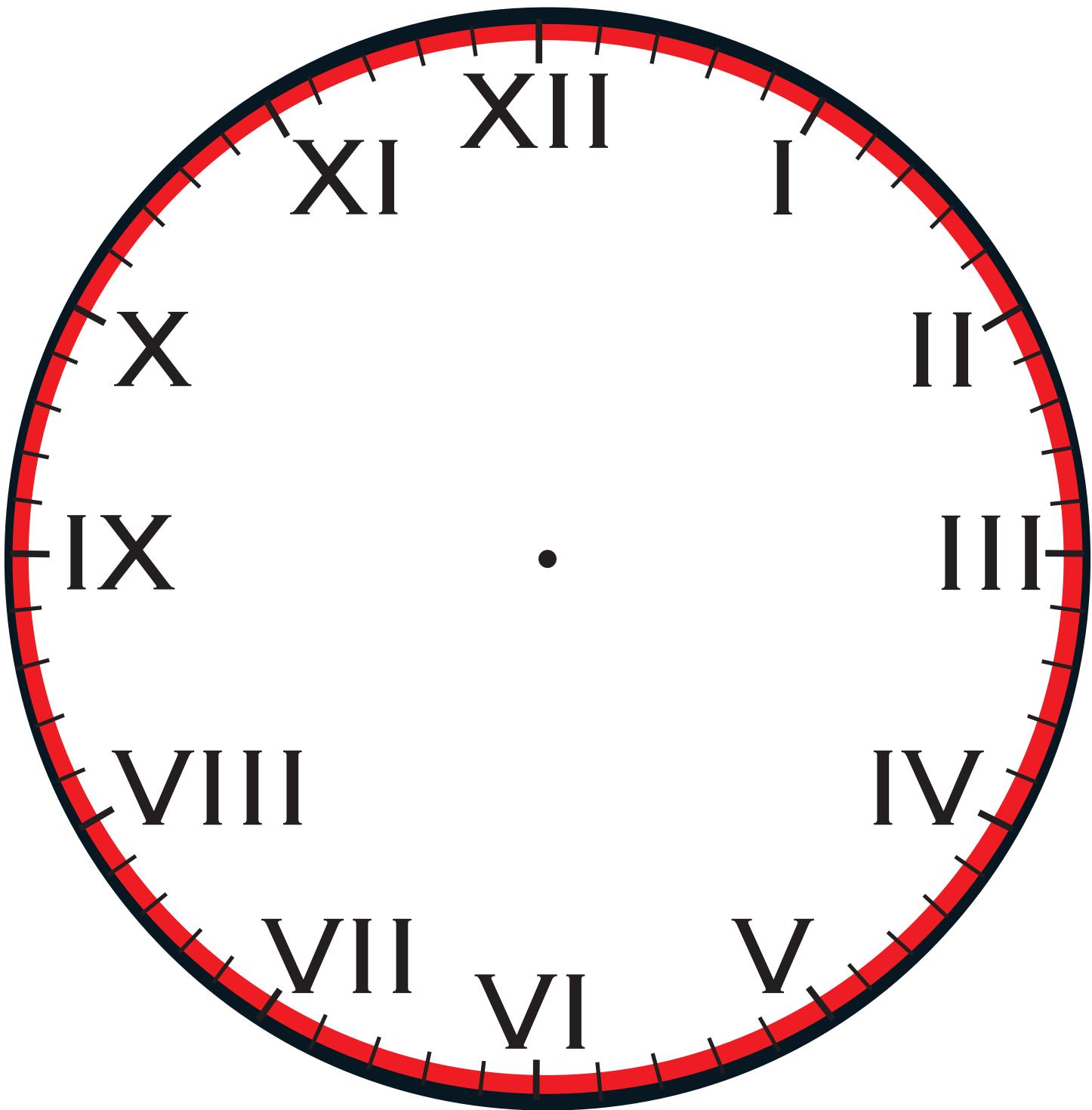


**212°F**

**Boiling  
Point**

**100°C**

# Roman Numeral Clock



Cut here.



