# LETTER HOME

## Big Numbers

Dear Family Member,

Big numbers occur every day in real life. Newspapers often report government spending in the billions. The population of the United States is in the hundreds of millions while that of China is well over a billion. The activities in this unit will help students better understand the size of numbers and how to work with them.

Two major themes of this unit are number sense and computation: getting an idea of how large these numbers are and learning how to solve problems involving big numbers. Students use place value charts, number lines, and number sentences to represent large numbers. They review ways to multiply numbers that are multiples of ten and rounding to estimate answers to problems involving multiplication of large numbers.

Students also explore using exponents and what it means to raise a number to a power.

Students estimate how many pennies they would have to stack up to reach the moon.

You can help your child learn more about big numbers with the following activities:

**Look for Big Numbers.** Read large numbers you may come across in the news or in your daily life.

**Compare and Order Big Numbers.** Compare large numbers you find. Ask your child to identify either the largest or smallest number. Make a list of numbers you find and put them in order from smallest to largest.

**Estimate Large Numbers.** Practice estimating large numbers, such as the number of cans of soda that can fit in the back of a delivery truck.

**Play the Spin and Read Big Numbers Game.** Ask your child to play the *Spin and Read Big Numbers Game*. In this game, your child will practice reading and writing big numbers. At the end of four rounds, players add their numbers. The player with the largest sum wins the game.

## Math Facts and Mental Math

This unit continues the systematic review and assessment of the multiplication and division facts.

**Multiplication Facts.** Students review the multiplication facts for the 2s and 3s to maintain and increase fluency and to learn to apply multiplication strategies to larger numbers.

You can help your child review these facts using the flash cards that are sent home or by making a set of flash cards from index cards or scrap paper. Study facts in small groups each night and focus on only those facts your child needs to learn. As your child goes through the flash cards, put the cards in three stacks: Facts I Know Quickly, Facts I Can Figure Out, and Facts I Need to Learn.

For the Facts I Need to Learn, work on strategies for figuring them out. If there are many multiplication facts that your child still needs to learn, divide them into smaller groups of facts. Choose groups of facts that lend themselves to the use of the same strategy and focus on one group at a time.

For Facts I Can Figure Out, use the flash cards to practice the facts for fluency.

For Facts I Know Quickly, help your child use mental math strategies to multiply 10s and 100s. You can also help your child extend and deepen their understanding by asking him or her to choose a multiplication fact that was difficult to learn and describe the strategies used for learning the fact.

**Division Facts.** Students review the division facts for 2s and 3s to maintain and increase fluency and to learn to apply multiplication and division strategies to larger numbers.

You can help your child review the division facts using the flash cards that are sent home or by making a set of flash cards form index cards or scrap paper. Study facts in small groups each night. As your child goes through the flash cards, put the cards in three stacks: Facts I Know Quickly, Facts I Can Figure Out, and Facts I Need to Learn.

For the Facts I Need to Learn, work on strategies for figuring them out. Good strategies include:

Skip counting. To solve $18 \div 2$, skip count: 2, 4, 6, 8, 10, 12, 14, 16, 18 and count the skips. It took 9 skips to land on 18. $18 \div 2 = 9$.
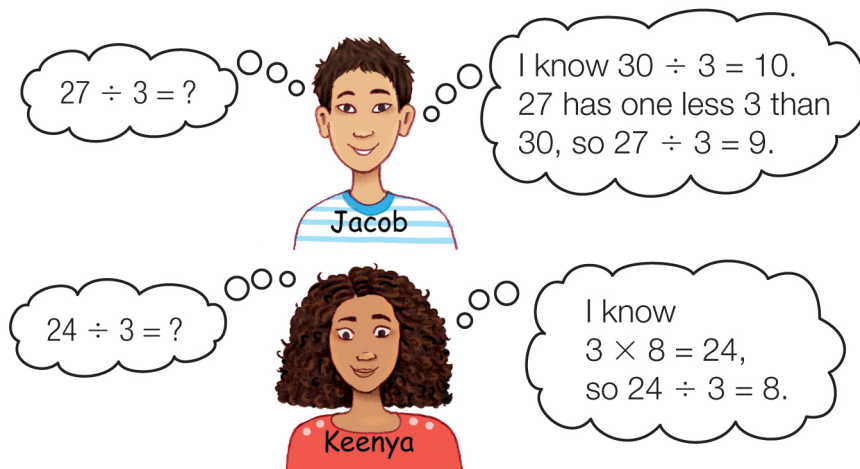
Reasoning from known facts. To solve $24 \div 3$: $12 \div 3 = 4$, so $24 \div 3$ is double 4. $24 \div 3 = 8$.

Turn-around facts. $27 \div 3 = 9$ because I know $9 \times 3 = 27$.

For Facts I Can Figure Out, use the flash cards to practice the facts for fluency.

For Facts I Know Quickly, help your child use mental math strategies to divide 10s and 100s:
$400 \div 2 = 200$; $900 \div 3 = 30$; $16,000 \div 200 = 80$



$27 \div 3 = ?$

I know $30 \div 3 = 10$. 27 has one less 3 than 30, so $27 \div 3 = 9$.

Jacob

$24 \div 3 = ?$

I know $3 \times 8 = 24$, so $24 \div 3 = 8$.

Keenya

Thank you for taking time to talk with your child about what he or she is doing in math.

Sincerely,

# Unit 3: Home Practice

**Part 1** Triangle Flash Cards: 2s and 3s

Study for the quiz on the multiplication and division facts for the 2s and 3s. Take home your Triangle Flash Cards: 2s and 3s and your list of facts you need to study.

To use the flash cards, ask a family member to choose one flash card at a time. To quiz you on a multiplication fact, he or she should cover the corner containing the highest number, the shaded number. This number will be the answer to a multiplication fact. Multiply the two uncovered numbers.

$2 \times 4 = ?$
$4 \times 2 = ?$
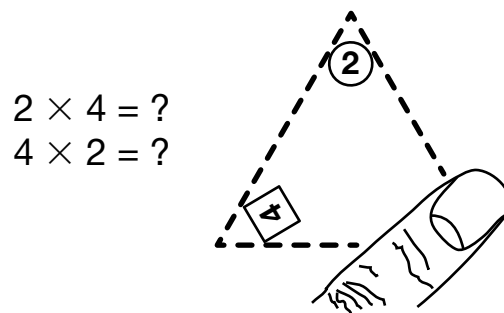
To quiz you on a division fact, your family member can cover the number in the square. Solve a division fact with the two uncovered numbers. Ask your family member to go through the cards again, this time covering the number in the circle.

$8 \div 2 = ?$     $8 \div 4 = ?$
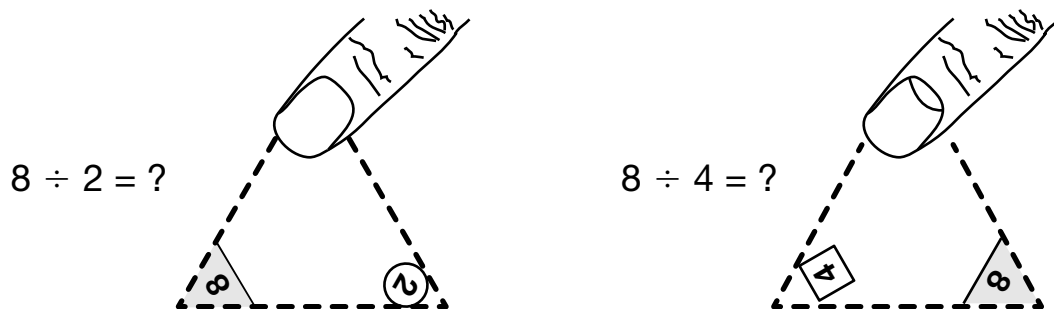
Ask your family member to mix up the multiplication and division facts. He or she should sometimes cover the highest number, sometimes cover the circled number, and sometimes cover the number in the square.

Remember to study only those facts you cannot answer correctly and quickly. Your teacher will tell you when the quiz on the 2s and 3s will be given.
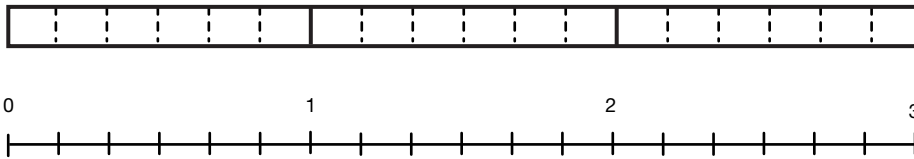
## Part 2 — Representing Fractions

**Show the fraction by shading the circles or rectangle. Then show where it is on the number line. Label the point. The first problem is an example.**

**Example:**

$1\frac{1}{4}$
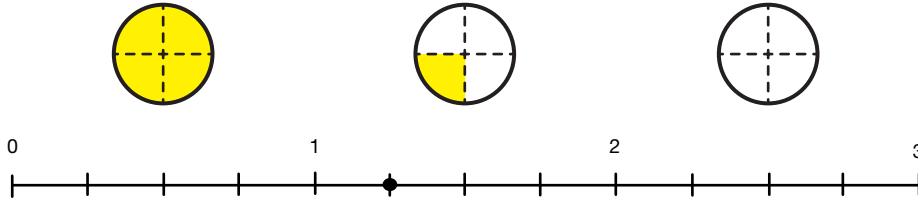


**1.** $\frac{8}{6}$



**2.** $2\frac{5}{8}$
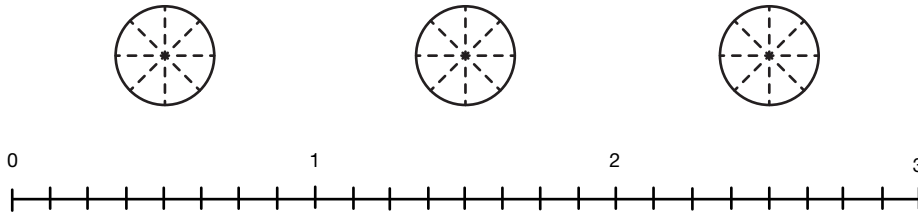


**3.** $\frac{5}{3}$
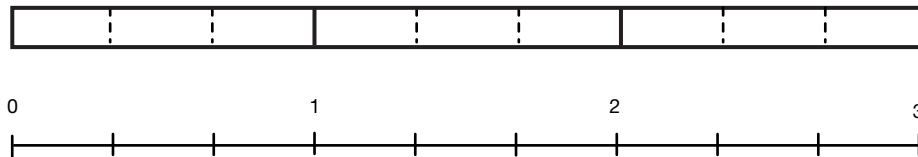
**Part 3** Mixed Numbers

**Solve the following problems.**

1. Change the following mixed numbers to fractions.

   **A.** $7\frac{1}{3}$

   **B.** $3\frac{2}{5}$

   **C.** $11\frac{1}{8}$

2. Change the following fractions to mixed numbers.

   **A.** $\frac{14}{3}$

   **B.** $\frac{65}{7}$

   **C.** $\frac{103}{10}$

**Part 4** Rounding Numbers

**Draw (or think of) number lines to help you with Questions 1–2.**

1. Round the following numbers to the nearest thousand.

   **A.** 2138

   **B.** 5894

   **C.** 988

   **D.** 14,867

   **E.** 28,159

   **F.** 59,876

2. Round the following numbers to the nearest ten thousand.

   **A.** 12,864

   **B.** 28,157

   **C.** 59,874

   **D.** 109,968

   **E.** 190,957

   **F.** 216,436

## **Part 5** Numbers in the Hundreds and Thousands

1. Number the line below from 0 to 10,000. Skip count by 1000s.

```
|——|——|——|——|——|——|——|——|——|——|
0
```
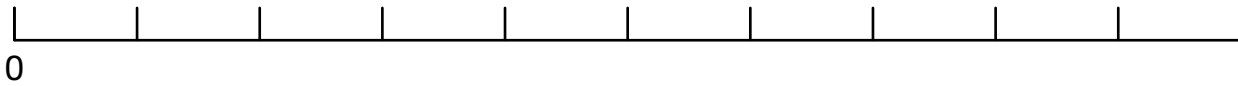
Read each of the facts about the United States. Then make a tick mark on the number line to show where each number falls on the line. Label the tick mark with the appropriate letter.

**A.** The highest bridge in the United States—1053 feet—is in Colorado. It is the suspension bridge over the Royal Gorge of the Arkansas River.

**B.** Mount Katahdin is the highest spot in Maine—5267 feet. This mountain is the first place in the entire United States to get hit with sunlight when the sun rises in the morning.

**C.** The world's tallest tree is 378 feet tall. It is a redwood tree in California. It is almost as tall as a 40-story building.

2. Without actually finding exact answers to these problems, give the number of digits in the answer. Explain how you know.

**A.** $512 + 369$

**B.** $843 - 776$

**C.** $2190 + 8756$

**D.** $15 \times 65$

**E.** $4589 - 637$

## Part 6  Multiplication Practice

1. **A.** $200 \times 60$    **B.** $300 \times 4 =$    **C.** $3000 \times 50 =$    **D.** $3000 \times 800 =$

**E.** $5000 \times 20 =$   **F.** $30 \times 600 =$   **G.** $900 \times 300 =$   **H.** $20{,}000 \times 5{,}000 =$

2. Solve the following problems. Choose an appropriate method: mental math, paper-and-pencil, or a calculator. Hint: Sometimes drawing a picture of a problem can help you solve it.

   **A.** Jessie's mother is shopping in a sports store. Socks are on sale for $2.95 for 3 pairs. If she has $20, how many pairs of socks can she buy?

   **B.** Lin's father purchased a brand new car. His car payments are $500 monthly for 4 years. After 4 years, how much will he have paid for his car?

   **C.** Last year Mr. Moreno bought two cans of soda from the machine at school each day. This year he decided to drink water instead. If one can of soda costs $1.50, will Mr. Moreno save more or less than $600 in one school year? (A school year has about 180 school days.)

## **Part 7** Number Sentences with Fractions

**1.** Write $<$, $>$, or $=$ to make each number sentence true.

**A.** $\frac{9}{2}$ ◯ $\frac{9}{5}$

**B.** $\frac{5}{5}$ ◯ $\frac{10}{10}$

**C.** $\frac{7}{12}$ ◯ $\frac{7}{10}$

**D.** $\frac{5}{3}$ ◯ $\frac{9}{6}$

**E.** $\frac{9}{2}$ ◯ $\frac{9}{5}$ and $\frac{5}{8}$ ◯ $\frac{1}{2}$ so $\frac{3}{6}$ ◯ $\frac{5}{8}$

**2.** Find the fraction to make each number sentence true.

**A.** $\frac{6}{24} = \frac{1}{4} = \frac{\square}{8}$

**B.** $\frac{1}{3} = \frac{5}{15} = \frac{\square}{24}$

**C.** $\frac{3}{4} = \frac{\square}{12} = \frac{12}{16}$

**D.** $\frac{9}{15} = \frac{12}{20} = \frac{3}{\square}$

**3.** Estimate to decide if each sum or difference is less than or greater than one. Then solve each problem.

Circle one

**A.** $\frac{1}{4} + \frac{1}{2} = \square$     Less than one     Greater than one

**B.** $\frac{5}{3} - \frac{1}{3} = \square$     Less than one     Greater than one

**C.** $\frac{3}{4} + \frac{4}{8} = \square$     Less than one     Greater than one

**D.** $\frac{14}{8} - \frac{3}{6} = \square$     Less than one     Greater than one

**E.** $\frac{3}{4} - \frac{2}{6} = \square$     Less than one     Greater than one

**F.** Show or tell how you decided if the estimated answer was less than or greater than one for Question C.

# Triangle Flash Cards: 2s

- Work with a partner. Each partner cuts out the flash cards.
- Your partner chooses one card at a time and covers one corner.
- To quiz you on a multiplication fact, your partner covers the shaded number. Multiply the two uncovered numbers.
- To quiz you on a division fact, your partner covers the number in the square or the number in the circle. Solve a division fact with the two uncovered numbers.
- Divide the used cards into three piles: those you know and can answer quickly, those you can figure out, and those you need to learn.
- Practice the last two piles again. Then make a list of the facts you need to practice at home.
- Repeat the directions for your partner.
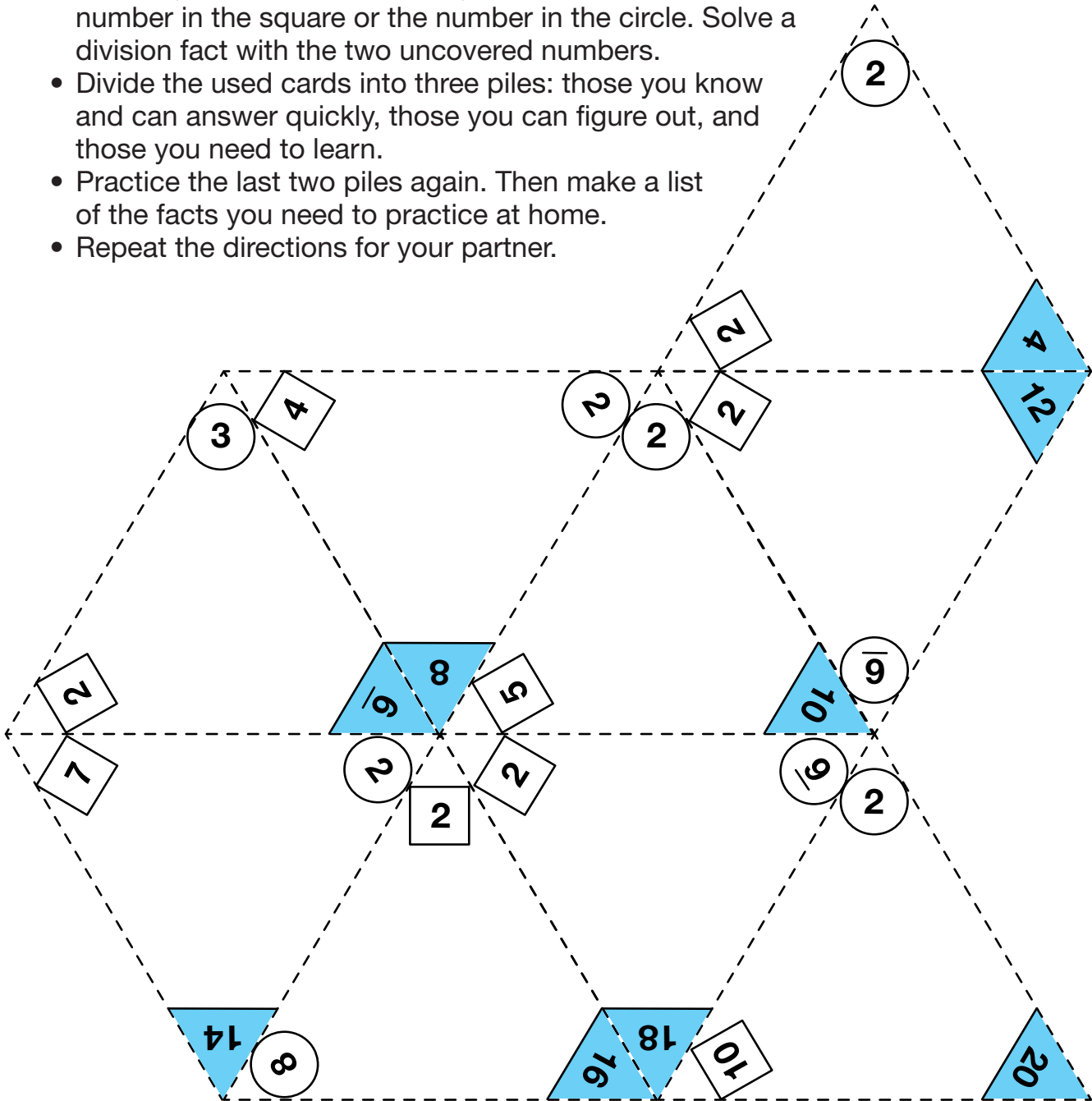
# Triangle Flash Cards: 3s

- Work with a partner. Each partner cuts out the flash cards.
- Your partner chooses one card at a time and covers one corner.
- To quiz you on a multiplication fact, your partner covers the shaded number. Multiply the two uncovered numbers.
- To quiz you on a division fact, your partner covers the number in the square or the number in the circle. Solve a division fact with the two uncovered numbers.
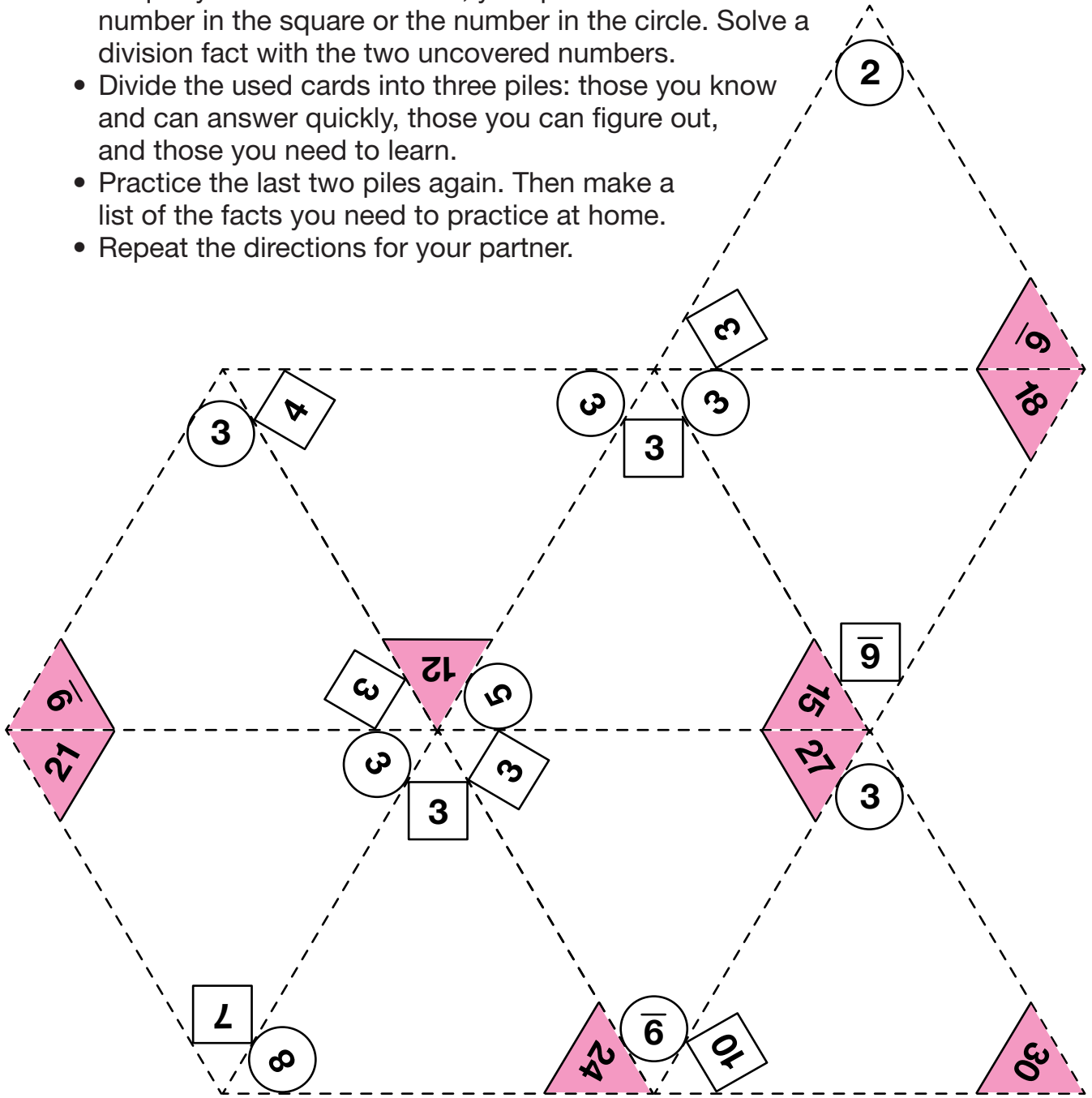- Divide the used cards into three piles: those you know and can answer quickly, those you can figure out, and those you need to learn.
- Practice the last two piles again. Then make a list of the facts you need to practice at home.
- Repeat the directions for your partner.

**Show Big Numbers**
**Check-In: Questions 10–14**
**Feedback Box**

| | Expect-ation | Check In | Comments |
|---|---|---|---|
| Read and write large numbers. [Q# 10–12] | E1 | | |
| Compare and order large numbers. [Q# 10] | E2 | | |
| Round large numbers. [Q# 13–14] | E3 | | |

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**Show Big Numbers**
**Check-In: Questions 10–14**
**Feedback Box**

| | Expect-ation | Check In | Comments |
|---|---|---|---|
| Read and write large numbers. [Q# 10–12] | E1 | | |
| Compare and order large numbers. [Q# 10] | E2 | | |
| Round large numbers. [Q# 13–14] | E3 | | |

# Digit Cards 0–9

| 5 | 0 |
|---|---|
| 6 | 1 |
| 7 | 2 |
| 8 | 3 |
| 9 | 4 |
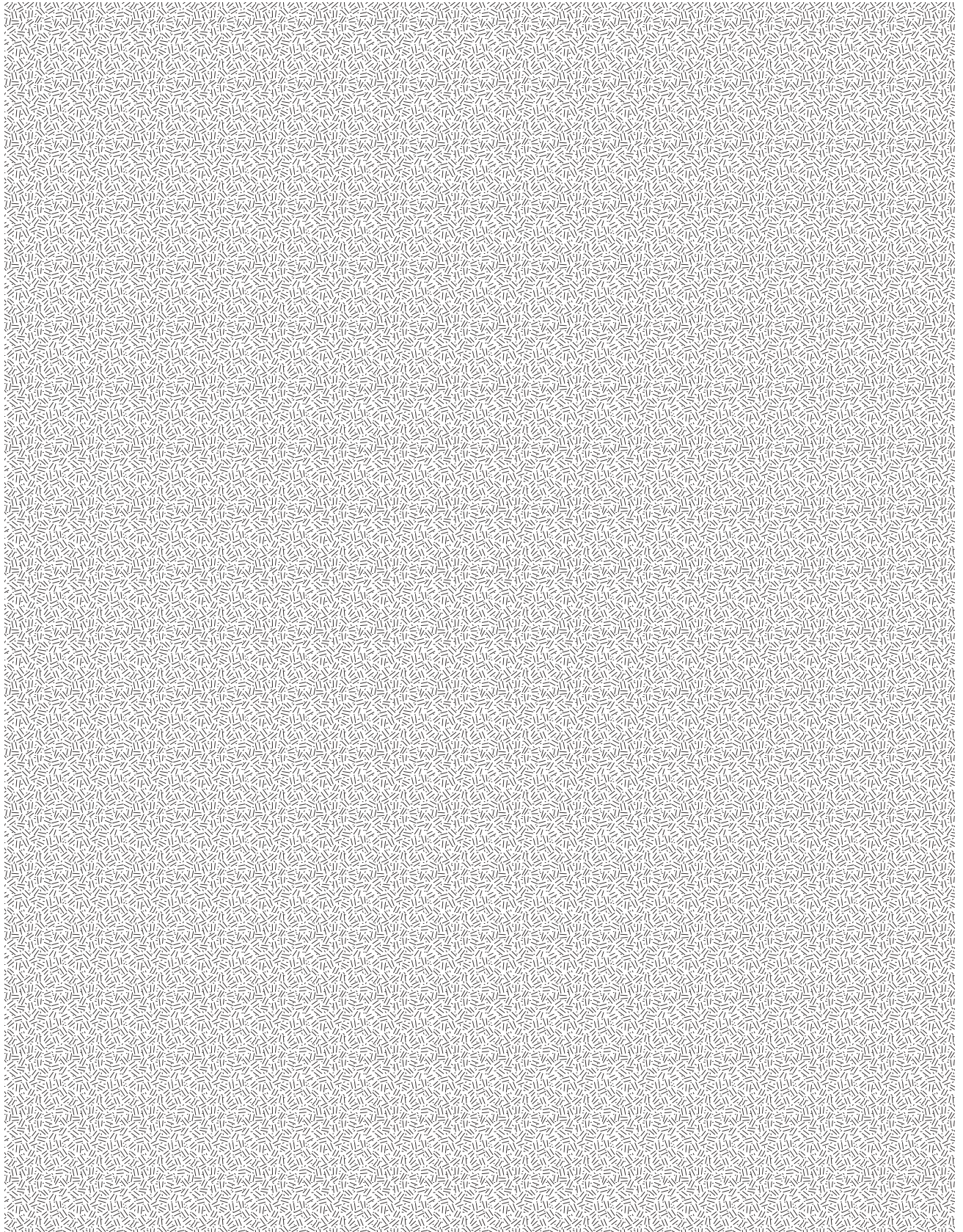
# Many Ways to Write Big Numbers

| Standard Form | Expanded Form | Word Form |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

# Math Practices

**Solving a problem:**

1. **Know the problem.** I read the problem carefully. I know the questions to answer and what information is important.

2. **Find a strategy.** I choose good tools and an efficient strategy for solving the problem.

3. **Check for reasonableness.** I look back at my solution to see if my answer makes sense. If it does not, I try again.

4. **Check my calculations.** If I make mistakes, I correct them.

**Showing or telling how I solve a problem:**

5. **Show my work.** I show or tell how I arrived at my answer so someone else can understand my thinking.

6. **Use labels.** I use labels to show what numbers mean.

Name _____   Date _____

# Problem Solving with U.S. Population Numbers

**1.** The population of the United States as reported in 1972 was 209,896,021 people and in 2012 reported as 313,914,040 people. About how many more people were there in the United States in 2012 than in 1972? Show or tell how you solved this problem.

**2.** If the U.S. continues to grow at this rate, estimate the year in which the population goes over four hundred million. Explain how you decided.

Name _____ Date _____

| Problem Solving with U.S. Population Numbers Feedback Box | Expec-tation | Check In | Comments |
|---|---|---|---|
| Read and write large numbers. | E1 | | |
| Compare and order large numbers. | E2 | | |
| Round large numbers. | E3 | | |

| | Yes . . . | Yes, but . . . | No, but . . . | No. . . |
|---|---|---|---|---|
| **MPE2. Find a strategy.** I choose good tools and an efficient strategy for solving the problem. | | | | |
| **MPE4. Check my calculations.** If I make mistakes, I correct them. | | | | |
| **MPE5. Show my work.** I show or tell how I arrived at my answer so someone else can understand my thinking. | | | | |

# Multiplication Facts I Know

- **Circle the facts you know well.**
- **Keep this table and use it to help you multiply.**
- **As you learn more facts, you may circle them too.**

| × | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|----|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 3 | 0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 |
| 4 | 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 6 | 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 |
| 7 | 0 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 |
| 8 | 0 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |
| 9 | 0 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 |
| 10 | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

# Division Facts I Know

- **Circle the facts you know well.**
- **Keep this table and use it to help you divide.**
- **As you learn more facts, you may circle them too.**

| × | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|----|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 3 | 0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 |
| 4 | 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 6 | 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 |
| 7 | 0 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 |
| 8 | 0 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |
| 9 | 0 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 |
| 10 | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |

**Divisor**

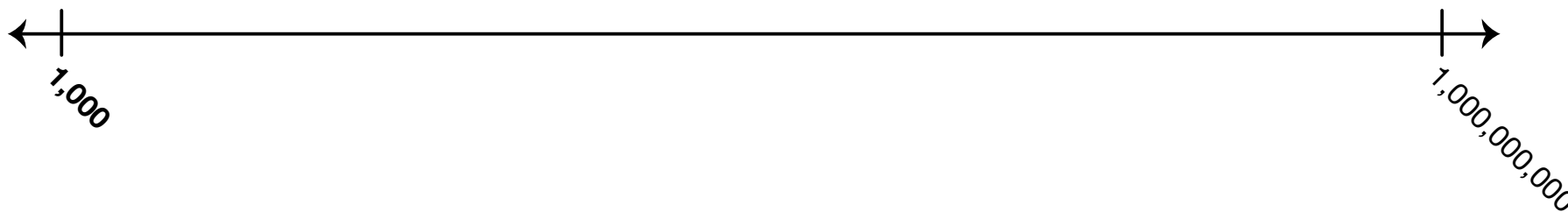# Number Lines
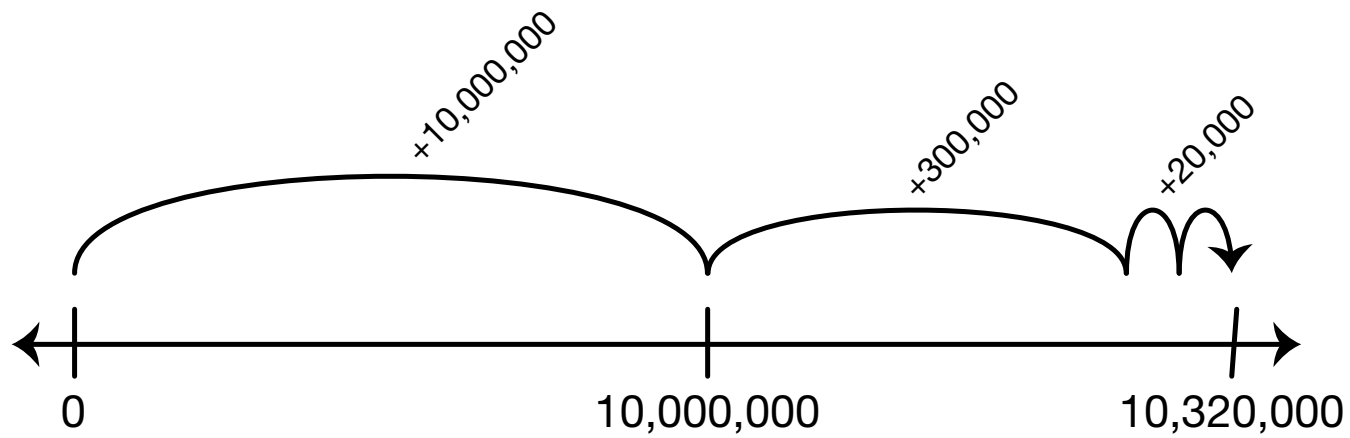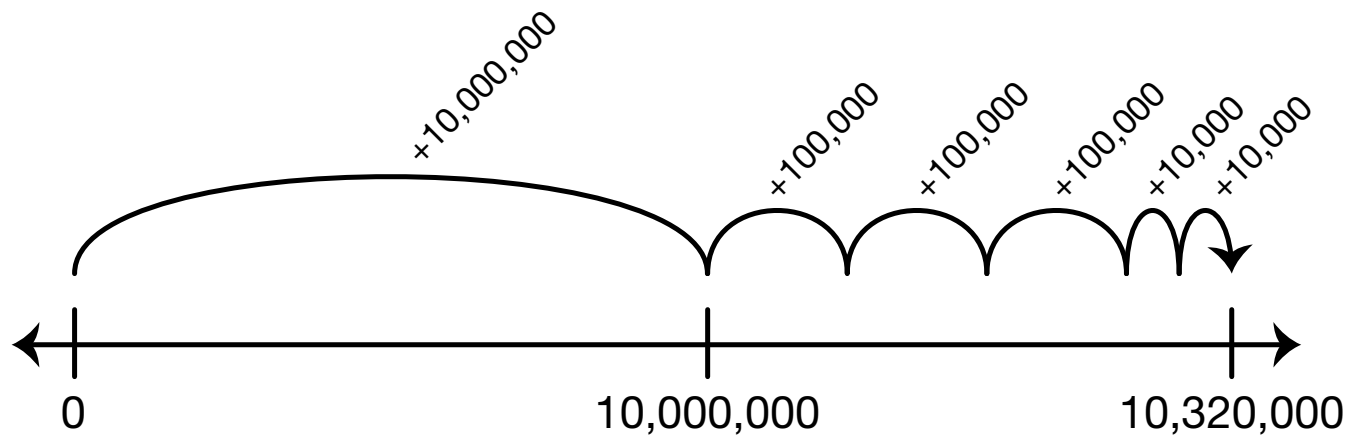
Name _____ Date _____

# Place 1 Million

**Where would you place 1 million on the number line below? Explain your reasoning.**

1,000 ◄————————————————————————————► 1,000,000,000

Name ———————————————————————— Date ————————————

## Place 1 Million Feedback Box

| Place 1 Million Feedback Box | Yes . . . | Yes, but . . . | No, but . . . | No. . . |
|---|---|---|---|---|
| **MPE2. Find a strategy.** I choose good tools and an efficient strategy for solving the problem. | | | | |
| **MPE3. Check for reasonableness.** I look back at my solution to see if my answer makes sense. If it does not, I try again. | | | | |
| **MPE5. Show my work.** I show or tell how I arrived at my answer so someone else can understand my thinking. | | | | |

# Your Town in Relation to the World

**1.** What is the population of your town?

**2.** How many towns of your size would it take to equal the population of the world? Show and explain how you found this number.

Name _____  Date _____

# Stack Up Work

**Work with a small group to collect data using pennies. Each group will need 20 pennies. You may use any tools that you use in class, including graph paper, a ruler, and a calculator.**

1. **A.** Predict how many pennies you will need to build a stack of pennies with a height of 5 cm.

   **B.** Check your prediction.  How many pennies did you need?

   How accurate was your prediction?

   *Where is zero on your ruler?*
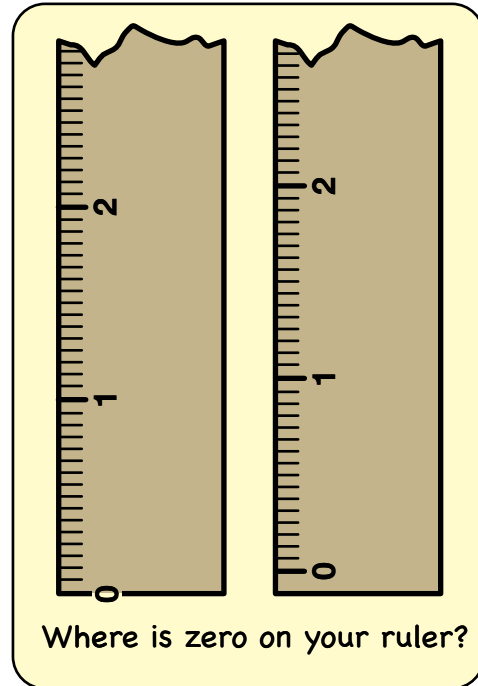
2. **A.** How many pennies would you need to build a stack 1 meter tall? (100 cm = 1 m)

   **B.** Explain how you found and checked your answer.

## ✓ Check-In: Question 3

**3.** The moon moves around the Earth in an orbit. Its average distance from the Earth is 384,400 km. (1 km = 1000 m) How many pennies would you need to build a stack to reach the moon? Show all of your work. Write a paragraph to justify your solution.

# Stack Up Work Check-In: Question 3 Feedback Box

**Reviewers** _____

| Student-to-Student | Yes . . . | Yes, but . . . | No, but . . . | No. . . |
|---|---|---|---|---|
| **MPE2.  Find a strategy.** I choose good tools and an efficient strategy for solving the problem. | | | | |
| **MPE3. Check for reasonableness.** I look back to see if my answer makes sense. If it does not, I try again. | | | | |
| **MPE5. Show my work.** I show or tell how I arrived at my answer so someone else can understand my thinking. | | | | |
| **MPE6.  Use labels.** I use labels to show what numbers mean. | | | | |

Name ———————————————————————————— Date ————————————

**Stack Up Work
Check-In: Question 3
Feedback Box**

| Teacher-to-Student | Yes . . . | Yes, but . . . | No, but . . . | No. . . |
|---|---|---|---|---|
| **MPE2. Find a strategy.** I choose good tools and an efficient strategy for solving the problem. | | | | |
| **MPE3. Check for reasonableness.** I look back to see if my answer makes sense. If it does not, I try again. | | | | |
| **MPE5. Show my work.** I show or tell how I arrived at my answer so someone else can understand my thinking. | | | | |
| **MPE6. Use labels.** I use labels to show what numbers mean. | | | | |

# Mary's Work

700 × 1000 = 700,000. pennies in a km

Then we multiplied 700,000 × 400,000

It would take 280,000,000,000 pennies to reach the moon

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The first thing we wanted to find out was how many pennies are in a km. Then we multiplied 700×1000=700,000 pennies in to km. Then we multiplied 7 × 4 = 28 and then added ten zros to 280,000,000,000 pennies to reach the moon.

# Maria's Work

I took the number 680 because 680 pennies =s 1 meter. Then I x's it by 1000, because 1000 m make 1 km. I got the # 680,000. 680,000 is how many pennies it takes to make 1 km. After that I x's it by 384,400, which is the average of how far away the moon is. When I finished, I got my answer, it takes 261,390,000,000. pennies to reach the moon.

# National Parks

| State | Number of National Parks | Number of Visitors in 2012 | Number Sentences for the Number of Visitors in 2012 |
|---|---|---|---|
| Arizona | 22 | 9,979,972 | |
| Wyoming | 7 | 6,194,752 | |
| New Mexico | 13 | 1,502,808 | |
| California | 26 | 35,991,200 | |
| Tennessee | 12 | 8,414,094 | |
| Colorado | 13 | 5,811,546 | |

# Spin and Read Big Numbers Game

**This game can be played in groups of three students. In each game two students play and one serves as the judge. The object of the game is to read large numbers correctly.**

## Materials

- three sets of *Digit Cards 0–9,* or one deck of playing cards (use the ace as "1", the king as "0", and remove the queens, jacks, and tens)
- Spin and Read Big Numbers Game Spinners
- Spin and Read Big Numbers Game Board, 1 per student
- clear plastic spinner or a paper clip and pencil
- calculator, 1 per player

## Directions

1.  Shuffle the digit cards together to make one deck of 30 cards (40 if using playing cards). Place these cards face down in the center of the table.

2.  Use one of the spinners on the Spin and Read Big Numbers Game Spinners page to know the number of cards to pick up. (Use Spinner 1 the first few times you play the game, then use Spinner 2 for a greater challenge.)

3.  The first player spins and draws the number of cards shown on the spinner. The student places these cards face-up on the table to make a number. That player then reads the number aloud.

    - If the number is read correctly, the player records the number on his or her Spin and Read Big Numbers Game Board, returns the cards to the deck, and reshuffles the cards.

    - If the number is not read correctly, the other player gets an opportunity to read the number, and if correct, writes it on his or her game board.

    - If neither player reads the number correctly, the cards go back into the deck and the deck is reshuffled.

    - It is the judge's responsibility to determine whether or not the number was read correctly. If there is a dispute, it is resolved by a discussion of the number.

4. Each game consists of four rounds with each player beginning two rounds.

5. At the end of the game, players add the numbers they recorded. The player with the largest sum wins. Play rotates and a new student serves as the judge.

## Spin and Read Big Numbers Game Boards

| Millions | | | Thousands | | | Ones | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| **Total** | | | | | | | | |

| Millions | | | Thousands | | | Ones | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| **Total** | | | | | | | | |

| Millions | | | Thousands | | | Ones | | |
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| | | | | | | | | |
| **Total** | | | | | | | | |

## Spin and Read Big Numbers Game Boards

| Millions | | | Thousands | | | Ones | | |
|---|---|---|---|---|---|---|---|---|
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| | | | | | | | | |
| | | | | | | | | |
| **Total** | | | | | | | | |

| Millions | | | Thousands | | | Ones | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| **Total** | | | | | | | | |

| Millions | | | Thousands | | | Ones | | |
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| **Total** | | | | | | | | |

# Spin and Read Number Game Spinners

**Spinner 1**



**Spinner 2**