Math Practice Sheets

Number Concepts Part I

Examples

Practice Questions

Extra Challenge Unit

Student Name

_____

Unit 1.1 Number Construction

Example

Place Value											
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
5	6	1	0	2	9	7	4	3	2	8
Billions			Millions			Thousands			Ones		
Period											

Standard form: 56, 102, 974, 328

Expanded form: 50,000,000,000 + 6,000,000,000 + 100,000,000 + 2,000,000 + 900,000 + 70,000 + 4,000 + 300 + 20 + 8

Word form: Fifty-six billion, one hundred two million, nine hundred seventy-four thousand, three hundred twenty-eight

Exercise

1. Put commas (,) in the appropriate places and write each of the following numbers in words.

a) 284543

b) 64054387

c) 534038769

d) 43394567808

e) 123432156789

Unit 1.1	Number Construction

Exercise

2. Write each of the following in numbers using commas.

    a) Sixty-five million, six hundred nineteen thousand, three hundred sixteen

    b) Seven hundred ninety million, thirty-five thousand, three hundred ninety-one

    c) Seventy-seven billion, five hundred sixty-six million, five hundred forty-six thousand

    d) Four hundred sixty-eight billion, one hundred fifty million, five hundred seven thousand

    e) Thirty billion, fourteen million, twelve thousand nine hundred ninety-nine

3. In which period is the circled digit in each of the following?

    a)   2①5,109

    b)   ⑤29,007,004

    c)   43⑧,001,52

    d)   50,11⑦,424

    e)   8,212,⑥76

    f)   932,1②3,765

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<table>
<tr><td>Unit
1.1</td><td>Number Construction</td></tr>
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Exercise

Solve the problems below.

4. What is the largest number that can be made with seven digits? Write the number in word form.

5. The standard form of 80,000,000,000 + 2,000,000,000 + 300,000,00 + 5,000,000 + 600,000 + 40,000 + 7,000 + 100 + 60 + 5 is

    a) 820,305,647,165   b) 82,305,647,165

    c) 82,035,647,165   d) 82,350,647,165

6. Write the place values of each of the circled digits.

| a) 7⑥0,140 ⬇	b) ⑨,514,520 ⬇
c) 11,5②5,915 ⬇	d) 5④1,214,507 ⬇

7. Express each of the following quantities in the units mentioned and write your answer in numbers and in words.

  a) $45,635 in pennies

  b)   12,678 liters in milliliters

  c)   567 km in cm

  d)   49,000 liters in cubic centiliters

Compare and Order Numbers

Example

Compare Numbers.

<u>Step I</u>: The number having more digits will be the greater number.

i.e. 3,123 > 899   (3,123 has 4 digits)

99,712 < 156,892   (156,892 has 6 digits)

<u>Step II</u>: When two numbers which have the same number of digits are compared, we start comparing the digits from the left. i.e.

3,876   3,786   =   > ⟹ 3,876 > 3,786

56,098   56,941   =   < ⟹ 56,098 < 56,941
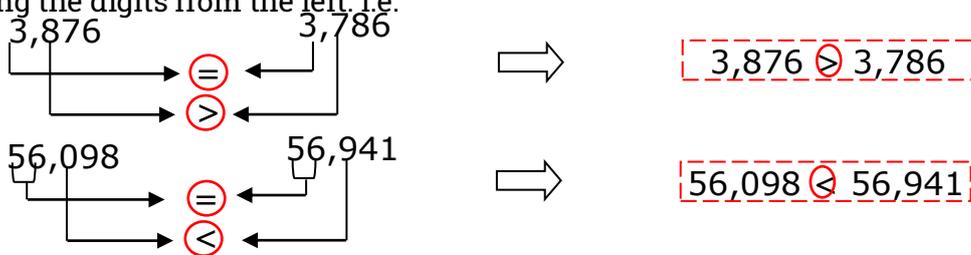
<u>Ascending</u> and <u>Descending</u> order: Ascending means increasing and descending means decreasing.

The ascending order of 50,050; 50,500; 55,000; 5,005 is

5,005; 50,050; 50,500; 55,000

Similarly, the descending order of 234,561; 456,123; 123,456; 561,234; and 345,621 is 561,234; 456,123; 345,621; 234,561; 123,456

Exercise

1. Compare each of the following pairs of numbers and fill in the blanks with '>', '<', or '='.

a) 65,827 _____ 65,900

b) 97,594 _____ 79,888

c) 174,582 _____ 88,877

d) 200,005 _____ 200,005

e) 746,740 _____ 747,000

f) 580,605 _____ 58,061

g) 461,325,003 _____ 461,316,003

h) 975,123,480 _____ 975,123,804

Exercise

2. Write the following numbers in ascending order.

    a) 4,282;   3,694;   15,000;   15,007;   13,000

    b) 10,011;   100,100;   11,100;   11,101;   11,011

    c) 888;   4,444;   688;   99,999;   900,000

    d) 738,354;   208,639;   408,671;   415,827;   413,483

3. Write the following numbers in descending order.

    a) 123,516;   234,561;   256,513;   342,456;   324,165

    b) 40,570;   48,520;   50,800;   41,725;   42,950

    c) 998,721;   999,347;   999,521;   998,627;   999,616

    d) 8,754;   88,754;   84,578;   47,488;   48,874

<table>
<tr><td>Unit
1.2</td><td>Compare and Order Numbers</td></tr>
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Exercise

Solve the problems below.

4. Write any six-digit number. Reverse the digits to get another number. Which of the two numbers is greater?

5. In a city, there are 34,890 adult men, 43,480 adult women, and 70,027 children. Write these three population numbers in descending order. Are there more men, or more women, or more children?

6. The smallest five-digit number with the digits 2, 9, 0, 6, and 7 is

    a) 97,620   b) 2,679

    c) 20,679   d) 20,976

7. Six candidates ran in an election and got the following numbers of votes.

J. Adams	706,563
J. Buchanan~~Candidate~~	752,765
J. Carter	735,904
G. Dallas	945,882
D. Senhower	652,867
B. Franklin	997,779

a) Which candidate got the most votes?

b) Who got the least votes?

c) Compare the votes of all the candidates and write the candidates in ascending order by number of votes.

Unit 1.3	Introduction to Exponents

Example

Exponent: A number is in exponential notation when we write it with a base and an exponent.

Exponent

Base ← 5^4 $5 \times 5 \times 5 \times 5 = 625$

Exponential form	Read	Multiply	Value
10^1	"10 to the 1st power"	10	10
10^2	"10 squared"	10×10	100
10^3	"10 cubed"	$10 \times 10 \times 10$	1,000
10^4	"10 to the 4th power"	$10 \times 10 \times 10 \times 10$	10,000

You can write the expanded form of a number using exponents.

Standard form: 729,146

Expanded form: $(7 \times 100,000) + (2 \times 10,000) + (9 \times 1,000) + (1 \times 100) + (4 \times 10) + 6$

Expanded form using exponents: $(7 \times 10^5) + (2 \times 10^4) + (9 \times 10^3) + (1 \times 10^2) + (4 \times 10^1) + (6 \times 10^0)$

Note: Any number raised to the first power always equals that number.

i.e. $10^1 = 10$ Similarly, $10° = 1$

Exercise

1. Write the following number in expanded form using exponential notation.

a) 7,423

b) 246,135

c) 9,214,757

d) 55,810,000

7

Exercise

2. Match the following powers with their values.

a) | 256 | A) | 64 |

b) | 81 | B) | 729 |

c) | 5^4 | C) | 2^8 |

d) | 9^3 | D) | 3^4 |

e) | 2^6 | E) | 625 |

3. Write each of the following expressions in exponential notation.

a) $3 \times 3 \times 3 \times 3 \times 3$

b) $5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5$

c) $9 \times 9 \times 9$

d) $1 \times 1 \times 1 \times 1 \times 1 \times 1 \times 1 \times 1$

e) $4 \times 4 \times 4 \times 4$

f) $8 \times 8 \times 8 \times 8 \times 8 \times 8$

g) 6×6

h) $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

i) $7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7$

j) $4 \times 4 \times 4 \times 4 \times 4$

Exercise

Solve the problems below.

4. Sara wants to find the value of the following powers. Complete her work.

    a) 2^6

    b) 4^4

    c) 8^2

    d) 7^3

5. Which one of the following correctly compares 5^4 and 4^5?

    a) $5^4 > 4^5$ b) $5^4 < 4^5$

    c) $4^5 < 5^4$ d) $5^4 = 4^5$

6. Which power computes to the greater number in each pair?
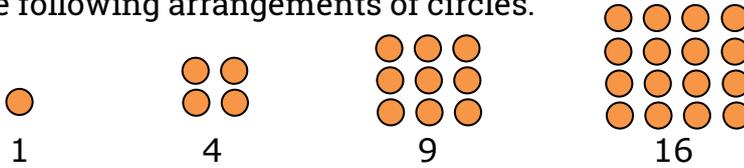
    a) 4^3 or 3^4

    b) 5^3 or 3^5

    c) 2^8 or 8^2

    d) 2^{10} or 10^2

7. At Eastside Middle School, one child will contact 3 friends and each of those 3 friends will contact 3 other friends and so on to enroll. How many children have been contacted after the seventh round?

Perfect Squares and their Roots

Example

Look at the following arrangements of circles.

1   4   9   16

What pattern can you see in the numbers 1, 4, 9, and 16?

Here, $1 = 1 \times 1$ $4 = 2 \times 2$ $9 = 3 \times 3$ $16 = 4 \times 4$

The numbers 1, 4, 9, 16, 25..... are formed by multiplying a number by itself. Such numbers are called <u>square numbers</u>.

So, $1 = 1^2$ $4 = 2^2$ $9 = 3^2$ $16 = 4^2$ $25 = 5^2$ .....

1, 4, 9, 16, 25, 36..... are squares of 1, 2, 3, 4, 5, 6.....respectively.
1, 2, 3, 4, 5, 6 are the <u>square root</u>s of 1, 4, 9, 16, 25, 36..... respectively.

We use symbol '$\sqrt{}$' to denote the square root.
i.e. $\sqrt{1} = 1$ $\sqrt{4} = 2$ $\sqrt{9} = 3$ $\sqrt{16} = 5$ $\sqrt{25} = 5$
This symbol is called a <u>radical</u>.

The square root of 225 is 15. i.e.
$\sqrt{225} = \sqrt{5 \times 5 \times 3 \times 3}$
$= 5 \times 3 = 15$

$$\begin{array}{r|r} 5 & 225 \\ \hline 5 & 45 \\ \hline 3 & 9 \\ \hline & 3 \end{array}$$

Exercise

1. Match the following square numbers.

a) 3^2 A) 81

b) 36   B) 16

c) 4^2 C) 6^2

d) 100   D) 9

e) 9^2 E) 10^2

Perfect Squares and their Roots

Exercise

2. Evaluate the following.

a) 1^2	b) 3^2	c) 5^2
d) 6^2	e) 8^2	f) 12^2

3. Find the square of each of the following.

a) 2	b) 4	c) 7
d) 11	e) 15	f) 18

4. Find the square root of the following by using prime factorization.

a) 169	b) 196
c) 900	d) 1,024

Unit 1.4	Perfect Squares and their Roots

Exercise

Solve the problem below.

5. What number multiplied by itself will give the product 625?

6. There are 121 baseball players on a diamond. If they are standing in equal rows and columns, how many players are there in each row or column?

7. The square numbers between 1 to 50 are

a) 1, 2, 9, 16, 25, 36, 49   b) 1, 4, 9, 16, 25, 30, 49

c) 1, 4, 9, 16, 25, 36, 49   d) 1, 4, 9, 16, 36, 49

8. In a garden, we plant flowers in rows and columns. If each of the rows and columns have 16 flowers, how many flowers are planted in the garden?

9. Some table tennis balls are divided among 18 sixth grade students. If each student of the class received 18 balls, how many balls are divided? Explain how you found them.

Patterns, Sequences, and Terms

Example

A <u>sequence</u> is an ordered set of numbers. Each number in the sequence is called a <u>term</u>. For example,

1, 3, 5, 7, 9, 11, 13, 15, 17................. form a sequence of odd numbers.
2, 4, 6, 8, 10, 12, 14, 16, 18............... form a sequence of even numbers.

Consider the numbers 1, 3, 6, 10, 15......

The nature of this sequence is different from the previous.
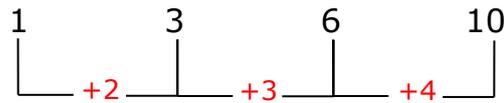How can you get the next term of this sequence?

<u>Study the following</u>.

Second term-first term = 3 - 1 = 2
Third term-second term = 6 - 3 = 3
Fourth term-third term = 10 - 6 = 4
Fifth term-fourth term = 15 - 10 = 5

```
1          3          6          10
|          |          |          |
|__ +2 ____|__ +3 ____|__ +4 ____|
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Thus, the differences of two successive terms are 2, 3, 4, 5.....respectively. So, if we add 6 to 15, we will get the term that follows 15.

$$\therefore \text{ Sixth term} = 15 + 6 = 21$$
$$\text{Seventh term} = 21 + 7 = 28 \text{ and so on.}$$

Exercise

1. For each of the following sequence, find next three terms.

a)
   1, 5, 9, _____, _____, _____

b)
   11, 15, 21, _____, _____, _____

c)
   7, 10, 14, _____, _____, _____

d)
   4, 8, 12, _____, _____, _____

e)
   23, 20, 17, _____, _____, _____

f)
   45, 55, 65, _____, _____, _____

g)
   10, 15, 21, _____, _____, _____
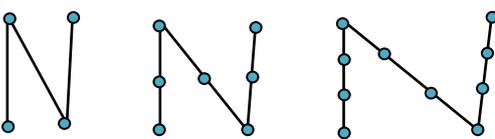
h)
   6, 12, 24, _____, _____, _____

i)
   10, 20, 40, _____, _____, _____

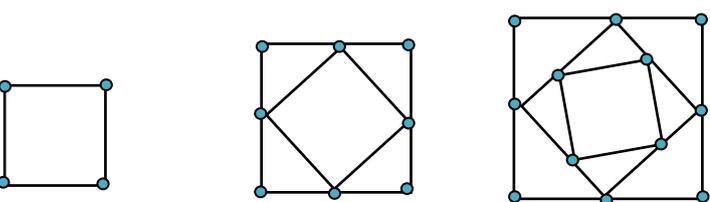j)
   1, 11, 111, _____, _____, _____

Exercise

2. Study the number pattern pictures below and supply the next term to continue the pattern. How many dots will the new figure contain?

a)
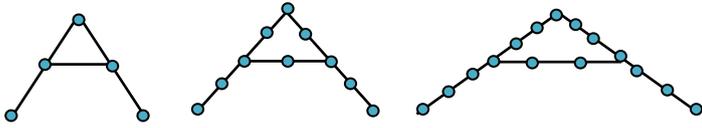
5   10   15   _____

b)

4   7   10   _____

c)

4   8   12   _____

3. Study the number pattern and fill in the blanks.

a)	b)	c)
$11 + 1 = 12$	$11 \times 1 = 11$	$1^2 + 10 = 11$
$22 + 2 = 24$	$12 \times 2 = 24$	$2^2 + 20 = 24$
$33 + 3 = 36$	$13 \times 3 = 39$	$3^2 + 30 = 39$
☐ + ☐ = ☐	☐ + ☐ = ☐	☐ + ☐ = ☐
☐ + ☐ = ☐	☐ + ☐ = ☐	☐ + ☐ = ☐
☐ + ☐ = ☐	☐ + ☐ = ☐	☐ + ☐ = ☐

Exercise

Solve the problems below.

4.   Use the pattern to write the first five terms of the sequence.

a)   Start with 2, multiply by 5

b)   Start with 3, add 7

c)   Start with 100, subtract 15

d)   Start with 128, divide by 2

5.   The pattern in the sequence 13, 25, 37, 49............... is

a) Add 13   b) Add 12

c) Subtract 12   d) Subtract 13

6.   The Chinese base their lunar calendar a 12-year cycle, with each of the 12 years named after a different animal. The year 2006 was the year of the dog.

a)   When will the next year of the dog occur?

b)   Will the year 2030 be a year of the dog?

Exercise

1. Write 175,605,284 in words. What is the place value of 6 and 7?

2. What is the largest number that can be made with 9 digits?
    What is the smallest number that can be made with 9 digits?
    What is the sum of the two numbers?
    What is the difference between the two numbers? Write the two numbers in standard form with commas.
    Write the two numbers in word form.

3. The Atlantic Ocean has an area of 33,420,000 square miles. This area is between which two numbers below?

    a) 33,430,000 and 33,500,000   b) 33,400,000 and 33,440,000

    c) 33,000,000 and 33,040,000   d) 33,100,000 and 33,419,000

4. Write three numbers that are greater than 4,560,000 but less than 4,561,000. Explain how you found them.

Exercise

5.　Read the table to answer the following questions.

a) According to the table, order the length
of the rivers from least to greatest

River length (mi)	
Mississippi	2,340
Red	1,290
Ohio	618
Rio Grande	1,900
Missouri	2,315

b) Which river is longest? How much longer is it as compared to the next
longest?

c) Which river's length is nearest to the length of the Rio Grande?

6.　Which one of the following orders the rivers from longest to shortest?

a) Mississippi, Rio Grande, Ohio, Red

b) Missouri, Rio Grande, Red, Ohio

c) Mississippi, Missouri, Red, Rio Grande

d) Ohio, Red, Rio Grande, Missouri

Exercise

7. If Prince's school closes, the school uses a phone tree to contact each student's family. The school secretary calls four families. Then each family calls four other families and so on. How many families will be notified during the 5th round of calls? Explain how you found your answer.

8. Marla says there are 10 square numbers between 1 and 100. Is she correct? What are they?

9. Fill in the blanks to complete the pattern.

    a) $1 = 1$

    b) $1 + \underline{} + 1 = 4 = 2^2$

    c) $1 + 2 + \underline{} + 2 + 1 = 9 = 3^2$

    d) \underline{\hspace{5cm}} $= 16 = 4^2$

    e) \underline{\hspace{5cm}} $= 25 = 5^2$

    f) \underline{\hspace{5cm}} $= 36 = 6^2$

    g) $1 + 2 + 3 + 4 + 5 + 6 + \underline{} + 6 + 5 + 4 + 3 + 2 + 1 = 49 = 7^2$

    h) \underline{\hspace{5cm}} $= 64 = 8^2$

    i) \underline{\hspace{5cm}} $= 81 = 9^2$

Congratulations!

You have finished a lesson. You should be very proud of yourself.
Now it is time to progress to the next lesson.
Your next assignment is notated by a green arrow.

Lesson 1   Number Concepts Part I
Lesson 2   Number Concepts Part II
          Unit 2.1   Introducing Roman Numerals

Next →   Unit 2.2   Introduction to Decimals
          Unit 2.3   Special Decimal Numbers
          Unit 2.4   Order Decimals
          Unit 2.5   Problem Solving: Make an Organized List
          Unit 2.6   Math Challenges
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Review 1   Review of Lesson 1, 2, 3, and 4
Lesson 5   Decimal Arithmetic
Lesson 6   More Advanced Decimal Concepts
Lesson 7   Steps toward Algebra: Solving Equations
Lesson 8   Introduction to Fraction Concepts
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Lesson 10   Arithmetic of Fractions and Mixed Numbers Part I
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Lesson 23   Two-Dimensional Measurement Formulae
Lesson 24   Three-Dimensional Measurement Formulae
Review 6   Review of Lesson 21, 22, 23, and 24
Lesson 25   Graphs and Data
Lesson 26   Introduction to Statistics
Lesson 27   Probability
Review of Lesson 1 to 14
Review of Lesson 15 to 27

Unit 1.1

1. a) 284,543; Two hundred eighty-four thousand, five hundred forty-three
   b) 64,054,387; Sixty-four millions, fifty-four thousand, three hundred eighty-seven
   c) 534,038,769; Five hundred thirty-four million, thirty-eight thousand, seven hundred sixty-nine
   d) 43,394,567,808; Forty-three billion, three hundred ninety-four million, five hundred sixty-seven thousand, eight hundred eight
   e) 123,432,156,789; One hundred twenty-three billion, four hundred thirty-two million, one hundred fifty-six thousand, seven hundred eighty-nine

2. a) 65,619,316   b) 790,035,391   c) 77,566,546,000
   d) 468,150,507,000   e) 30,014,012,999

3. a) Thousand   b) Million   c) Million
   d) Thousand   e) Hundred   f) Thousand

4. 9,999,999; Nine million, nine hundred ninety-nine thousand, nine hundred ninety-nine

5. b

6. a) Ten-thousand   b) Million   c) Ten-thousand
   d) Ten million

7. a) 4,563,500 pennies; Four million, five hundred six-three thousand, five hundred
   b) 12,678,000 ml; Twelve million, six hundred seventy-eight thousand
   c) 56,700,000 cm; Fifty-six million, seven hundred thousand
   d) 49,000,000; forty-nine million

Unit 1.2

1. a) <   b) >   c) >   d) =
   e) <   f) >   g) >   h) <

2. a) 3,694; 4,282; 13,000; 15,000; 15,007
   b) 10,011; 11,011; 11,100; 11,101; 100,100
   c) 688; 888; 4,444; 99,999; 900,000
   d) 208,639; 408,671; 413,483; 415,827; 738,354

3. a) 342,456; 324,165; 256,513; 234,561; 123,516
   b) 50,800; 48,520; 42,950; 41,725; 40,570
   c) 999,616; 999,521; 999,347; 998,721; 998,627
   d) 88,754; 84,578; 48,874; 47,488; 8,754

5. 70,027; 43,480; 34,890; children   6. c

7. a) B. Franklin   b) D. Senhower
   c) 652,867; 706,563; 735,904; 752,765; 945,882; 997,779

Unit 1.3

1. a) $7 \times 10^3 + 4 \times 10^2 + 2 \times 10^1 + 3 \times 10^0$
   b) $2 \times 10^5 + 4 \times 10^4 + 6 \times 10^3 + 1 \times 10^2 + 3 \times 10^1 + 5 \times 10^0$
   c) $9 \times 10^6 + 2 \times 10^5 + 1 \times 10^4 + 4 \times 10^3 + 7 \times 10^2 + 5 \times 10^1 + 5 \times 10^0$
   d) $5 \times 10^7 + 5 \times 10^6 + 8 \times 10^5 + 1 \times 10^4$

2. a) C   b) D   c) E   d) B   e) A

3. a) 3^5 b) 5^7 c) 9^3 d) 1^8 e) 4^4
   f) 8^6 g) 6^2 h) 2^7 i) 7^8 j) 4^5

4. a) 64   b) 256   c) 64   d) 343

5. b   6. a) 3^4 b) 3^5 c) 2^8 d) 2^{10} 7. 2,187

Unit 1.4

1. a) D   b) C   c) B   d) E   e) A
2. a) 1   b) 9   c) 25   d) 36   e) 64   f) 144
3. a) 4   b) 16   c) 49   d) 121   e) 225   f) 324
4. a) 13   b) 14   c) 30   d) 32
5. 25   6. 11   7. c   8. 256   9. 324

Unit 1.5

1. a) 13,17,21 b) 29,39,51 c) 19,25,32 d) 16,20,24 e) 14,11,8 f) 75,85,95
   g) 28,36,45 h) 48,96,192 i) 80,160,320 j) 1,111; 11,111; 111,111
2. a) 20   b) 13   c) 16
3. a) 44+4=48   b) 14×4=56   c) 16+40=56
     55+5=60   15×5=75   25+50=75
     66+6=72   16×6=96   36+60=96
4. a) 2; 10; 50; 250; 1,250   b) 3; 10; 17; 24; 31
   c) 100; 85; 70; 55; 40   d) 128; 64; 32; 16; 8
5. b   6. a) 2018   b) yes

Unit 1.6

1. one hundred seventy-five million, six hundred five-thousand, two hundred and
   eighty-four; 600,000 and 70,000,000

2. 999,999,999; 100,000,000; 1,099,999,999; 899,999,999;
   nine hundred ninety-nine million, nine hundred ninety-thousand, nine hundred
   ninety-nine; one billion

3. b

5. a) 618; 1,290; 1,900; 2,315; 2,340

   b) Mississippi with 25 miles

   c) Missouri

6. b

8. no; 9

9. b) 2   c) 3   d) 1+2+3+4+3+2+1
   e) 1+2+3+4+5+4+3+2+1 f) 1+2+3+4+5+6+5+4+3+2+1
   g) 7   h) 1+2+3+4+5+6+7+8+7+6+5+4+3+2+1
   i) 1+2+3+4+5+6+7+8+9+8+7+6+5+4+3+2+1