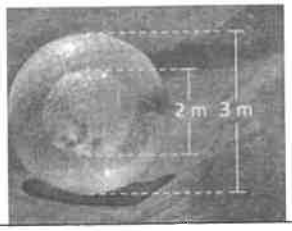
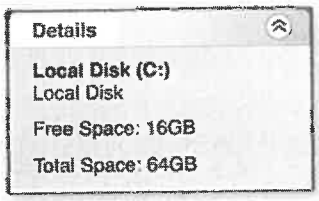
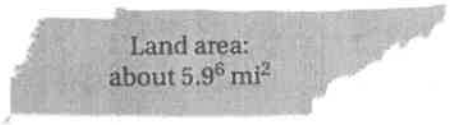
Chapter 10 Pre-Algebra	Exponents and Scientific Notation
MAFS.8.EE.1.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions.
Essential Question	How can you use exponents to write numbers?
Learning Targets	In this lesson, I will: • Write expressions using integer exponents. • Evaluate expressions involving integer exponents.
10.1 Exponents	A **power** is a product of repeated factors. The **base** of a power is the common factor. The **exponent** of a power indicates the number of times the base is used as a factor. base, exponent $\left(\frac{1}{2}\right)^5 = \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$ power $\frac{1}{2}$ is used as a factor 5 times.
Example 1 Writing Expressions Using Exponents	**Write each product using exponents.** **a.** $(-7) \cdot (-7) \cdot (-7)$ **b.** $\pi \cdot \pi \cdot r \cdot r \cdot r$
On Your Own	**Write the product using exponents.** **1.** $\frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4}$ **2.** $0.3 \cdot 0.3 \cdot 0.3 \cdot 0.3 \cdot x \cdot x$
Example 2 Evaluating Expressions	**Evaluate each expression.** **a.** $(-2)^4$ **b.** -2^4
Example 3 Using the Order of Operations	**Evaluate each expression.** **a.** $3 + 2 \cdot 3^4$ **b.** $3^3 - 8^2 \div 2$
On Your Own	**Evaluate the expression.** **3.** -5^4 **4.** $\left(-\frac{1}{6}\right)^3$ **5.** $\lvert -3^3 \div 27 \rvert$ **6.** $9 - 2^5 \cdot 0.5$

Example 4 **Real-Life Application**	**In sphering, a person is secured inside a small, hollow sphere that is surrounded by a larger sphere. The space between the spheres is inflated with air. What is the volume of the inflated space?** 
On Your Own	**7. WHAT IF?** The diameter of the inner sphere is 1.8 meters. What is the volume of the inflated space?
Essential Question	How can you use inductive reasoning to observe patterns and write general rules involving properties of exponents?
Learning Target	In this lesson, you will • Multiply powers with the same base. • Find a power of a power. • Find a power of a product.
10.2 **Product of Powers Property**	**Product of Powers Property** **Words** To multiply powers with the same base, add their exponents. **Numbers** $4^2 \cdot 4^3 = 4^{2+3} = 4^5$ **Algebra** $a^m \cdot a^n = a^{m+n}$ **Power of a Power Property** **Words** To find a power of a power, multiply the exponents. **Numbers** $(4^6)^3 = 4^{6 \cdot 3} = 4^{18}$ **Algebra** $(a^m)^n = a^{mn}$ **Power of a Product Property** **Words** To find a power of a product, find the power of each factor and multiply. **Numbers** $(3 \cdot 2)^5 = 3^5 \cdot 2^5$ **Algebra** $(ab)^m = a^m b^m$
Example 1 **Multiplying Powers with the Same Base**	**a.** $2^4 \cdot 2^5$ **b.** $-5 \cdot (-5)^6$ **c.** $x^3 \cdot x^7$
Example 2 **Finding a Power of a Power**	**a.** $(3^4)^3$ **b.** $(w^5)^4$
Example 3 **Finding a Power of a Product**	**a.** $(2x)^3$ **b.** $(3xy)^2$

On Your Own	**Simplify the expression.** **1.** $6^2 \cdot 6^4$ **2.** $\left(-\frac{1}{2}\right)^3 \cdot \left(-\frac{1}{2}\right)^6$ **3.** $z \cdot z^{12}$ **4.** $(4^4)^3$ **5.** $(y^2)^4$ **6.** $((-4)^3)^2$ **7.** $(5y)^4$ **8.** $(ab)^5$ **9.** $(0.5mn)^2$
Example 4 Simplifying an Expression	 **A gigabyte (GB) of computer storage space is 2^{30} bytes. The details of a computer are shown. How many bytes of total storage space does the computer have?** Ⓐ 2^{34} Ⓑ 2^{36} Ⓒ 2^{180} Ⓓ 128^{30} Total number of bytes = Number of bytes in a gigabyte • Number of gigabytes
On Your Own	**10.** How many bytes of free storage space does the computer have?
Essential Question	How can you divide two powers that have the same base?
Learning Targets	In this lesson I will: • Divide powers with the same base. • Simplify expressions involving the quotient of powers.
10.3 Quotient of Powers Property	**Quotient of Powers Property** **Words** To divide powers with the same base, subtract their exponents. **Numbers** $\frac{4^5}{4^2} = 4^{5-2} = 4^3$ **Algebra** $\frac{a^m}{a^n} = a^{m-n}$, where $a \neq 0$

Example 1 **Dividing Powers with the Same Base**	**a.** $\frac{2^6}{2^4}$ **b.** $\frac{(-7)^9}{(-7)^3}$ **c.** $\frac{h^7}{h^6}$
On Your Own	**Simplify the expression. Write your answer as a power.** **1.** $\frac{9^7}{9^4}$ **2.** $\frac{4.2^6}{4.2^5}$ **3.** $\frac{(-8)^8}{(-8)^4}$ **4.** $\frac{x^8}{x^3}$
Example 2 **Simplifying an Expression**	**Simplify $\frac{3^4 \cdot 3^2}{3^3}$. Write your answer as a power.**
Example 3 **Simplifying an Expression**	**Simplify $\frac{a^{10}}{a^6} \cdot \frac{a^7}{a^4}$. Write your answer as a power.**
On Your Own	**Simplify the expression. Write your answer as a power.** **5.** $\frac{2^{15}}{2^3 \cdot 2^5}$ **6.** $\frac{d^5}{d} \cdot \frac{d^9}{d^8}$ **7.** $\frac{5^9}{5^4} \cdot \frac{5^5}{5^2}$
Example 4 **Real-Life Application**	**The projected population of Tennessee in 2030 is about $5 \cdot 5.9^8$. Predict the average number of people per square mile in 2030.** People per square mile $= \frac{\text{Population in 2030}}{\text{Land area}}$ 
On Your Own	**8.** The projected population of Alabama in 2030 is about $2.25 \cdot 2^{21}$. The land area of Alabama is about 2^{17} square kilometers. Predict the average number of people per square kilometer in 2030.

Essential Question	How can you evaluate an exponent of zero or a negative exponent?
Learning Targets	In this lesson, you will: • Evaluate expressions involving numbers with zero as an exponent. • Evaluate expressions involving numbers with negative integer exponents.
10.4 Zero and Negative Exponents	**Zero Exponents** **Words** For any nonzero number a, $a^0 = 1$. The power 0^0 is *undefined*. **Numbers** $4^0 = 1$ **Algebra** $a^0 = 1$, where $a \neq 0$ **Negative Exponents** **Words** For any integer n and any nonzero number a, a^{-n} is the reciprocal of a^n. **Numbers** $4^{-2} = \frac{1}{4^2}$ **Algebra** $a^{-n} = \frac{1}{a^n}$, where $a \neq 0$
Example 1 Evaluating Expressions	**a.** 3^{-4} **b.** $(-8.5)^{-4} \cdot (-8.5)^4$ **c.** $\frac{2^6}{2^8}$
On Your Own	**Evaluate the expression.** **1.** 4^{-2} **2.** $(-2)^{-5}$ **3.** $6^{-8} \cdot 6^8$ **4.** $\frac{(-3)^5}{(-3)^6}$ **5.** $\frac{1}{5^7} \cdot \frac{1}{5^{-4}}$ **6.** $\frac{4^5 \cdot 4^{-3}}{4^2}$
Example 2 Simplifying Expressions	**a.** $-5x^0$ **b.** $\frac{9y^{-3}}{y^5}$

On Your Own	**Simplify. Write the expression using only positive exponents.** **7.** $8x^{-2}$ **8.** $b^0 \cdot b^{-10}$ **9.** $\frac{z^6}{15z^9}$
Example 3 **Real-life Application**	**A drop of water leaks from a faucet every second. How many liters of water leak from the faucet in 1 hour?**  Drop of water: 50^{-2} liter
On Your Own	**10. WHAT IF?** The faucet leaks water at a rate of 5^{-5} liter per second. How many liters of water leak from the faucet in 1 hour?
Essential Question	How can you read numbers written in Scientific Notation?
Learning Targets	n this lesson, I will: • Identify numbers written in scientific notation. • Write numbers in standard form. • Compare numbers in scientific notation.
10.5 **Reading Scientific Notation**	**Scientific Notation** A number is written in **scientific notation** when it is represented as the product of a factor and a power of 10. The factor must be greater than or equal to 1 and less than 10. The factor is greater than or equal to 1 and less than 10. → 8.3×10^{-7} ← The power of 10 has an integer exponent. **Writing Numbers in Standard Form** The absolute value of the exponent indicates how many places to move the decimal point. • If the exponent is negative, move the decimal point to the left. • If the exponent is positive, move the decimal point to the right.
Example 1 **Identifying Numbers Written in Scientific Notation**	**Tell whether the number is written in scientific notation. Explain.** **a.** 5.9×10^{-6} **b.** 0.9×10^{8}
Example 2 **Writing Numbers in Standard Form**	**a. Write 3.22×10^{-4} in standard form.** **b. Write 7.9×10^{5} in standard form.**

On Your Own	**1.** Is 12×10^4 written in scientific notation? Explain. **Write the number in standard form.** **2.** 6×10^7 **3.** 9.9×10^{-5} **4.** 1.285×10^4
Example 3 **Comparing Numbers in Scientific Notation**	**An object with a lesser density than water will float. An object with a greater density than water will sink. Use each given density (in kilograms per cubic meter) to explain what happens when you place a brick and an apple in water.** **Water:** 1.0×10^3 **Brick:** 1.84×10^3 **Apple:** 6.41×10^2 
Example 4 **Real-Life Application**	**A dog has 100 female fleas. How much blood do the fleas consume per day?**  A female flea consumes about 1.4×10^{-5} liter of blood per day.
On Your Own	**5. WHAT IF?** In Example 3, the density of lead is 1.14×10^4 kilograms per cubic meter. What happens when you place lead in water? **6. WHAT IF?** In Example 4, a dog has 75 female fleas. How much blood do the fleas consume per day?
Essential Question	How can you write a number in scientific notation?
Learning Targets	In this lesson, I will: • Write large and small numbers in scientific notation. • Perform operations with numbers written in scientific notation.

10.6 Writing Scientific Notation

Study Tip

When you write a number greater than or equal to 1 and less than 10 in scientific notation, use zero as the exponent.

$6 = 6 \times 10^0$

Writing Numbers in Scientific Notation

Step 1: Move the decimal point so it is located to the right of the leading nonzero digit.

Step 2: Count the number of places you moved the decimal point. This indicates the exponent of the power of 10, as shown below.

Number Greater Than or Equal to 10

Use a positive exponent when you move the decimal point to the left.

$8600 = 8.6 \times 10^3$

3

Number Between 0 and 1

Use a negative exponent when you move the decimal point to the right.

$0.0024 = 2.4 \times 10^{-3}$

3

Example 1 Writing Large Numbers in Scientific Notation

Google purchased YouTube for $1,650,000,000. Write this number in scientific notation.

Example 2 Writing Small Numbers in Scientific Notation

The 2004 Indonesian earthquake slowed the rotation of Earth, making the length of a day 0.00000268 second shorter. Write this number in scientific notation.

On Your Own

Write the number in scientific notation.

1. 50,000
2. 25,000,000
3. 683
4. 0.005
5. 0.00000033
6. 0.000506

Example 3 Using Scientific Notation

An album has sold 8,780,000 copies. How many more copies does it need to sell to receive the award?

Ⓐ 1.22×10^{-7} Ⓑ 1.22×10^{-6}

Ⓒ 1.22×10^6 Ⓓ 1.22×10^7

Example 4 Real-Life Application

The table shows when the last three geologic eras began. Order the eras from earliest to most recent.

Era	Began
Paleozoic	5.42×10^8 years ago
Cenozoic	6.55×10^7 years ago
Mesozoic	2.51×10^8 years ago

On Your Own

7. **WHAT IF?** In Example 3, an album has sold 955,000 copies. How many more copies does it need to sell to receive the award? Write your answer in scientific notation.

	8. The *Tyrannosaurus rex* lived 7.0×10^7 years ago. Consider the eras given in Example 4. During which era did the *Tyrannosaurus rex* live?
Essential Question	How can you perform operations with numbers written in scientific notation?
Learning Targets	In this lesson, I will: • Add, subtract, multiply, and divide scientific notation.
10.7 Operations in Scientific Notation	To add or subtract numbers written in scientific notation with the same power of 10, add or subtract the factors. When the numbers have different powers of 10, first rewrite the numbers so they have the same power of 10.
Example 1 Adding and Subtracting Numbers in Scientific Notation	**Find the sum or difference. Write your answer in scientific notation.** **a.** $(4.6 \times 10^3) + (8.72 \times 10^3)$ **b.** $(3.5 \times 10^{-2}) - (6.6 \times 10^{-3})$
On Your Own	**Find the sum or difference. Write your answer in scientific notation.** **1.** $(8.2 \times 10^2) + (3.41 \times 10^{-1})$ **2.** $(7.8 \times 10^{-5}) - (4.5 \times 10^{-5})$
Example 2 Multiplying Numbers in Scientific Notation	**Find $(3 \times 10^{-5}) \times (5 \times 10^{-2})$. Write your answer in scientific notation.**
Example 3 Dividing Numbers in Scientific Notation	**Find $\frac{1.5 \times 10^{-8}}{6 \times 10^7}$. Write your answer in scientific notation.**
On Your Own	**Find the product or quotient. Write your answer in scientific notation.** **3.** $6 \times (8 \times 10^{-5})$ **4.** $(7 \times 10^2) \times (3 \times 10^5)$ **5.** $(9.2 \times 10^{12}) \div 4.6$ **6.** $(1.5 \times 10^{-3}) \div (7.5 \times 10^2)$
Example 4 Real-Life Application	**How many times greater is the diameter of the Sun than the diameter of Earth?**  Diameter = 1,400,000 km  Diameter = 1.28×10^4 km
On Your Own	**7.** How many more kilometers is the radius of the Sun than the radius of Earth? Write your answer in standard form.

Name_____ Date_____

10.1 Practice A

Write the product using exponents.

1. $6 \cdot 6 \cdot 6 \cdot 6 \cdot 6$
2. $(-2) \cdot (-2) \cdot (-2)$
3. $\frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3}$
4. $(-1.2) \cdot (-1.2) \cdot (-1.2)$
5. $\frac{1}{5} \cdot \frac{1}{5} \cdot x \cdot x \cdot x$
6. $10 \cdot 10 \cdot (-n) \cdot (-n) \cdot (-n)$
7. $(-5) \cdot (-5) \cdot (-5) \cdot (-5) \cdot y \cdot y \cdot y \cdot y \cdot y$

Evaluate the expression.

8. 9^2
9. -5^4
10. $(-3)^4$
11. $\left(\frac{1}{4}\right)^3$
12. Write the prime factorization of 500 using exponents.

Evaluate the expression.

13. $7 + (-2) \cdot 3^2$
14. $\left(15^2 - 5 \cdot 4^2\right) \div 5$
15. $\left|\frac{1}{3}\left(2^3 - \frac{10^2}{5}\right)\right|$
16. $\frac{3}{2}\left(4^3 - 2^2 \cdot 3^2\right)$
17. There are 5 posts supporting the guard rail for the steps to your home. The tallest post is 3 feet tall. The height of each of the other posts is $\frac{5}{6}$ the height of the next larger post.
    a. Write an expression for the height of the shortest post.
    b. What is the height of the shortest post?
18. You ran 4 miles. Rob ran half as far as you. Tim ran half as far as Rob. Nicole ran half as far as Tim.
    a. Write an expression for how far Nicole ran.
    b. How far did Nicole run?

Name_____ Date_____

10.2 Practice A

Simplify the expression. Write your answer as a power.

1. $2^3 \cdot 2^2$
2. $9^6 \cdot 9^8$
3. $(-7)^3 \cdot (-7)^5$
4. $\left(\frac{5}{8}\right)^{10} \cdot \left(\frac{5}{8}\right)^2$
5. $c \cdot c^5$
6. $q^4 \cdot q^4$
7. $\left(-\frac{4}{9}\right)^2 \cdot \left(-\frac{4}{9}\right)^5$
8. $(4.7)^3 \cdot (4.7)^2$
9. $\left(3^2\right)^3$
10. $\left(k^5\right)^{10}$
11. $\left(\left(\frac{1}{2}\right)^4\right)^3$
12. $\left((9.2)^3\right)^6$

Simplify the expression.

13. $(4n)^2$
14. $(-2w)^5$
15. $\left(\frac{1}{3}p\right)^4$
16. $(2.5j)^3$
17. $(ab)^{18}$
18. $3^2\left(3 \cdot 3^4\right)$
19. Is $3^2 \cdot 4^2 = 12^4$? Evaluate each side of the equation to explain your answer.
20. The volume of a sphere is $V = \frac{4}{3}\pi r^3$ and the relationship between the radius r and the diameter d is $r = \frac{d}{2}$.

    a. Find the volume of the sphere in terms of the diameter d and simplify the expressions.

    b. What is the volume of the sphere when the diameter is $\frac{2}{3}$ centimeter?

Name_____ Date_____

10.3 Practice A

Simplify the expression. Write your answer as a power.

1. $\frac{3^8}{3^6}$

2. $\frac{10^{11}}{10^3}$

3. $\frac{(-4)^5}{(-4)^4}$

4. $\frac{(5.6)^{15}}{(5.6)^9}$

5. $\frac{p^{13}}{p^{11}}$

6. $\frac{(-0.7)^{25}}{(-0.7)^{12}}$

7. $\frac{s^{28}}{s^7}$

8. $\frac{\pi^6}{\pi}$

9. A personal computer developed in the 1980s had approximately 2^{18} bytes of memory. Today a laptop has 1 gigabyte $= 2^{30}$ bytes of memory. How many times more memory does today's laptop have than the personal computer from the 1980s?

Simplify the expression. Write your answer as a power.

10. $\frac{6^3 \cdot 6^7}{6^4}$

11. $\frac{3^4 \cdot 3^5}{3 \cdot 3^2}$

12. $\frac{(-0.5)^8 \cdot (-0.5)^5}{(-0.5)^6 \cdot (-0.5)^2}$

13. $\frac{m^{14}}{m^{10}} \cdot \frac{m^5}{m^2}$

Simplify the expression.

14. $\frac{5^4 \cdot n^4}{5^2}$

15. $\frac{x^5 \cdot z^4}{x^2 \cdot z^2}$

16. $\frac{c^6 \cdot d^{10} \cdot 2^6}{d^5 \cdot 2^3}$

17. $\frac{a^{12}b^8}{a^{10}b^5}$

Find the value of x in the equation without evaluating the power.

18. $\frac{5^9}{5^x} = 625$

19. $\frac{3^7 \cdot 3^x}{3^6} = 9$

Name _____ Date _____

10.4 Practice A

Evaluate the expression.

1. 3^{-4}
2. 32^{0}
3. $\frac{8^3}{8^5}$
4. $\frac{(-9)^4}{(-9)^7}$
5. $5^{-12} \cdot 5^{12}$
6. $\frac{1}{4^{-5}} \cdot \frac{1}{4^8}$
7. $6^{-1} \cdot 6^{-2}$
8. $\frac{2^6}{2^{-8} \cdot 2^{10}}$
9. One terameter equals 10^{12} meters. One micrometer equals 10^{-6} meter. One nanometer equals 10^{-9} meter.
   a. Find the product of one terameter and one micrometer, using only positive exponents.
   b. Find the quotient of one terameter and one micrometer, using only positive exponents.
   c. Find the product of one terameter and one nanometer, using only positive exponents.
   d. Find the quotient of one terameter and one nanometer, using only positive exponents.
   e. Find the quotient of one nanometer and one terameter, using only positive exponents.
   f. Find the quotient of one nanometer and one micrometer, using only positive exponents.
   g. Find the product of one nanometer and one micrometer, using only positive exponents.

Simplify. Write the expression using only positive exponents.

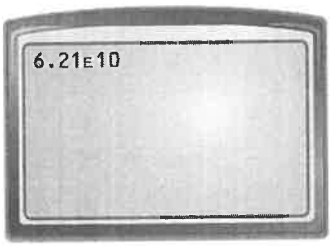
10. $8x^{-3}$
11. $5^{-3} \cdot m^6$
12. $\frac{7p^5}{p^{-1}}$
13. $\frac{10t^{-5}}{t^{-2}}$
14. $\frac{15d^4}{3d^9}$
15. $6w^{-2} \cdot 4w^2$

Name_____ Date_____

10.5 Practice A

Write the number shown on the calculator display in standard form.

1.



2.

Tell whether the number is written in scientific notation. Explain.

3. 4.375×10^{-8}

4. 62.9×10^{14}

5. 9.897×10^{-15}

6. 0.451×10^{-12}

7. 25×10^{18}

8. 5.1786×10^{-25}

Write the number in standard form.

9. 8×10^{6}

10. 9×10^{-2}

11. 2×10^{3}

12. 5.3×10^{-4}

13. 1.2×10^{8}

14. 7.86×10^{5}

15. The average distance from Earth to the Sun is about 1.5×10^{11} meters. The average distance from Earth to the Moon is about 3.84×10^{8} meters.

a. Write the distance from Earth to the Sun in standard form.

b. Write the distance from Earth to the Moon in standard form.

c. Which is closer to Earth, the *Sun* or the *Moon*?

16. A day is about 8.64×10^{4} seconds.

a. How many seconds are in 5 days? Write your answer in standard form.

b. How many seconds are in 1 month (30 days)? Write your answer in standard form.

c. How many seconds are in 1 year (365 days)? Write your answer in standard form.

d. How many seconds are in 1 leap year (366 days)? Write your answer in standard form.

e. What is the difference (in seconds) between 1 year and 1 leap year? Write your answer in both standard form and scientific notation.

Name_____ Date_____

10.6 Practice A

Write the number in scientific notation.

1. 350,000
2. 0.0004
3. 0.000000000000527
4. 12,500,000
5. 1,900,000,000
6. 0.0000001
7. 5,000,000,000,000
8. 0.00006524

Order the numbers from least to greatest.

9. 3.6×10^8, 6.3×10^8, 3.26×10^8
10. 9.8×10^{-12}, 1.23×10^{-11}, 5.05×10^{-13}
11. 6.18×10^7, 5.6×10^{-7}, 6.8×10^7
12. 4.81×10^{-5}, 4.27×10^{-5}, 4.7×10^{-5}

13. The number of stars in the Milky Way Galaxy has been approximated to be between 200 billion and 400 billion. Write these numbers in scientific notation.

14. The ångström is a unit of length defined to be 0.1 nanometer or 0.0000000001 meter. Write this number in scientific notation.

15. In 2013, the net worth of a businessman was \$59,000,000,000.

    a. Write \$59,000,000,000 in scientific notation.

    b. As of 2012, the businessman had given over \$28,000,000,000 to charity. Write \$28,000,000,000 in scientific notation.

    c. In 2002, the businessman's wealth briefly surpassed \$101,000,000,000. Write \$101,000,000,000 in scientific notation.

16. A pipette is a laboratory instrument that is used to transport a measured volume of liquid. A pipette that dispenses between 1 and 1000 microliters is called a micropipette.

    a. A microliter is equivalent to 0.000001 liter. Write 0.000001 in scientific notation.

    b. One thousand microliters is equivalent to 0.001 liter. Write 0.001 in scientific notation.

Order the numbers from least to greatest.

17. $\frac{16}{5}$, 322, 3.2×10^2, 3.2%
18. 5.89×10^3, $\frac{589}{1000}$, 0.58

Name _____ Date _____

10.7 Practice A

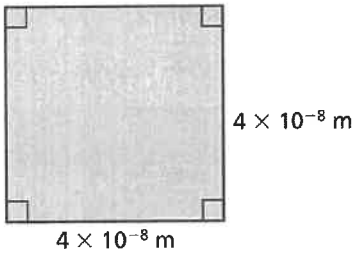
Find the sum or difference. Write your answer in scientific notation.

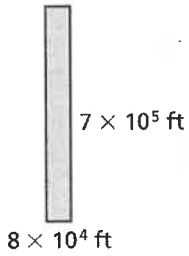
1. $(2 \times 10^4) + (5 \times 10^4)$
2. $(3.5 \times 10^{-3}) + (1 \times 10^{-3})$
3. $(8.3 \times 10^{-5}) - (4.4 \times 10^{-5})$
4. $(7.2 \times 10^9) - (5.8 \times 10^9)$
5. $(7.4 \times 10^{-6}) + (5 \times 10^{-6})$
6. $(7.13 \times 10^{12}) + (8.04 \times 10^{12})$

Find the product or quotient. Write your answer in scientific notation.

7. $(1 \times 10^5) \times (4 \times 10^2)$
8. $(8 \times 10^5) \div (4 \times 10^5)$
9. $(2 \times 10^{-4}) \times (3 \times 10^7)$
10. $(9 \times 10^7) \div (3 \times 10^2)$
11. $(6 \times 10^{-12}) \times (7 \times 10^{-9})$
12. $(8 \times 10^5) \times (8 \times 10^5)$
13. $(2 \times 10^{-3}) \times (1.1 \times 10^2)$
14. $(9 \times 10^{-7}) \times (2.5 \times 10^3)$

Find the area of the figure. Write your answer in scientific notation.

15. 

16. 

17. The table shows the volumes of the three largest giant sequoia trees. Which tree has the greatest volume? How much greater is its volume than each of the other two trees?

Tree Name	Volume (cubic feet)
General Grant	4.66×10^4
General Sherman	5.25×10^4
Washington	4.785×10^4