Pre-Algebra Workbook

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MATH

NUMBER SETS

■ 1. The number 0 is included in all the number sets except _____ numbers.

■ 2. Positive and negative whole numbers are called _____.

■ 3. Fractions and decimals can be considered _____ numbers.

■ 4. The number set $\{2,4,6,8\}$ shows a set of _____ numbers.

■ 5. What is the real number that's halfway between 1 and 2?

■ 6. The number sets that include negative numbers are _____, _____, _____, and _____ numbers.

IDENTITY NUMBERS

■ 1. Find the sum.

$$4 + 0 =$$

■ 2. Find the product.

$$15 \cdot 1$$

■ 3. The identity number for addition is 0 because when we add 0 to a number the value does _____ change.

■ 4. The _____ number for multiplication is 1 because when we multiply a number by 1, the value does not change.

■ 5. Given the problem $10 + 0 = 10$, the 0 is the identity number for _____.

■ 6. Given the problem $20 \cdot 1 = 20$, the 1 is the identity number for _____.

OPPOSITE OF A NUMBER

- 1. What is the opposite of -15?

- 2. What is the opposite of $2/3$?

- 3. Opposites are numbers that are equal distance from _____.

- 4. What is the only number that is its own opposite?

- 5. When looking at a number line, the negative numbers are to the _____ of 0 and the positive numbers are to the _____ of 0.

- 6. We know 5 and -5 are opposite numbers because they are both _____ units away from 0.

ABSOLUTE VALUE

■ 1. Simplify the expression.

$$|-4|$$

■ 2. Simplify the expression.

$$|75|$$

■ 3. Write the numbers from least to greatest.

$$|-4|, |1|, |0|, |-8|, |9|$$

■ 4. Write the values from greatest to least.

$$|7|, |-3|, |0|, |-9|, |5|$$

■ 5. Absolute values make positive numbers _____ and negative numbers _____.

■ 6. Simplify the expression.

$|-3|$

ADDING AND SUBTRACTING SIGNED NUMBERS

■ 1. Simplify the expression.

$$-4 + 2$$

■ 2. Simplify the expression.

$$-11 - 8$$

■ 3. When we add two negative numbers, we'll always get a _____ number.

■ 4. Simplify the expression.

$$-19 - 26$$

■ 5. Simplify the expression.

$$5 - 8$$

■ 6. Simplify the expression.

$3 - (-6)$

MULTIPLYING SIGNED NUMBERS

■ 1. Multiplying two negative numbers will always result in a _____ number.

■ 2. Multiplying a negative and a positive number will always result in a _____ number.

■ 3. Multiplying two positive numbers will always result in a _____ number.

■ 4. Simplify the expression.

$$12 \cdot -5$$

■ 5. Simplify the expression.

$$-8 \cdot -6$$

■ 6. Simplify the expression.

$$25 \cdot 3$$

DIVIDING SIGNED NUMBERS

■ 1. Dividing a negative number by a negative number will always result in a _____ number.

■ 2. Dividing a positive number by a negative number will always result in a _____ number.

■ 3. Simplify the expression.

$$-12 \div 2$$

■ 4. Simplify the expression.

$$0 \div -8$$

■ 5. Simplify the expression.

$$24 \div -6$$

■ 6. Simplify the expression.

$-144 \div -12$

ABSOLUTE VALUE OF AN EXPRESSION

1. Simplify the expression.

$$|-6|+|-5\cdot 2|$$

2. Simplify the expression.

$$|-6|-|7|$$

3. Simplify the expression.

$$|-5\cdot 4|$$

4. Simplify the expression.

$$|-5\cdot -4\cdot 2|$$

5. Simplify the expression.

$$|-11+3|\cdot|-9|$$

6. Simplify the expression.

$|-8-2| \cdot |-4-3|$

DIVISIBILITY

1. Is 369 divisible by 3?

2. How can we determine if a number is divisible by 5?

3. "Divisibility" of whole numbers means we're looking at numbers that divide into a number _____.

4. Is 245 divisible by 7?

5. What is the smallest whole number larger than 20 that's divisible by 2 and 4?

6. What is the smallest whole number larger than 50 that's divisible by both 3 and 5?

MULTIPLES ✓

1. List the first four multiples of 8.

2. List the first five multiples of 40.

3. Is 8 a multiple of 8? Why or why not?

4. What are two common multiples of 2 and 3?

5. What are two common multiples of 5 and 10?

6. The concept of multiples is related to the concept of _____.

PRIME AND COMPOSITE

1. _____ numbers are numbers that are divisible by numbers other than 1 and themselves.

2. Is 7 a prime or composite number?

3. Is 15 a prime or composite number?

4. 35 is a composite number because it's divisible by which numbers?

5. 98 is a composite number because it's divisible by which numbers?

6. By how many numbers will a prime number be divisible?

PRIME FACTORIZATION AND PRODUCT OF PRIMES

■ 1. What is the prime factorization of 75?

■ 2. What is the prime factorization of 55?

■ 3. What is the prime factorization of 148?

■ 4. The prime factorization of 156 is $2 \cdot 2 \cdot 3 \cdot$ _____.

■ 5. The prime factorization of 63 is $3 \cdot 3 \cdot$ _____.

■ 6. Prime factorization is when we break down a composite number into its factors until every factor is a _____ number.

LEAST COMMON MULTIPLE

1. Find the least common multiple of 3 and 15.

2. Find the least common multiple of 16 and 40.

3. Find the least common multiple of the set $\{36, 84\}$.

4. Find the least common multiple of 12 and 20.

5. If the prime factorization of one number is $2 \cdot 3 \cdot 5^2$, and the prime factorization of another is $2^3 \cdot 3$, what's the least common multiple of the two numbers?

6. Is there only one possible pair of two numbers that can have a LCM of 20? Give examples to support the answer.

GREATEST COMMON FACTOR ✓

■ 1. The greatest common factor of two numbers is the _____ number that divides evenly into both numbers.

■ 2. Find the greatest common factor of 100 and 75.

■ 3. Find the greatest common factor of the set $\{54, 162\}$.

■ 4. If one number has a prime factorization of $3 \cdot 5 \cdot 11$, while another has a prime factorization of $2 \cdot 3^2 \cdot 11^2$, what is their greatest common factor?

■ 5. If one number has a prime factorization of $2^4 \cdot 3 \cdot 11$, while another has a prime factorization of $2^3 \cdot 5$, What is their greatest common factor?

■ 6. Is there only one possible pair of two numbers that can have a GCF of 16? Give examples to support the answer.

FRACTIONS ✓

- 1. What is the denominator of the fraction $3/5$?

- 2. How would we write $40\,\%$ as a fraction?

- 3. How would we write $75\,\%$ as a fraction?

- 4. If a pizza is cut into 6 equal pieces and Ben eats 2 of them, what fraction of the pizza did Ben eat?

- 5. Hazel is cleaning out her closet. She has 8 sweaters and 2 of them are blue. What fraction of her sweaters are blue?

- 6. Joey cuts a pie into 10 equal slices and eats 1 slice. What fraction of the pie did he eat?

SIMPLIFYING FRACTIONS AND EQUIVALENT FRACTIONS

- 1. Write $20/50$ as a simplified fraction.

- 2. Write the fraction $4/5$ in terms of 20ths.

- 3. Write $110/154$ as a simplified fraction.

- 4. Are the fractions $3/15$ and $6/36$ equivalent?

- 5. Are the fractions $2/16$ and $4/32$ equivalent?

- 6. When using prime factorization to reduce fractions, we're looking for the numbers in the numerator and denominator that are the _____ prime number.

DIVISION OF ZERO ✓

■ 1. The fraction $0/7$ means _____ divided by _____.

■ 2. The number _____ can never be the denominator of a fraction.

■ 3. The fraction $0/8$ has a value of _____.

■ 4. True or false? $5/0$ has a value of 0.

■ 5. Complete the statement.

$6 \cdot 0 = 0$ and $0 \div 6 =$ _____.

■ 6. Complete the statement of why we can't divide by 0.

$7 \div 0$ means that that something times 0 has a value equal to 7. But there's nothing times 0 that will ever equal 7 because anything times 0 will always equal _____. Therefore, it's impossible to divide by 0.

ADDING AND SUBTRACTING FRACTIONS ✓

■ 1. When we add or subtract fractions, we'll add or subtract the _____ and the _____ will stay the same.

■ 2. Find the sum.

$$\frac{1}{9}+\frac{3}{9}$$

■ 3. Find the difference.

$$\frac{7}{12}-\frac{2}{6}$$

■ 4. Find the sum.

$$\frac{1}{16}+\frac{3}{4}+\frac{5}{8}$$

■ 5. Simplify the expression.

$$\frac{7}{10}-\frac{1}{10}+\frac{2}{5}$$

6. Simplify the expression.

$$\frac{2}{15}+\frac{1}{5}-\frac{1}{30}$$

MULTIPLYING AND DIVIDING FRACTIONS ✓

■ 1. When we're dividing fractions, we need to flip the _____ fraction.

■ 2. Simplify the expression.

$$\frac{4}{7} \cdot \frac{2}{9}$$

■ 3. Simplify the expression.

$$\frac{5}{8} \div \frac{1}{12}$$

■ 4. Simplify the expression.

$$\frac{2}{9} \div \frac{1}{15}$$

■ 5. Simplify the expression.

$$\frac{1}{10} \cdot \frac{2}{5} \div \frac{1}{4}$$

6. Simplify the expression.

$$\frac{3}{5} \div \frac{1}{6} \cdot \frac{4}{9}$$

SIGNS OF FRACTIONS ✓

■ 1. Is the statement true or false?

$-\frac{1}{6}$ is equivalent to $\frac{-6}{1}$.

■ 2. Is the statement true or false?

$-\frac{3}{4}$ is equivalent to $\frac{3}{-4}$.

■ 3. Simplify the expression.

$$\frac{2}{11} \cdot -\frac{1}{4}$$

■ 4. Simplify the expression.

$$-\frac{3}{20} \cdot -\frac{2}{13}$$

■ 5. Simplify the expression.

$$\frac{4}{7} \div -\frac{3}{11}$$

■ 6. If the numerator and the denominator are both negative, the fraction will be _____.

RECIPROCALS ✓

- 1. A reciprocal is what we get when we _____ the fraction.

- 2. What is the reciprocal of $-1/2$?

- 3. What is the reciprocal of 3?

- 4. What is the reciprocal of $-1/4$?

- 5. The only number that does not have a reciprocal is _____.

- 6. When we multiply two numbers that are reciprocals of one another, the result is always _____.

MIXED NUMBERS AND IMPROPER FRACTIONS

■ 1. Mixed numbers are a representation of what operation (addition, subtraction, multiplication, division)?

■ 2. Convert $15/4$ into a mixed number.

■ 3. Convert $34/6$ into a mixed number.

■ 4. Write $-114/25$ as a mixed number.

■ 5. Convert the mixed number into an improper fraction.

$$-2\frac{1}{6}$$

■ 6. Convert the mixed number into an improper fraction.

$$8\frac{4}{9}$$

ADDING AND SUBTRACTING MIXED NUMBERS

■ 1. Simplify the expression.

$$5\frac{2}{3} + 1\frac{1}{12}$$

■ 2. Simplify the expression.

$$8\frac{7}{8} - 2\frac{1}{8}$$

■ 3. Simplify the expression.

$$7\frac{4}{5} - 6\frac{1}{15}$$

■ 4. Simplify the expression.

$$15\frac{1}{2} - 11\frac{1}{4}$$

■ 5. Joey and Alex are both solving the following problem.

$$2\frac{1}{3} + 1\frac{3}{5}$$

Joey takes $2 + 1 = 3$ and then takes

$$\frac{1}{3} + \frac{3}{5} = \frac{14}{15}$$

Then he adds them together to get

$$3\frac{14}{15}$$

Alex decides to change both into improper fractions before adding. He gets

$$2\frac{1}{3} = \frac{7}{3} \text{ and } 1\frac{3}{5} = \frac{8}{5}$$

Then she finds common denominators and adds them together to get

$$\frac{59}{15}$$

Who solved this problem correctly?

6. Simplify the expression.

$$3\frac{2}{5} + \frac{3}{10} - 2\frac{3}{5}$$

MULTIPLYING AND DIVIDING MIXED NUMBERS

■ 1. When we multiply and divide mixed numbers, we need to change the mixed numbers into _____ fractions before we do the multiplication or division.

■ 2. Simplify the expression.

$$3\frac{3}{7} \cdot 1\frac{1}{7}$$

■ 3. Simplify the expression.

$$5\frac{1}{5} \cdot 2\frac{2}{3}$$

■ 4. Simplify the expression.

$$2\frac{3}{4} \div 5\frac{1}{8}$$

■ 5. Simplify the expression.

$$4\frac{5}{9} \div 2\frac{1}{4}$$

6. Simplify the expression.

$$1\frac{4}{5} \div 3\frac{3}{8}$$

RELATIONSHIPS OF NUMBERS

1. Which fraction is larger?

$$\frac{1}{8} \text{ or } \frac{1}{6}$$

2. Which fraction is smaller?

$$\frac{3}{7} \text{ or } \frac{3}{8}$$

3. Find a number that's $1/5$ of the way from $2/5$ to $3/10$.

4. Find a number that's $2/3$ of the way from $-2/3$ to $1/4$.

5. Find the fraction halfway between $1/2$ and $2/5$.

6. Find the fraction halfway between $1/10$ and $8/13$.

ADDING MIXED MEASURES

■ 1. Add the mixed measures.

4 seconds, 11 minutes, 3 hours, 35 minutes, 56 minutes, 35 seconds

■ 2. Add the mixed measures.

34 inches, 2 yards, 5 feet, 8 inches, 13 feet, 1 yard

■ 3. Add the mixed measures.

25 seconds, 1 hour, 15 minutes, 45 seconds, 22 minutes

■ 4. Add the mixed measures.

13 inches, 45 feet, 35 inches, 27 feet, 9 yards

■ 5. Add the mixed measures.

1 foot, 38 inches

■ 6. Add the mixed measures.

1 hour, 85 minutes, 55 seconds, 20 minutes

PLACE VALUE

- 1. Identify the place value of the 2 in $4{,}562.387$.

- 2. Identify the place value of the 0 in 307.119.

- 3. What is the number in the ten-thousandths place of $6{,}520.0019$?

- 4. What is the number in the tenths place of 0.89104?

- 5. The further we move to the right of the decimal point, the _____ (smaller or larger?) the value gets.

- 6. The further we move to the left of the decimal point, the _____ (smaller or larger?) the value gets.

DECIMAL ARITHMETIC

1. Find the sum.

$$4.5 + 3.75$$

2. Find the difference.

$$7.87 - 4.9876$$

3. Find the product.

$$1.5 \cdot 8.8$$

4. Find the quotient.

$$5.65 \div 0.02$$

5. Simplify the expression.

$$2.5783 + 5.789 - 3.25$$

6. Simplify the expression.

$1.24 \cdot 2.61$

REPEATING DECIMALS

1. A finite decimal number is a number that _____.

2. Rewrite 0.888888 as a repeating decimal.

3. Rewrite 0.1818181818 as a repeating decimal.

4. What is the next digit in $3.\overline{142857}$?

5. What is the next digit in $0.41\overline{6}$?

6. Name an example of a decimal number that does not end, but does not repeat.

ROUNDING

1. If a number is _____ or greater, we round up.

2. Round 11.451 to the nearest tenth.

3. Round 691.014 to the tens place.

4. Round $11.\overline{6}$ to the nearest thousandth.

5. When we round a number to the tenths place, we look at the digit in the _____ place in order to determine which way to round the number.

6. Judith types $2 \div 3$ into the calculator and gets the answer 0.66666666667. Judith tells her friend Andy that this is not a repeating decimal because there is a 7 at the end. Andy disagrees and says the calculator rounds the number and that is why there is a 7. Who is correct? Why?

RATIO AND PROPORTION

■ 1. Solve for the variable.

$$\frac{6}{10} = \frac{m}{15}$$

■ 2. Solve for the variable.

$$\frac{d}{7} = \frac{14}{49}$$

■ 3. Solve for the variable.

$$\frac{5}{v} = \frac{25}{40}$$

■ 4. Solve for the variable.

$$\frac{22}{30} = \frac{33}{t}$$

■ 5. Solve for the variable.

$$\frac{8}{12} = \frac{20}{x}$$

■ 6. The reason we multiply the left and right side by the same number when we cross multiply is because, when we're solving equations, we must keep both sides _____.

UNIT PRICE

■ 1. If we can purchase 2 oranges for $\$0.20$, how many oranges can we purchase for $\$2.00$?

■ 2. If we purchase 2 oranges for $\$0.20$, how much will it cost to purchase 5 oranges?

■ 3. Sally went to the candy store and bought 40 jelly beans for $\$0.50$. How much would 60 jelly beans cost her?

■ 4. While Steven is at the grocery store, he's trying to determine which bag of popcorn is the better deal. The first bag is a 10-ounce bag of popcorn for $\$1.59$. The second bag is a 15-ounce bag of popcorn for $\$1.89$. Which bag is the better deal? Why?

■ 5. We can purchase 15 pencils for $\$4$. If we want to find the price per pencil, we would divide _____ by _____.

6. We can purchase 15 pencils for $\$4$. If we want to find the number of pencils we can buy per dollar, we would divide _____ by _____.

UNIT MULTIPLIERS

■ 1. When we're setting up a unit multiplier, the units we want to keep need to be placed in the _____ of the fraction.

■ 2. Convert 8 yards to inches.

■ 3. Convert 4 square feet to square inches.

■ 4. Convert 144 square inches to square feet.

■ 5. Convert $4{,}320$ cubic inches to cubic feet.

■ 6. Jason is converting $4{,}536$ cubic feet to cubic yards. His work is shown below. Did he solve the problem correctly? Why or why not?

$$4{,}536 \text{ cubic feet} \cdot \frac{3 \text{ feet}}{1 \text{ yard}} \cdot \frac{3 \text{ feet}}{1 \text{ yard}} \cdot \frac{3 \text{ feet}}{1 \text{ yard}} = 122{,}472 \text{ cubic yards}$$

EXPONENTS

■ 1. An exponent tells us how many times to multiply the base by _____.

■ 2. Is 2^3 the same as 3^2? Why or why not?

■ 3. Find the sum.

$$5^3 + 2^4$$

■ 4. Write the number using exponents.

$$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

■ 5. Write the following number without an exponent.

$$1^6$$

■ 6. Write the number without an exponent.

$$(-9)^6$$

RULES OF EXPONENTS

■ 1. Find the sum.

$$2x^3 + x^3 + x^3 + 3x^3$$

■ 2. Find the product.

$$x^6 \cdot x^2 \cdot x^3$$

■ 3. Simplify the expression.

$$x \cdot x \cdot x$$

■ 4. Stephanie and Jimmy are trying to find a shortcut to simplify the expression below. Stephanie says that they should add the exponents $(3 + 5 = 8)$ and then raise 4 to that power. Jimmy says that since it's multiplication, they should multiply the exponents $(3 \cdot 5 = 15)$ and then raise 4 to that power. Who is correct and why?

$$4^3 \cdot 4^5$$

■ 5. Simplify the expression.

$$\frac{x^5 + x^2 \cdot x^3}{x^7}$$

6. Simplify the expression.

$$\frac{x^{-4} \cdot x^6}{x^2}$$

POWER RULE FOR EXPONENTS

■ 1. The power rule tells us that, when we raise a power to a power, we can _____ those powers together.

■ 2. Simplify the expression.

$$(x^3)^3$$

■ 3. Simplify the expression.

$$(x^2)^{-4}$$

■ 4. Simplify the expression.

$$(2^m)^p$$

■ 5. Simplify the expression.

$$(x^2y^2)^3$$

■ 6. Simplify the expression.

$(x^{-5} \cdot x^4)^{-2}$

NEGATIVE AND OTHER EXPONENT RULES

■ 1. Simplify the expression.

$$\frac{9a^5b^4}{3a^2b^7}$$

■ 2. Simplify the expression.

$$\frac{2x^0y^6 - (y^2)^3}{x^6}$$

■ 3. Simplify the expression.

$$\frac{(x^{2p})^3}{x^{3p}y^{3p}}$$

■ 4. Simplify the expression.

$$\frac{(x^{-3a+4})^2}{x^{-4a+8}y^{-2a}}$$

■ 5. Simplify the expression.

$$\left(\frac{5x^{-2}}{y^{-2}}\right)^4$$

6. Simplify the expression.

$$\left(\frac{2x^5y^7}{y^{12}}\right)^0$$

RADICALS

- 1. Radicals are the opposite of _____.
- 2. $\sqrt[4]{x}$ can also be written as _____.
- 3. Find the value of $\sqrt{36}$.
- 4. $x^{\frac{1}{3}}$ can also be written as _____.
- 5. Find the value of $\sqrt{300}$.
- 6. Find the value of $\sqrt{5{,}000}$.

ADDING AND SUBTRACTING RADICALS

- 1. Find the value of $2\sqrt{3} + 5\sqrt{3}$.

- 2. Find the value of $\sqrt{32} - \sqrt{2}$.

- 3. Find the value of $\sqrt{3} + \sqrt{12}$.

- 4. Find the value of $\sqrt{16} + \sqrt{25}$.

- 5. Find the value of $4\sqrt{3} + 2\sqrt{2} - 2\sqrt{3} - \sqrt{2}$.

- 6. Find the value of $3\sqrt{4} - 2\sqrt{9}$.

MULTIPLYING RADICALS

1. Find the value of $\sqrt{20} \cdot \sqrt{4}$.

2. Find the value of $\sqrt{13} \cdot \sqrt{7}$.

3. Find the value of $8\sqrt{3} \cdot \sqrt{12}$.

4. Find the value of $15\sqrt{2} \cdot \sqrt{16}$.

5. Find the value of $2\sqrt{3} \cdot 5\sqrt{5}$.

6. Find the value of $\sqrt[3]{12} \cdot \sqrt[3]{4}$.

DIVIDING RADICALS

1. Simplify the expression.

$$\sqrt{\frac{36}{6}}$$

2. Simplify the expression.

$$\sqrt{\frac{45}{5}}$$

3. Simplify the expression.

$$\frac{\sqrt{20x^5y^7}}{\sqrt{5x^3y}}$$

4. Simplify the expression.

$$\frac{\sqrt[3]{-32}}{\sqrt[3]{2}}$$

■ 5. Simplify the expression.

$$\frac{\sqrt{5}}{\sqrt{15}}$$

■ 6. Simplify the expression.

$$\frac{\sqrt{8}}{5\sqrt{2}}$$

RADICAL EXPRESSIONS

■ 1. Find the value of $\sqrt{80} - \sqrt{20}$.

■ 2. Find the value of $5\sqrt{24} \cdot \sqrt{15}$.

■ 3. The square root of a number multiplied by the square root of the same number is equal to _____.

■ 4. Find the value of $\sqrt{2} + \sqrt{32} - \sqrt{50}$.

■ 5. To be able to add or subtract radicals, the roots must be _____ when they are simplified.

■ 6. Roberta is trying to simplify the following radical expression,

$$\sqrt{4} + \sqrt{20} - 2\sqrt{5} + \sqrt{25}$$

and her work is shown below.

Step 1: $2 + \sqrt{20} - 2\sqrt{5} + 5$

Step 2: $2+\sqrt{4\cdot 5}-2\sqrt{5}+5$

Step 3: $2+4\sqrt{5}-2\sqrt{5}+5$

Step 4: $7+2\sqrt{5}$

In which step did she make a mistake? What should she have done differently, and what is the correct answer?

POWERS OF 10

■ 1. If we multiply a number by a power of 10, e can count the number of zeroes to know how many spaces to move the _____ to the _____.

■ 2. Find the product.

$$450 \cdot 10^0$$

■ 3. Find the quotient.

$$6.4 \div 100$$

■ 4. Find the product.

$$3.5 \times 10^4$$

■ 5. Find the product.

$$1.8 \times 10^{-2}$$

6. Find the quotient.

$$420 \div 10^3$$

SCIENTIFIC NOTATION

■ 1. Scientific notation has 2 parts. The first part is the decimal number and the second part is the _____.

■ 2. The decimal number of a number written in scientific notation must be between 1 and _____.

■ 3. Write the number in scientific notation.

0.000000056

■ 4. Write the number in scientific notation.

0.000000000000012

■ 5. Write number in expanded form.

7.2×10^{12}

■ 6. Write number in expanded form.

4.9×10^{-7}

MULTIPLYING SCIENTIFIC NOTATION

■ 1. Write the product $(3.1 \times 10^5)(5.5 \times 10^{-7})$ in scientific notation.

■ 2. Write the product $(1.8 \times 10^4)(5.9 \times 10^6)$ in scientific notation.

■ 3. Write the product $(8.8 \times 10^{-2})(7.85 \times 10^{-5})$ in scientific notation.

■ 4. Write the product $(1.3 \times 10^3)(2.6 \times 10^{-4})$ in scientific notation.

■ 5. If we're given 3.6×10^{-2} in scientific notation, will we get a smaller or larger number when we multiply it by a positive power of 10?

■ 6. Yvonne is asked to find the product of two numbers written in scientific notation:

$$(2.8 \times 10^4)(4.46 \times 10^{-6})$$

She solves the problem in three steps.

Step 1 $2.8 \times 4.46 = 12.488$

Step 2 $4 + (-6) = -2$

Step 3 12.488×10^{-2}

In what step did she make her mistake? What is the correct answer?

DIVIDING SCIENTIFIC NOTATION

■ 1. When we divide two numbers that have the same base, we _____ the exponents.

■ 2. Find the value of $(1.5 \times 10^{8}) \div (2.0 \times 10^{-3})$.

■ 3. Find the value of $(6.75 \times 10^{3}) \div (1.5 \times 10^{9})$.

■ 4. Find the value of $(2.75 \times 10^{10}) \div (8.0 \times 10^{8})$.

■ 5. Find the value of $(7.5 \times 10^{4}) \div (1.5 \times 10^{-4})$.

■ 6. If we're given 5.75×10^{6} in scientific notation and we divide it by a negative power of 10, will we get a larger or smaller result?

MULTIPLYING AND DIVIDING SCIENTIFIC NOTATION

■ 1. Simplify the expression.

$$\frac{(4.5 \times 10^{3})(1.4 \times 10^{-5})}{2.8 \times 10^{-1}}$$

■ 2. Simplify the expression.

$$\frac{(7.6 \times 10^{5})(1.1 \times 10^{-7})}{5.1 \times 10^{-3}}$$

■ 3. Simplify the expression.

$$\frac{(1.7 \times 10^{-3})(3.4 \times 10^{-4})}{(6.3 \times 10^{-3})(7.3 \times 10^{-2})}$$

■ 4. Simplify the expression.

$$\frac{(4.9 \times 10^{4})(6.4 \times 10^{-4})}{(8.2 \times 10^{-3})(2 \times 10^{3})}$$

■ 5. Simplify the expression.

$$\frac{(6.1 \times 10^{6})(6.8 \times 10^{-4})}{(1.1 \times 10^{-5})(1.8 \times 10^{5})}$$

■ 6. Danny and Deacon are working on finding the quotient below. Danny decides to multiply out the numerator and gets $10{,}000$ for the powers of 10 portion. Then he divides it by 0.00061 to get $16{,}393{,}442.6$ or 1.63934426×10^{7}. Deacon decides he wants to divide, so he divides each number by 0.00061 and gets $819{,}672{,}131$ and 32.78689852. Then he multiplies those numbers to get 2.68745×10^{10}. Why are the answers different? Who is correct?

$$\frac{(5 \times 10^{5})(2 \times 10^{-2})}{6.1 \times 10^{-4}}$$

ESTIMATING SCIENTIFIC NOTATION

■ 1. Estimate the value of 3.65×10^{-5}.

■ 2. Use scientific notation to estimate the value $(5.75 \times 10^{6})(2.34 \times 10^{-1})$.

■ 3. Use scientific notation to estimate the value of $(2.456 \times 10^{3})(1.67 \times 10^{-7})$.

■ 4. Use scientific notation to estimate the value of the expression.

$$\frac{7.152 \times 10^{2}}{2.91 \times 10^{2}}$$

■ 5. Use scientific notation to estimate the value of the expression.

$$\frac{(6.2 \times 10^{6})(6.4 \times 10^{-3})}{(4.25 \times 10^{-2})(2.9 \times 10^{-3})}$$

■ 6. Use scientific notation to estimate the value of the expression.

$$\frac{(1.7 \times 10^{-5})(2.6 \times 10^{2})}{(3.334 \times 10^{-3})(2.5 \times 10^{-1})}$$

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