

Mid-term Study Guide and Review

CHAPTER 1: NUMBER SENSE, ADDITION, AND SUBTRACTION

1-1 Place Value (Pages 34-35)

Write the place of the underlined digit. Then write its value.

1) 259,887,934 _____

2) 17.09875 _____

Write the number in standard form.

3) Fourteen million, six thousand, five hundred forty-two _____

1-2 Expanded Form (Pages 36-37)

A number expressed in expanded form shows the sum of the products of each digit and its place value.

Write in expanded form in two ways.

1) 7,801,560

Write in standard form and expanded form.

2) 4 trillion, eight million, three

Write the expanded form in standard form.

3) $30 + 1 + 0.05 + 0.007 + 0.0009$ _____

1-3 Place Value and Exponents (Pages 38-39)

Remember: Any base to the zero power is 1.

Write each power of ten in standard form.

1) 10^7 _____

2) 10^0 _____

3) 10^{-2} _____

Write the number in standard form

$$4) (5 \times 10^7) + (8 \times 10^5) + (3 \times 10^1) \quad \underline{\hspace{10em}}$$

1-4 Compare and Order Decimals (Pages 40-41)

Compare, write $<$, $=$, or $>$

1) 0.509 _____ 0.510

2) 7.610 _____ 7.61

3) 91.42 _____ 90.425

Write in order from greatest to least.

4) 0.484, 0.495, 0.523, 0.54

1-5 Round Whole Numbers and Decimals (Pages 42-43)

Round to the nearest cent.

1) \$5.389 _____

2) \$ 0.85 _____

3) \$99.9996 _____

Round to the underlined place.

4) 12,225 _____

5) 99.37 _____

6) 3.14159 _____

Round each number to its greatest nonzero place.

7) 44.8276 _____

8) 0.00473 _____

1-7 Addition of Whole Numbers and Decimals (Pages 46-47)

Find the sum.

$$\begin{array}{r} 1) \ 11 \\ + \ 5.276 \\ \hline \end{array}$$

$$\begin{array}{r} 2) \ 7.5833 \\ + \ 22.05 \\ \hline \end{array}$$

$$3) \ 16 + 2.75 + 0.00972$$

1-8 Subtraction of Whole Numbers and Decimals (Pages 48-49)

Find the difference.

$$\begin{array}{r} 1) \ \$740,666 \\ - \ \$326,457 \\ \hline \end{array}$$

$$\begin{array}{r} 2) \ 0.7089 \\ - \ 0.6192 \\ \hline \end{array}$$

Align and find the difference.

$$3) \ 20,700.675 - 700.775$$

1-9 Addition and Subtraction of Decimals (Pages 50-51)

Find the sum.

$$\begin{array}{r} 1) \ 0.62 \\ \ 0.0635 \\ + \ 0.0042 \\ \hline \end{array}$$

Find the difference.

$$\begin{array}{r} 2) \ 412.009 \\ - \ 228.4 \\ \hline \end{array}$$

Align and add.

$$3) \ 629.55 + 401.39201$$

Align and subtract.

$$4) \ 5,790.005 - 4,937.552$$

CHAPTER 2: MULTIPLICATION:WHOLE NUMBERS AND DECIMALS

2-3 Multiply with Whole numbers (Pages 70-71)

Find each product.

1) 805×436

2) 740×5565

2-4 Multiply with Decimals (Pages 72-73)

Write the decimal point in the product.

1)
$$\begin{array}{r} 9.27 \\ \times 1.5 \\ \hline 13905 \end{array}$$

Multiply, round to the nearest cent if necessary.

2)
$$\begin{array}{r} 0.7 \\ \times 22 \\ \hline \end{array}$$

3)
$$\begin{array}{r} 0.911 \\ \times 9.11 \\ \hline \end{array}$$

4) $\$59.50 \times 2.4$

2-5 Exponents (Pages 74-75)

Base^{Exponent}

The Base is a repeated factor.

The Exponent tells you how many times the base is a repeated factor

Exponents are also called powers

$5^6 = 5 \times 5 \times 5 \times 5 \times 5 \times 5$ 5 is the base
6 is the exponent
5 is a repeated factor 6 times

Any base to the zero (0) exponent (power) is 1.

$3^0 = 1$

$99^0 = 1$

“squared” means to the second power – exponent of 2

“cubed” means to the third power = exponent of 3

Write each product in its exponential form.

1) $5 \times 5 \times 5 \times 5 \times 5 \times 5$ _____

2) $100 \times 100 \times 100$ _____

3) $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$ _____

Write the standard form for each.

4) 3^1 _____

5) 4^3 _____

6) 6^0 _____

7) 12^2 _____

8) 3^4 _____

2-6 Scientific Notation (Pages 76-77)

Scientific notation is used to write very large and very small numbers in a more compact way.

If the number is very large – (greater than 1) then the exponents on the power of 10 will be positive.

If the number is very small – (less than 1) then the exponents on the power of 10 will be negative.

A Number is written in Scientific form if it is written as a product of a power of 10 and a factor greater than or equal to 1, but less than 10.

Write in Scientific Notation

1) 350,000 _____

2) 25,500,000 _____

3) 9,000,000,000,000 _____

Write in standard form

4) 7×10^5 _____

5) 3.704×10^8 _____

6) 2.4×10^3 _____

CHAPTER 3: DIVISION: WHOLE NUMBERS AND DECIMALS

3-3 Divide Whole Numbers (Pages 92-93)

Use the steps of Long division to divide whole numbers

Divide	(Does)
Multiply	(McDonalds)
Subtract	(Sell)
Check	(Cheese)
Bringdown	(Burgers)

When the divisor does not “go into” the dividend, you can write an “x” to help you keep your numbers aligned.

Once you have begun dividing, if the divisor cannot go into the next number, write a zero in the quotient. Multiply by zero, subtract and bring down the next number in the dividend.

Find each quotient.

1) $\overline{72)72,072}$ _____

2) $400,458 \div 186$ _____

3-5 Divide Decimals by Whole Numbers (Pages 96-97)

Make sure the divisor is a whole number.

Then, write the decimal point in the quotient directly above the decimal point in the dividend.

Divide as you would with whole numbers

Check.

1) $\overline{5)99.5}$ _____

2) $\overline{3)0.1077}$ _____

3) $\overline{6)7.836}$ _____

3-8 Decimal Divisors (Pages 102-103)

This is an important lesson – you cannot have a decimal divisor.

The divisor must always be a whole number!

You will need to move the decimal point in the divisor to the right enough spaces to make the divisor a whole number

You must then move the decimal point in the dividend to the right the SAME number of spaces that you moved it in the divisor. You may have to place a decimal point behind the last digit in the dividend if there was not a decimal point.

That is OK – because you know that “Every whole number has a decimal behind it – whether you can see it or not , it is there.”

Divide

$$1) \overline{0.5)7.55}$$

$$2) \overline{0.18)0.036}$$

$$3) 555.6 \div 0.6$$

3-9 Zeros in Division (Pages 104-105)

When there are more decimal places in the divisor than in the dividend, one or more zeros must be written in the dividend in order to complete the division. In some cases you need to place zero places holders in the quotient before you can begin dividing.

Divide.

$$1) \overline{0.32)0.4}$$

$$2) \overline{0.8)1}$$

$$3) \overline{6.2)0.372}$$

3-10 Multiplication and Division Expressions (Pages 106-107)

There are several equivalent ways to represent multiplication expressions

$$45 \times 2 \quad 45 \cdot 2 \quad 45(2) \quad (45)(2)$$

When a variable is part of the multiplication expression, there is one more way.- writing the variable letter squished next to a number.

$$45 \times a \quad 45 \cdot a \quad 45(a) \quad (45)(a) \quad 45a$$

There are equivalent ways to represent a division expression

$$90 \div 4 \quad \frac{90}{4} \quad \overline{4)90} \quad \Leftarrow \text{This is only for long division}$$

When a variable is part of the expression, this is the way it looks.

$$90 \div m \quad \frac{90}{m} \quad \overline{m)90} \quad \Leftarrow \text{This is only for long division}$$

3-11 Evaluate Multiplication and Division Expressions (Pages 108-109)

Evaluate means find the the value.

To evaluate an algebraic expression: Substitute the given number for the variable.
Simplify to find the value of the expression

Evaluate:

1) $0.25 \times 8 \times 30.4$

2) $345 \div f$; when $f = 15$

CHAPTER 5: INTEGERS

5-1 Identify integers just before and just after a given integer. (Pages 150-151)

Integers are the whole numbers and their opposites. They are either positive, negative or zero.

1. Write the integer that is just before and just after the given number on a number line.

a. +8 _____

c. +99 _____

b. -17 _____

d. 0 _____

2. Write the opposite of each integer

a. -16 _____

b. +20 _____

3. Write the integer to represent the situation.

a. a gain of 45 dollars. _____

b. 20 degrees cooler _____

5-1 Interpret Absolute Value (Pages 150-151)

The absolute value of a number is its distance from zero on a number line.

1. Write the absolute value of the integer.

a. $|-33|$ _____

c. $|257|$ _____

b. $|+8|$ _____

d. $-|100|$ _____

5-2 Compare and order integers (Pages 152-153)

1. Choose the greater integer. Use a number line to help.

a. +10, -16 _____

b. -8, -11 _____

2. Compare. Write $<$, $>$, $=$

a. -25 ___ $+16$ _____

b. $-(-33)$ ___ 32 _____

3. Arrange in order from least to greatest.

a. $+4, -2, +5, -4$ _____

4. Arrange in order from greatest to least.

a. $+8, +12, -15, -30$ _____

5-3 Add Positive and Negative Integers (Pages 154-155)

To add integers with like signs, add the absolute value of the addends, use the sign of the addends for the sum.

To add integers with unlike signs, Subtract the addend with the lesser absolute value from the addend with the greater absolute value. Use the sign from the addend with the greater absolute value for the sum.

1. Add.

a. $-4 + +9 =$ _____

b. $-7 + -3 =$ _____

c. $+4 + +8 =$ _____

d. $+20 + -19 =$ _____

5-4 Subtract Positive and Negative Integers (Pages 156-157)

Subtracting an integer is the same as adding the opposite of that integer. $a - b = a + (-b)$

Remember we say "Subtraction is the same as adding the opposite – so switch subtraction to addition and flip the sign of the number we are subtracting"

1. Subtract.

a. $+3 - -2 =$ _____

c. $-6 - -7 =$ _____

b. $+8 - +10 =$ _____

d. $-10 - +15 =$ _____

5-5 Multiply Positive and Negative Integers (Pages 158-159)

To multiply two integers, multiply their absolute values.

When the two factors have like sign, the product is positive

$$(+)\times (+) = + \quad (-)\times (-) = +$$

When the two factors have unlike signs, the product is negative.

$$(+)\times (-) = - \quad (-)\times (+) = -$$

1. Find the product.

a. $-75 \times 0 =$ _____

b. $25 \times -15 =$ _____

c. $-12 \times -12 =$ _____

d. $+10 \times +15 =$ _____

e. $+6 \times -6 \times +1 =$ _____

5-6 Divide Positive and Negative Integers (Pages 160 – 161)

YOU CANNOT DIVIDE AN INTEGER BY ZERO – IMPOSSIBLE!!!!

To divide two integers, divide their absolute values.

The quotient will be positive when the integers have like signs

$$(+)\div(+)=+ \quad (-)\div(-)=+$$

The quotient will be negative when the integers have unlike signs.

$$(-)\div(+)= - \quad (+)\div(-)= -$$

1. Find the quotient.

a. $+54 \div -6 =$ _____

b. $-200 \div -10 =$ _____

c. $0 \div 9 =$ _____

d. $-15 \div 0 =$ _____

e. $+72 \div -9 =$ _____

5-7 Order of Operations for Computation with Integers (Pages 162 – 164)

PEMDAS

Parentheses

Exponents

Multiplication/Division – whichever is first reading right to left

Addition/Subtraction – whichever is first reading right to left

1. Compute

a. $+3 \times -16 - (+36)^2 \div 2 =$ _____

b. $-16 - +4 \div (+1 + +1)^2 =$ _____

5-8 Expressions and Equations with Integers (Page 164- 165)

Evaluate each expression when $a = +5$, $b = -3$, $c = -6$ and $d = 0$

1. $a - b$ _____

2. $(c + b) \times a$ _____

3. $bc - a$ _____

4. $b \div d$ _____

5-9 Temperature – apply addition and subtraction of integers to temperature

- Use formulas to estimate conversions between degrees Celsius and degrees Fahrenheit (Pages 166-167)

When the temperature drops 25° - think -25

When the temperature rises 2° - think $+2$

Temperature is measured in degrees Fahrenheit ($^\circ\text{F}$) and degrees Celsius ($^\circ\text{C}$)

The approximate conversion between $^\circ\text{F}$ and $^\circ\text{C}$: $^\circ\text{C} \approx (^\circ\text{F} - 30) \div 2$

The approximate conversion between $^\circ\text{C}$ and $^\circ\text{F}$: $^\circ\text{F} \approx 2(^\circ\text{C}) + 30$

1. Estimate the temperature in $^\circ\text{C}$ or $^\circ\text{F}$.
 - a. 75°C _____
 - b. 114°F _____

CHAPTER 6: NUMBER THEORY AND FRACTIONS

6-1 Prime and Composite Numbers (Pages 180-181)

A Prime number is a whole number greater than 1 with *exactly (only)* two factors : itself and 1.

A Composite number is a whole number greater than 1 with *more than* two factors.

Zero (0) and one (1) are neither prime nor composite.

Two (2) is the only even prime number.

6-3 Prime Factorization (Pages 182-183)

See your notes and worksheets on prime factor trees.

6-4 Equivalent Fractions (Pages 184-185)

6-5 Greatest Common Factor (Pages 186-187)

Choose one of two methods to find the GCF

- 1) List all the factors of each number – circle the greatest number common to each lists.
- 2) Make a prime factor tree for each number. Circle factors common to each tree – then multiply the common factors to get the greatest factor.

6-6 Fractions in Simplest Form (Pages 188-189)

6-7 Mixed and Improper Fractions (Pages 190-191)

6-8 Fraction Sense – How to tell if a fraction is close to 1, $\frac{1}{2}$, or 0 (Pages 192-194)

A fraction is close to 0 when the numerator is much less than the denominator

A fraction is close to $\frac{1}{2}$ when double the numerator is about equal to the denominator.

A fraction is close to 1 when the numerator is about equal to the denominator,

1. Tell whether the fraction is close to 0, $\frac{1}{2}$, or 1

a. $\frac{17}{30}$ _____

b. $\frac{18}{100}$ _____

c. $\frac{6}{7}$ _____

6-9 Least Common Multiple) Pages 194-195)

List the multiples of each number you are comparing until you find a multiple that is common to each list.

6-10 Comparing Fractions on a Number Line (Pages 196-197)

To compare fractions with like denominators, compare the numerators. The fraction with the greatest numerator is the greater fraction.

If the fractions do not have a common denominator, you will need to find the least common denominator (LCD) and rename the fractions as equivalent fractions with the same denominator, Then you can compare the numerators to determine the larger fraction.

1. Rename each pair of fractions using the LCD as their denominator. Determine the greater fraction.

a. $\frac{1}{3}$ and $\frac{4}{9}$ _____

b. $\frac{2}{5}$ and $\frac{3}{7}$ _____

6-11 Order Fractions (Pages 198-199)

1. Write in order from least to greatest.

a. $5/12, 3/8, 5/6$

b. $3/7, 1/2, 4/14$

6-12 Relate Fractions to Decimals (Pages 200-201)

Fractions that have denominators that are powers of 10 can be rewritten as decimals.

$7/10$; seven tenths = 0.7 $7/100$; seven hundredths = 0.07 $7/1000$; seven thousandths = 0.007

1. Write the equivalent fraction or decimal

a. $8/100$

b. $273/1000$

c. 12.37

d. 0.83

6-13 Rename Fractions as Decimals (Pages 202-203)

To rename a fraction as a decimal:

Drop a line and divide the numerator by the denominator

Place a decimal point after the numerator in the the quotient.

Divide, add zeros as needed.

To rename a mixed number as a decimal:

Separate the mixed number into a whole part and a fraction part

Rename the fraction part as a decimal

Add the whole part and the decimal part

1. Write each fraction as a decimal.

a. $2/5$

b. $1/25$

c. $19/20$

2. Write each mixed number as a decimal

a. $8 \frac{9}{10}$

b. $7 \frac{3}{100}$

6-14 Rename Decimals as Fractions (Pages 204-205)

To rename a decimal as a fraction:

Read the given decimal

Determine the denominator (10, 100, 1000, etc)

Write the equivalent fraction

Simplify if necessary

1. Rename each decimal as a fraction, reduce to simplest form if necessary.

a. 0.77

b. 0.05

c. 0.36

d. 12.1

6-15 Terminating and Repeating Decimals (Pages 206-207)

Decimals that have a finite number of decimal places, (in other words stop) are called terminating decimals.

Decimals that have a digit or set of digits that repeat indefinitely (such as 0.333333, or 0.2727272727) are called repeating decimals and are written with a horizontal bar over the repeating numbers.

6-16 Rational Numbers (Pages 208-209)

A rational number is a number that can be written in the form of a fraction (or ratio) a/b

6-17 Compare and Order Rational Numbers (Pages 210-211)

CHAPTER 11: RATIO, PROPORTION, AND PERCENT

11-1 Ratio (Pages 376- 377)

A ratio is a way of comparing two numbers or quantities, a and b , by division. The numbers a and b are called the terms of the ratio.

A ratio can be written in three forms:

Word form: a to b

Ratio form : $a : b$

Fraction form : a/b

All three forms are read as the ratio of a to b

11-2 Equivalent Ratios (pages 378-379)

Write and use equivalent ratios.

11-4 Proportions (pages 382-383)

Determine if two ratios form a proportion.

To find the missing term in a proportion.

11-5 Solve Proportions (pages 384-385)

Find the missing term in a proportion.

11-10 Relate Percents to Fractions (Pages 394-395)

A percent is a ratio that compare a number to 100. Percent means “per hundred” or “out of 100”.

The symbol for percent is %

11-11 Relate Percents to Decimals (Pages 396-397)

Write a percent as a decimal and visa versa.

11-12 Decimals, Fractions, and Percents (Pages 398-399)

Write a decimal percent as a decimal.

Write a fraction that is not a factor of 100 as a percent.

11-13 Percents Greater than 100% (Pages 400-401)

Write percents greater than 100% as decimals and mixed numbers.

11-14 Percents Less than 1% (Pages 402-403)

Write decimals and fractions less than .001 and $1/100$ as percents less than 1% in both decimal and fraction form.

Write decimal and fraction percents less than 1% as decimals and fractions less than .001 and $1/100$.