

Mini-Lecture 1.1

Tips for Success in Mathematics

Learning Objectives:

1. Getting ready for this course
2. Understand some general tips for success.
3. Understand how to use the text.
4. Get help as soon as you need it.
5. Learn how to prepare for and take an exam.
6. Develop good time management.

Examples:

1. Getting ready for this course.
 - a) Positive attitude
 - b) Allow adequate time for class arrival
 - c) Bring all required materials

General tips for success.

- | | |
|--|---|
| <ol style="list-style-type: none">d) Find a contact personf) Do your homeworkh) Learn from mistakesj) Stay organizedl) Ask questions | <ol style="list-style-type: none">e) Choose to attend <u>all</u> classesg) Check your worki) Seek help when neededk) Read textbook before classm) Hand in all assignments on time |
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-
2. Understand how to use the text.
 - a) Practice Problems – a problem the student can try to match each example in each section.
 - b) Chapter Test Prep Video CD – (CD inside book) each Chapter test exercise worked out by the author.
 - c) Lecture Video CDs – (not included with book) the author explains each section and works specified example problems within each section
 - d) **Review** the meaning of icons used in text.
 - e) **At beginning** of each section, a list of icons shows availability of support materials.
 - f) **Integrated Reviews** – found in the middle of each chapter for students to practice the concepts previous learned in a chapter
 - g) Each chapter ends with Chapter Highlights, Reviews, and Practice Tests.
 3. Learn to take exams.
 - a) Review previous homework assignments, class notes, quizzes, etc.
 - b) Read Chapter Highlights to review concepts and definitions.
 - c) Practice working out exercises in the end-of-the-chapter Review and Test.
 - d) When taking a test, read directions and problems carefully.
 - e) Pace yourself. Use all available time. Check your work and answers.
 4. Good time management.
 - a) Make a list of all weekly commitments with estimated time needed.
 - b) Be sure to schedule study time. Don't forget eating, sleeping, and relaxing!

Teaching Notes:

- Most developmental students have a high anxiety level with mathematics.
- Many developmental students are hesitant to ask questions and seek extra help.
- Be sure to include your individual expectations. Keep your expectations clear and concise.

Mini-Lecture 1.2

Place Value and Names for Numbers

Learning Objectives:

1. Find the place value of a digit in a whole number.
2. Write a whole number in words and in standard form.
3. Write a whole number in expanded form.
4. Read tables.
5. Key Vocabulary: *whole numbers, place value, standard form, period, expanded form, tables.*

Examples:

1. Find the place value of the digit 7 in each whole number.

a) 7,352 b) 607 c) 702,433 d) 17,009,321

2. Write each whole number in words.

a) 62 b) 698 c) 17,403 d) 1,067,599

Write each number in standard form.

- e) nine hundred fifty-two
f) three hundred sixty-two thousand, five hundred eighty-six
g) three million, four hundred thousand, one hundred two

3. Write each number in expanded form.

a) 398 b) 2,907 c) 4,089,347

4. Use the following table of Number of Students Enrolled to answer the questions.

Subject	Section 1	Section 2	Section 3	Total
Basic Mathematics	23	27	19	69
Statistics	20	25	22	67

- a) How many total students are enrolled in Basic Mathematics?
- b) How many students are enrolled in Section 3 of Statistics?

Teaching Notes:

- Students who do not have English as their first language will need additional assistance learning place value vocabulary.
- Students who do not have English as their first language may use periods instead of commas in writing numbers.

Answers: 1a) thousands, b) ones, c) hundred thousands, d) million; 2a) sixty-two, b) six hundred ninety-eight, c) seventeen thousand, four hundred three, d) one million, sixty-seven thousand, five hundred ninety-nine, e) 952, f) 362,586, g) 3,400,102; 3a) $300+90+8$, b) $2000+900+7$, c) $4,000,000+80,000+9,000+300+40+7$; 4a) 69, b) 22.

Mini-Lecture 1.3

Adding and Subtracting Whole Numbers, and Perimeter

Learning Objectives:

1. Add whole numbers.
2. Subtracting whole numbers.
3. Find the perimeter of a polygon.
4. Solve problems by adding or subtracting whole numbers.
5. Key Vocabulary: *sum, addend, perimeter, minuend, subtrahend and difference.*

Examples:

1. Add.

a) $3 + 9$

b) $40 + 70$

c) $1900 + 17$

d) $5703 + 0$

e)
$$\begin{array}{r} 51 \\ +27 \\ \hline \end{array}$$

f)
$$\begin{array}{r} 7329 \\ + 683 \\ \hline \end{array}$$

g) $93 + 145 + 69$

h)
$$\begin{array}{r} 6,403 \\ + 793 \\ \hline 17,187 \end{array}$$

2. Subtract. Check by adding.

a) $11 - 7$

b) $15 - 8$

c) $22 - 22$

d) $31 - 0$

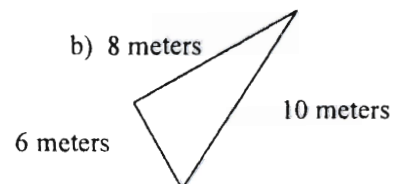
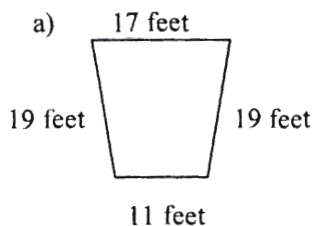
e)
$$\begin{array}{r} 27 \\ - 13 \\ \hline \end{array}$$

f)
$$\begin{array}{r} 198 \\ - 94 \\ \hline \end{array}$$

g)
$$\begin{array}{r} 3004 \\ -2965 \\ \hline \end{array}$$

h)
$$\begin{array}{r} 20,003 \\ -16,867 \\ \hline \end{array}$$

3. Find the perimeter of each figure



4. Solve the following word problems.

a) What is the **sum** of 8,932 and 14,799?

b) Subtract **376** from 803.

c) The Library Renovation Project has set a goal of \$75,000 to fundraise. To date, \$47,908 has been fundraised. How much more money does the Library Renovation Project need to fundraise?

d) On Monday, Karen drove 57 miles; on Tuesday, she drove 39 miles; and on Wednesday, Karen drove 92 miles. How many total miles did Karen drive?

Teaching Notes:

- Some students need additional practice with basic addition and subtraction facts.
- Remind students that it is acceptable to write the carry digit in order to obtain the correct answer.
- Most students will find this section easy but may need assistance with word problems.
- Many students need to write the borrowing/regrouping step to maintain accuracy.
- Many students are challenged when borrowing with zeros.

Answers: 1a) 12, b) 110, c) 1917, d) 5703, e) 78, f) 8012, g) 307, h) 24,383; 2a) 4, b) 7, c) 0, d) 31, e) 14, f) 104, g) 39, h) 3,136; 3a) 66 ft., b) 24 m.; 4a) 23,731, b) 427, c) \$27,092, d) 188 miles.

Mini-Lecture 1.4

Rounding and Estimating

Learning Objectives:

1. Round whole numbers.
2. Use rounding to estimate sums and differences.
3. Solve problems by estimating.
4. Key Vocabulary: *rounding, graph, estimating, and exact.*

Examples:

1. Round to the nearest ten.

a) 31 b) 57 c) 346 d) 2,795

Round to the nearest hundred.

e) 312 f) 6,658 g) 8,672 h) 1,899

2. Round to the nearest thousand to find the estimated sum or difference.

a) $\begin{array}{r} 4892 \\ -2305 \\ \hline \end{array}$ b) $\begin{array}{r} 2731 \\ + 3020 \\ \hline \end{array}$ c) $\begin{array}{r} 17,032 \\ - 12,513 \\ \hline \end{array}$ d) $\begin{array}{r} 24,803 \\ + 14,587 \\ \hline \end{array}$

3. Solve.

a) At the last 3 dances, attendance was 657 students, 403 students, and 559 students. Estimate the total attendance by rounding each to the nearest hundred.

b) Enrollment figures at the Town of Johnson's School Department increased from 6,721 students to 7,653 students. Round each number to the nearest hundred to estimate the increase.

c) The Carlisle family needs to buy a refrigerator for \$999, a stove for \$459, and a dishwasher for \$449. Round each cost to the nearest hundred to estimate the total cost.

Teaching Notes:

- Some students need to be repeatedly reminded to look at the digit to the right of the rounding position. Have students draw a line after the digit in the rounding position.
- A common error students make is to leave the digits to the right of the rounding position the same instead of changing them to zeros after rounding.
- Stress the importance of rounding and estimating with applications.

Answers: 1a) 30, b) 60, c) 350, d) 2,800, e) 300, f) 6,700, g) 8,700, h) 1,900; 2a) 3000, b) 6000, c) 4000, d) 40,000; 3a) 1700, b) 1,000, c) \$1,900

Mini-Lecture 1.5

Multiplying Whole Numbers and Area

Learning Objectives:

1. Use the properties of multiplication.
2. Multiply whole numbers.
3. Find area of a rectangle.
4. Solve problems by multiplying whole numbers.
5. Key Vocabulary: *factor, product, distribute, and area.*

Examples:

1. Multiply.

a) $37 \cdot 1$

b) $1 \cdot 22$

c) $0 \cdot 183$

d) $9 \cdot 5 \cdot 0$

Use the distributive property to rewrite each expression.

e) $2(5 + 4)$

f) $5(1 + 9)$

g) $10(9 + 6)$

h) $15(0 + 14)$

2. Multiply.

a)
$$\begin{array}{r} 37 \\ \times 6 \\ \hline \end{array}$$

b) 412×4

c)
$$\begin{array}{r} 1708 \\ \times 9 \\ \hline \end{array}$$

d)
$$\begin{array}{r} 337 \\ \times 25 \\ \hline \end{array}$$

e)
$$\begin{array}{r} 643 \\ \times 27 \\ \hline \end{array}$$

f)
$$\begin{array}{r} 309 \\ \times 800 \\ \hline \end{array}$$

g) $825 \times 1,000$

h)
$$\begin{array}{r} 2,477 \\ \times 963 \\ \hline \end{array}$$

3. Find the area of a rectangle with length 14 feet and width 8 feet.
4. At a recent football game, 413 adult tickets were sold at a price of \$5 each. There were 127 child tickets sold at a price of \$3 each. How much total amount of money in ticket sales for the game?

Teaching Notes:

- Some students need additional practice with basic multiplication facts.
- Some students do not know the different types of symbols used for multiplication.
- When using distributive property, many students forget to distribute over both terms.
- When multiplying, remind students to carefully line up the ones, tens, hundreds, etc.

Answers: 1a) 37, b) 22, c) 0, d) 0, e) 18, f) 50, g) 150, h) 210; 2a) 222, b) 1648, c) 15,372, d) 8,425, e) 17,361, f) 247,200, g) 825,000, h) 2,385,351; 3) 112 sq. ft.; 4) \$2,446

Mini-Lecture 1.6

Dividing Whole Numbers

Learning Objectives:

1. Divide whole numbers
2. Perform long division.
3. Solve problems that require dividing by whole numbers.
4. Find the average of a list of numbers
5. Key Vocabulary: *dividend, divisor, quotient, and average.*

Examples:

1. Find each quotient. Check by multiplying.

a) $3 \overline{)12}$

b) $13 \div 1$

c) $\frac{5}{5}$

d) $15 \div 15$

e) $0 \overline{)5}$

2. Divide. Check by multiplying.

a) $228 \div 4$

b) $\frac{572}{7}$

c) $1570 \div 3$

d) $14 \overline{)7070}$

e) $97 \overline{)41,270}$

f) $603 \overline{)604,911}$

3. a) Find the quotient of 94 and 5.

b) Recently, Amy earned \$1,722 selling calendars. If each calendar cost \$14, how many calendars did Amy sell?

4. a) During the semester, Kyle's test scores were: 87, 93, 62, 83 and 100. What was Kyle's average for the semester?

Teaching Notes:

- Some students need additional practice with basic division facts.
- Many students confuse division by zero (undefined) and zero divided by any non-zero number ($= 0$).
- Many students need to be cautious with placement of digits in quotient and dividend. Be sure appropriate place values are lined up. Stress organization!

Answers: 1a) 4, b) 13, c) 1, d) 1, e) undefined; 2a) 57, b) $81r5$, c) $523r1$; d) 505, e) $425r45$, f) $1003r102$;
3a) $18r4$, b) 123; 4a) 85

Mini-Lecture 1.7

Exponents and Order of Operations

Learning Objectives:

1. Write repeated factors using exponential notation.
2. Evaluate expressions containing exponents.
3. Use order of operations.
4. Find the area of a square.
5. Key Vocabulary: *exponential notation, exponent, base, order of operations, and area of a square.*

Examples:

1. Write using exponential notation.

a) $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$ b) $(7)(7)(7)$ c) $4 \cdot 4 \cdot 3 \cdot 3 \cdot 3$ d) $5 \cdot 5 \cdot 8 \cdot 8 \cdot 5 \cdot 5$

2. Evaluate.

a) 5^2 b) 7^3 c) 3^6 d) 10^4

3. Using order of operations, simplify.

a) $3 \cdot 4 - 10 \div 2$ b) $6^2 \div 3 \cdot 2$ c) $8 \cdot 4 + \{27 \div [8 - (3 + 2)]\}$

4. a) Find the area of a square whose side measures 6 feet.

b) Find the area of a square whose side measures 23 miles.

Teaching Notes:

- Students may confuse exponent and base.
- Many students have trouble with order of operations.
- Avoid "PEMDAS" as many students will multiply before dividing and add before subtracting.
- Stress to students that all multiplication/division must be performed in order from left to right.
- Stress to students that addition/subtraction is performed in order from left to right.
- Stress to students you can only add/subtract after all multiplication/division is complete.

Answers: 1a) 2^6 , b) 7^3 , c) $3^3 \cdot 4^2$, d) $5^4 \cdot 8^2$; 2a) 25, b) 343, c) 729, d) 10,000; 3a) 7, b) 24, c) 41; 4a) 36 sq. ft, b) 529 sq. ft.

Mini-Lecture 1.8

Introduction to Variables, Algebraic Expressions, and Equations

Learning Objectives:

1. Evaluate algebraic expressions given replacement values.
2. Identify solutions of equations.
3. Translate phrases into variable expressions.

Addition (+)	Subtraction (-)	Multiplication (•)	Division (÷)
Sum, plus, added to, more than, increased by, total	Difference, minus, subtract, less than, decreased by, less	Product, times, multiply, multiply by, of, double, triple	Quotient, divide, shared equally among, divided by, divided into

4. Key Vocabulary: *variable, algebraic expression, equation, and solution.*

Examples:

1. Evaluate each expression for $x = 12$, $y = 4$, and $z = 3$

a) $x - y + z$ b) $x - (y + z)$ c) $5(3x + 7)$ d) $2xy - 3z$

e) $x^2 - 4y$ f) $y^3 - 2x$ g) $\frac{3x}{4} - \frac{yz}{3}$ h) $\left(\frac{2yz - x}{2}\right)^3$

2. Determine whether the given number is a solution of the given equation.
 - a) Is 10 a solution of $n - 3 = 7$?
 - b) Is 3 a solution of $2n = 12$?

Determine which numbers in each set are solutions to the corresponding equations.

c) $n - 3 = 12$; {11, 12, 15}
 d) $4n = 24$; {3, 6, 20}

3. Write each phrase as a variable expression. Use x to represent "a number."
 - a) The sum of a number and eleven
 - b) Fifteen added to a number
 - c) The difference between a number and three hundred
 - d) A number subtracted from forty-two
 - e) The product of sixteen and a number
 - f) A number times thirteen
 - g) The quotient of thirty and a number
 - h) Seven divided by a number
 - i) The quotient of eighteen and a number, decreased by two

Teaching Notes:

- Remind students that order of operations apply with variables.
- Stress to students that an equation has an equal sign and an expression does not.
- Many students will have difficulty translating a phrase into an algebraic expression.
- Refer students to textbook for *Translating Phrases into Variable Expressions Chart*.

Answers: 1a) 11, b) 5, c) 215, d) 87, e) 128, f) 40, g) 5, h) 216; 2a) yes, b) no, c) 15, d) 6; 3a) $x + 11$, b) $15 + x$,

c) $x - 300$, d) $42 - x$, e) $16x$, f) $13x$, g) $30/x$, h) $7/x$, i) $\frac{18}{x} - 2$

Mini-Lecture 2.1

Introduction to Integers

Learning Objectives:

1. Represent real-life situations with integers.
2. Graph integers on a number line.
3. Compare integers.
4. Find the absolute value of a number.
5. Find the opposite of a number.
6. Read bar graphs containing integers.
7. **Key Vocabulary:** *positive numbers, negative numbers, signed numbers, integers, is less than, is greater than, opposite, absolute value.*

Examples:

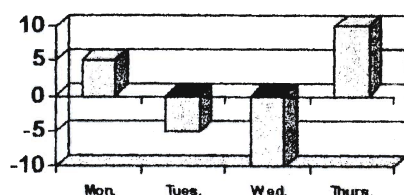
1. Represent each quantity by an integer.
 - a) A scuba diver is swimming 25 feet below sea level.
 - b) The record high temperature for the town is 113°F.
 - c) The number of televisions sold reflected a 35 percent loss from the previous year.
2. Graph each integer in the list on the same number line.

a) 1, 3, 5, 6	b) 2, -2, 3, -3	c) 4, 0, -2, -5	d) 0, -1, -2, -5
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3. Insert $<$ or $>$ between each pair of integers to make a true statement.

a) 5 ____ 10	b) 0 ____ -3	c) -42 ____ -38	d) -22 ____ 22
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4. Simplify.

a) $ 2 $	b) $ -12 $	c) $ -3 $	d) $- 14 $
e) $- 45 $	f) $- -103 $	g) $ -x $ if $x = -25$	h) $ x $ if $x = -8$
5. Find the opposite of each integer.

a) 9	b) -15	c) 0	d) -16
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6. The bar graph shows the January temperatures for four days in Boston..
 - a) Which day was the coldest?
 - b) Which day was the warmest?



Teaching Notes:

- Many students will confuse absolute value and opposite.
- Encourage students to list everyday situation where negative numbers are used.

Answers: 1a) -25; b) +113; c) -35; 2a) b) c) d)

d) ; 3a) $<$; b) $>$; c) $<$; d) $<$; 4a) 2, b) 12; c) 3; d) -14; e) -45; f) -103;

g) 25; h) 8; 5a) -9; b) 15; c) 0; d) 16; 6a) Wed.; b) Thurs.

Mini-Lecture 2.2

Adding Integers

Learning Objectives:

1. Add integers.
2. Evaluate an algebraic expression by adding.
3. Solve problems by adding integers.

Examples:

1. Add.

- | | | | |
|------------------------|----------------------|-------------------------------|------------------|
| a) $23 + 12$ | b) $-23 + (-17)$ | c) $-11 + (-2)$ | d) $-21 + (-13)$ |
| e) $6 + (-8)$ | f) $-3 + 5$ | g) $-74 + 27$ | h) $-51 + (24)$ |
| i) $-8 + (-13)$ | j) $-79 + 97$ | k) $46 + (-54)$ | l) $-4 + (-24)$ |
| m) $23 + (-19) + (-8)$ | n) $14 + 25 + (-16)$ | o) $-25 + (-4) + (-2) + (-6)$ | |

2. Evaluate $x + y$ for the given replacement values.

- | | | |
|--------------------------|----------------------------|---------------------------|
| a) $x = -5$ and $y = 14$ | b) $x = -33$ and $y = -27$ | c) $x = -43$ and $y = 38$ |
|--------------------------|----------------------------|---------------------------|

3. Solve.

- | | |
|------------------------------------|---|
| a) Find the sum of -7 and 25 . | b) Find the sum of -52 , 13 , and -82 |
|------------------------------------|---|

c) During a storm in Anchorage Alaska, the temperature was 10°F at Noon. At 1 p.m., the temperature had dropped 7° . At 2 p.m., the temperature dropped another 5° ; and finally, at 3 p.m., the temperature had dropped an additional 9° . Use positive and negative numbers to represent his situation. Then find the present temperature.

Teaching Notes:

- Some students need to see adding integers done on a number line first.
- Many students have a better understanding if they think of depositing and withdrawing money from a bank account.
- Refer students to the rules for adding signed numbers in the textbook.

Answers: 1a) 35; b) -40; c) -13; d) -34; e) -2; f) 2; g) -47; h) -27; i) -21; j) 18; k) -8; l) -28; m) -4; n) 23; o) -37; 2a) 9; b) -60; c) -5; 3a) 18; b) -121; c) -11 $^{\circ}$.

Mini-Lecture 2.3

Subtracting Integers

Learning Objectives:

1. Subtract integers.
2. Add and subtract integers.
3. Evaluate an algebraic expression by subtracting.
4. Solve problems by subtracting integers.
5. Key Vocabulary: *additive inverse*.

Examples:

1. Subtract.

a) $-9 - (-2)$	b) $-14 - (-2)$	c) $4 - (-3)$	d) $20 - 20$
e) $2 - 5$	f) $-2 - 12$	g) $-150 - 410$	h) $-147 - (-85)$

2. Simplify.

a) $6 + 20 - 15$	b) $-1 - 11 - 12$	c) $-1 - 20 + 10$	d) $-16 + 11 - 18 + (-4)$
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3. Evaluate $x - y$ for the given replacement values.

a) $x = -2$ and $y = -8$	b) $x = 8$ and $y = -32$
c) $x = -9$ and $y = -9$	d) $x = 3$ and $y = -15$

4. Solve.

a) Amy has \$545 in her checking account. She writes a check for \$257, makes a deposit of \$75, and then writes another check for \$409. Find the balance in her account. (Write the amount as an integer.)

b) The city of Manchester has an elevation of 13,005 feet above sea level while the city of Catherine has an elevation of 17,532 feet below sea level. Find the difference in elevation between those two cities.

c) The temperature on a January morning in Worcester is -5°F at 2 a.m. If the temperature drops 4° by 3 a.m., rise 6° by 4 a.m., and then drops 8° by 5 a.m., find the temperature by 8 a.m.

Teaching Notes:

- Many students find subtracting signed numbers difficult at first.
- Some students like to see subtracting signed numbers on a number line.
- Many students make errors when evaluating $x - y$ when y is a negative number. Encourage students to make a direct substitution first so they do not forget to write the subtraction symbol.

Answers: 1a) -7 ; b) -12 ; c) 7 ; d) 0 ; e) -3 ; f) -14 ; g) -560 ; h) -62 ; 2a) 11 ; b) -24 ; c) -11 ; d) -27 ;
3a) 6 ; b) 40 ; c) 0 ; d) 18 ; 4a) $-\$46$; b) 4527 ft.; c) -11°F .

Mini-Lecture 2.4

Multiplying and Dividing Integers

Learning Objectives:

1. Multiply integers.
2. Divide integers.
3. Evaluate an algebraic expression by multiplying or dividing.
4. Solve problems by multiplying or dividing integers.

Examples:

1. Multiply.

a) $7(-6)$ b) $-4(10)$ c) $-20(13)$ d) $-10(-19)$
e) $(-4)(-3)(6)$ f) $(-50)(0)(-5)(8)$ g) $(-4)(-5)(-4)(-3)$ h) $(-2)(3)(-1)(-4)(2)$
i) -4^2 j) $(-3)^3$ k) -3^3 l) $(-8)^2$

2. Find each quotient.

a) $21 \div 7$ b) $36 \div (-6)$ c) $\frac{-48}{6}$ d) $\frac{-17}{0}$

3. Evaluate xy and also $\frac{x}{y}$ for the given replacement values.

a) $x = 8$ and $y = -4$ b) $x = -30$ and $y = -10$ c) $x = 0$ and $y = -16$

4. Solve.

a) Find the product of -13 and -5 .

b) Find the quotient of 63 and -9 .

c) Better Electric Co. marked \$15 off the price of each microwave in stock. If there are 57 microwaves in stock, write the **total reduction in price** of all microwaves as an integer.

d) During a cold front in Canada the temperature dropped 4°F each hour for 7 hours. Express the total drop in temperature as an integer.

Teaching Notes:

- Some students need a review of basic multiplication and division facts before they begin working **with** integers.
- Some students **mix up the rules** for addition of integers and the rules for multiplication/division of integers.
- Many students have a hard time understanding the difference between -3^2 and $(-3)^2$

Answers: 1a) -42 ; b) -40 ; c) -260 ; d) 190 ; e) 72 ; f) 0 ; g) 240 ; h) -48 ; i) -16 ; j) -27 ; k) -27 ; l) 64 ; 2a) 3 ; b) -6 ; c) -8 ; d) *undefined*; 3a) -2 ; b) 3 ; c) 0 ; 4a) 65 ; b) -7 ; c) $-\$855$; d) -28°F .

Mini-Lecture 2.5

Order of Operations

Learning Objectives:

1. Simplify expressions by using the order of operations.
2. Evaluate an algebraic expression.
3. Find the average of a list of numbers.

Examples:

1. Simplify.

a) $-2 + 5 \cdot 6$

b) $-2 - 5(5 - 8)$

c) $2(-5)(7 - 3) - 7$

d) $80 \div (-8) - 15$

e) $3^3 - 8(2)$

f) $8 - 2(7 - 2^2) + 3$

g) $8^2 - 2(6) + 45 \div 5$

h) $3(-2) + (8 - 10)^2$

i) $21 \div [7(-15 \div (-5))]$

j) $\frac{8(-2) - 4 + 3}{-85 \div 5}$

k) $\frac{[-36 \div (-4) - 1]}{[2 - (-2)]}$

l) $\frac{20(-1) - (-5)(-2)}{3[-12 \div (-3 - 3)]}$

2. Evaluate each expression for $x = -3$, $y = 6$, and $z = -1$.

a) $x + y + z$

b) $2y - 3z + x$

c) $x^2 - y + z$

d) $\frac{8x}{2y}$

e) $5y - x^2$

f) $x^3 + yz$

3. Find the average of each list of numbers.

a) -20, -9, -1, 0, 4, 6, 6

b) -50, -30, -15, -5

Teaching Notes:

- Many students confuse the addition/subtraction rules with the multiplication/division rules when working with many operations in one expression.
- Encourage students to perform one operation at a time.
- Refer students to Order of Operations in the textbook.

Answers: 1a) 2, b) 13, c) -47, d) -25, e) 11, f) 5, g) 61, h) -2, i) 1, j) 1, k) 2, l) -5; 2a) 2, b) 12, c) 2, d) -2, e) 21, f) -31; 3a) -2, b) -25

Mini-Lecture 2.6

Solving Equations: The Addition and Multiplication Properties

Learning Objectives:

1. Identify solutions of equations.
2. Use the addition property of equality to solve equations.
3. Use the multiplication property of equality to solve equations.
4. Key Vocabulary: *equation, expression, multiplication, solution, addition and equivalent.*

Examples:

1. Decide whether the given number is a solution of the given equation.
 - a) Is 12 a solution of $x + 3 = 15$
 - b) Is 8 a solution of $z - 15 = 23$
 - c) Is -2 a solution of $4k = k - 6$
 - d) Is 5 a solution of $6(x - 2) = 3x + 1$
 - e) Is $\frac{1}{2}$ a solution of $-3x = 5x + 1$
 - f) Is -2 a solution of $-2x + 5 = 6x - 5x + 7$
2. Solve. Check each solution.
 - a) $a + 7 = 25$
 - b) $d - 4 = -19$
 - c) $10z = 9z - 13$
 - d) $-14 = 15 + x$
3. Solve. Check each solution.
 - a) $3x = 18$
 - b) $\frac{x}{-5} = 5$
 - c) $-5y = 0$
 - d) $-20x = -20$

Teaching Notes:

- Encourage students to write down all steps in a neat, organized manner. This habit will help students as equations increase in difficulty.
- Encourage students to use the addition property in such a way that the variable ends up with a positive coefficient.
- Mention to students that it does not matter on which side of the equation you isolate the variable.
- Remind students to always check their final answer by substituting it back into the original equation.

Answers: 1a) yes, b) no, c) yes, d) no, e) no, f) no; 2a) 18, b)-15, c) -13, d)-29; 3a) 6, b)-25, c) 0, d) 1