Prealgebra
Chapter 2 Review

Objective [2.1a] Tell which integers correspond to a real-world situation.		
Brief Procedure	Example	Practice Exercise
Determine whether a negative integer or a positive integer corresponds to the given situation.	Tell which integers correspond to this situation: A student has \$106 in his checking account. The student owes \$248 on his credit card. The integer 106 corresponds to having \$106 in a checking account. The integer -248 corresponds to a \$248 credit card debt.	1. Tell which integer corresponds to this situation: A business lost \$1200 during a 30-day period. A. $-36,000$ B. -1200 C. 1200 D. 36,000

Objective [2.1b] Form a true sentence using $<$ or $>$.		
Brief Procedure	Example	Practice Exercise
To determine which of two real numbers is greater, consider the relative position of the two numbers on the number line. The one to the left is less than the one to the right. The symbol $<$ means "is less than" and the symbol $>$ means "is greater than."	Use either $<$ or $>$ for $\square$ to form a true sentence: $-7 \ \square \ -10$ Since -7 is to the right of -10 on the number line, we have $-7 > -10$.	2. Use either $<$ or $>$ for $\square$ to form a true sentence: $-8 \ \square \ 1$ A. $<$ B. $>$

Objective [2.1c] Find the absolute value of any integer.		
Brief Procedure	Example	Practice Exercise
If the number is negative, make it positive. If the number is positive or zero, leave it alone.	Find $\|-4\|$. The number is negative, so we make it positive. $\|-4\| = 4$	3. Find $\|59\|$. A. -59 B. 0 C. 59

Objective [2.1d] Find the opposite of any integer.		
Brief Procedure	Example	Practice Exercise
The opposite, or additive inverse, of any integer is its reflection across 0 on the number line. To find the opposite of a number, we can change its sign.	If x is 5, find $-x$. We reflect 5 across 0. Thus, the opposite of 5 is -5, or $-(5) = -5$.	4. If x is -20, find $-x$. A. -20 B. 0 C. 20

Objective [2.2a] Add integers without using a number line.		
Brief Procedure	**Example**	**Practice Exercise**
1. *Positive integers*: Add the same as arithmetic numbers. The answer is positive. 2. *Negative integers*: Add absolute values and change the sign, making the answer negative. 3. *A positive and a negative integer*: Subtract the smaller absolute value from the larger. Then: a) If the positive number has the greater absolute value, the answer is positive. b) If the negative number has the greater absolute value, the answer is negative.	Add without using a number line: $-15+9$. We have a negative and a positive integer. The absolute values are 15 and 9. The difference is 6. The negative number has the larger absolute value, so the answer is negative. $-15+9=-6$	5. Add without using a number line: $-1+(-3)$. A. 4 B. 2 C. -2 D. -4

Objective [2.3a] Subtract integers and simplify combinations of additions and subtractions.		
Brief Procedure	**Example**	**Practice Exercises**
For any real numbers a and b, $a-b=a+(-b)$. (To subtract, add the opposite, or additive inverse, of the number being subtracted.)	Subtract: $6-(-7)$. The opposite of -7 is 7. We change the subtraction to addition and add the opposite. $6-(-7)=6+7=13$	6. Subtract: $2-12$. A. -14 B. -10 C. 10 D. 14
When several additions and subtractions occur together, rewrite the subtractions as additions and then carry out the calculation.	Simplify: $5-(-1)-3+7$. $5-(-1)-3+7=5+1+(-3)+7$ $=10$	7. Simplify: $-8-4+12-(-9)$. A. -33 B. -15 C. 9 D. 25

Objective [2.3b] Solve applied problems involving addition and subtraction of integers.		
Brief Procedure	**Example**	**Practice Exercise**
Determine whether addition or subtraction applies to the given situation. Then carry out the appropriate calculation.	The temperature in a small town was 46° at 7 A.M. and it rose 18° by noon. What was the temperature at noon? We add 18° to 46°: 46° + 18° =64° The temperature was 64° at noon.	8. Corey has $278 in his checking account. He writes a check for $54 to pay for a textbook. What is the balance in his checking account? A. $54 B. $176 C. $224 D. $332

Objective [2.4a] Multiply integers.

Brief Procedure	Example	Practice Exercise
a) Multiply the absolute values. b) If the signs are the same, the answer is positive. c) If the signs are different, the answer is negative.	Multiply: $-2(3)$. The signs are different, so the answer is negative. $-2(3) = -6$	9. Multiply: $-7(-9)$. A. -63 B. -16 C. 2 D. 63

Objective [2.4b] Find products of three or more integers and simplify powers of integers.

Brief Procedure	Example	Practice Exercises
We can group as we please when multiplying three or more integers because of the commutative and associative laws. The product of an even number of negative integers is positive. The product of an odd number of negative integers is negative.	Multiply: $-3(2)(-1)(-5)$. We multiply the first two numbers and the last two numbers. Then we multiply the two resulting products. $-3(2)(-1)(-5)$ $= -6 \cdot 5$ $= -30$	10. Multiply: $-8(-5)(-2)$. A. -80 B. -40 C. 18 D. 80
When a negative number is raised to an even exponent, the result is positive. When a negative number is raised to an odd exponent, the result is negative.	Simplify: (a) $(-5)^3$ (b) $(-3)^4$. (a) $(-5)^3 = (-5)(-5)(-5)$ $= 25(-5)$ $= -125$ (b) $(-3)^4 = (-3)(-3)(-3)(-3)$ $= 9 \cdot 9$ $= 81$	11. Simplify: $(-2)^5$. A. 32 B. 16 C. -10 D. -32

Objective [2.5a] Divide integers.

Brief Procedure	Example	Practice Exercise
a) Divide the absolute values. b) If the signs are the same, the answer is positive. c) If the signs are different, the answer is negative.	Divide: $-36 \div (-4)$. The signs are the same, so the answer is positive. $-36 \div (-4) = 9$	12. Divide: $\frac{56}{-8}$. A. -9 B. -7 C. 7 D. 9

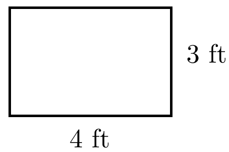
Objective [2.5b] Use the rules for order of operations with integers.		
Brief Procedure	**Example**	**Practice Exercise**
1. Do all calculations within parentheses, brackets, braces, or absolute-value symbols. Simplify, if possible, above and below any fraction bars. 2. Evaluate all exponential expressions. 3. Do all multiplications and divisions in order from left to right. 4. Do all additions and subtractions in order from left to right.	Simplify: $10-(6-4\cdot 5)$. $10-(6-4\cdot 5) = 10-(6-20)$ $= 10-(-14)$ $= 10+14$ $= 24$	13. Simplify: $100 \div (-25) + 12 \div 3$. A. -8 B. -4 C. 0 D. 8

Objective [2.6a] Evaluate an algebraic expression by substitution.		
Brief Procedure	**Example**	**Practice Exercise**
Substitute for the variable(s) and carry out the resulting calculation.	Evaluate $m-n$ for $m=29$ and $n=12$. Substitute 29 for m and 12 for n and carry out the subtraction. $m-n = 29-12 = 17$	14. Evaluate $\frac{x}{y}$ for $x=72$ and $y=9$. A. 8 B. 63 C. 81 D. 648

Objective [2.7a] Use the distributive law to find equivalent expressions.		
Brief Procedure	**Example**	**Practice Exercise**
For any numbers a, b, and c, $a(b+c) = ab+ac$.	Multiply: $5(2x-3y+z)$. $5(2x-3y+z)$ $= 5\cdot 2x - 5\cdot 3y + 5\cdot z$ $= 10x-15y+5z$	15. Multiply: $3(x+4y-2z)$. A. $3x+4y-2z$ B. $3x+12y+6z$ C. $3x+12y-6z$ D. $3x-12y-6z$

Objective [2.7b] Combine like terms.		
Brief Procedure	**Example**	**Practice Exercise**
Identify the terms with exactly the same variable, use the distributive law "in reverse," and then simplify.	Combine like terms: $3x-5y+8x+y$. $3x-5y+8x+y$ $= 3x+8x-5y+y$ $= 3x+8x-5y+1\cdot y$ $= (3+8)x+(-5+1)y$ $= 11x-4y$	16. Combine like terms: $6a-4b-a+2b$. A. $5a-2b$ B. $2a+b$ C. $6a-2b$ D. $5a+6b$

Objective [2.7c] Determine the perimeter of a polygon.

Brief Procedure	Example	Practice Exercise
Find the sum of the lengths of the sides of the polygon. Since rectangles and squares appear frequently in applications, we have special formulas to find their perimeters. The perimeter of a rectangle with length l and width w is given by $P = 2 \cdot (l + w)$, or $P = 2 \cdot l + 2 \cdot w$. The perimeter of a square with side s is given by $P = 4 \cdot s$.	Find the perimeter of a rectangle that is 4 ft by 3 ft.  $P = 2 \cdot (l + w)$ $= 2 \cdot (4\text{ ft} + 3\text{ ft}) = 2 \cdot 7\text{ ft}$ $= 14\text{ ft}$	17. Find the perimeter of a square whose sides are 5 cm long. A. 10 cm B. 15 cm C. 20 cm D. 25 cm

Objective [2.8a] Use the addition principle to solve equations.

Brief Procedure	Example	Practice Exercise
For any numbers a, b, and c, $a = b$ is equivalent to $a + c = b + c$. Add the same number on both sides of the equation to get the variable alone. Since subtraction can be regarded as adding the opposite of the number being subtracted, we can also subtract the same number on both sides of the equation.	Solve: $x + 4 = 9$. We subtract 4 on both sides of the equation to get x alone. $x + 4 = 9$ $x + 4 - 4 = 9 - 4$ $x + 0 = 5$ $x = 5$ The solution is 5.	18. Solve: $y - 3 = -1$. A. -4 B. -2 C. 2 D. 4

Objective [2.8b] Use the division principle to solve equations.

Brief Procedure	Example	Practice Exercise
For any numbers a, b, and c $(c \neq 0)$, $a = b$ is equivalent to $\frac{a}{c} = \frac{b}{c}$. Divide by the same number on both sides of an equation to get the variable alone.	Solve: $54 = -9y$. We divide by -9 on both sides of the equation to get y alone. $54 = -9y$ $\frac{54}{-9} = \frac{-9y}{-9}$ $-6 = 1 \cdot y$ $-6 = y$ The solution is -6.	19. Solve: $6x = -42$. A. 7 B. -7 C. -36 D. -48

Objective [2.8c] Decide which principle should be used to solve an equation.		
Brief Procedure	Example	Practice Exercise
Use the addition principle to undo addition or subtraction. Use the division principle to undo multiplication.	Solve: (a) $5 = t+1$ (b) $-4x = 12$. (a) To undo addition of 1, we use the addition principle and subtract 1 on both sides of the equation. $5 = t + 1$ $5 - 1 = t + 1 - 1$ $4 = t + 0$ $4 = t$ The solution is 4. (b) To undo multiplication by -4, use the division principle and divide by -4 on both sides. $-4x = 12$ $\frac{-4x}{-4} = \frac{12}{-4}$ $x = -3$ The solution is -3.	20. Solve: $-18 = 6y$. A. -24 B. -12 C. -3 D. 12