Evaluate the expression.

1. $2[54 \div (4^2 + 2)]$

2. $\frac{5x}{x+2}$ *when* $x = 3$

3. Eight students each ordered 2 drawing kits and 4 drawing pencils. The expression $8(2k + 4p)$ gives the total cost, where k is the cost of a kit, and p is the cost of a pencil. Find the total cost if a kit costs \$25 and a pencil costs \$1.25.

1.3 Study Guide

Algebra 1

LEARNING GOAL:
Translate verbal phrases into expressions.

Vocabulary

A **verbal model** describes a situation using words as labels and using math symbols to relate the words.
A **rate** is a fraction that compares two quantities measured in different units.
A **unit rate** is a rate whose fraction has a denominator of 1.

Operation:	Common verbal terms:
Addition	
Subtraction	
Multiplication	
Division	
Parentheses	

EXAMPLE 1
Translate verbal phrases into expressions

Verbal Phrase	Expression
a. 8 more than the product of 5 times a number w	
b. The quotient of 11 and the sum of 7 and a number x	
c. The square of a number y decreased by 13	

Homework: Text Pages 18-19, #4-24 even, and #31

Exercises for Example 1

Translate the phrase into an expression.

1. The difference of 3 times a number m and 5	
2. 26 divided by a number n	
3. $\frac{1}{3}$ of a number p	
4. The sum of 9 and the square of a number k	
5. The quotient when the quantity 10 plus a number x is divided by 2.	
6. 8 times the quantity 4 plus a number n	
7. 12 decreased by a number x	
8. The quotient of the square of a number w and 5.	

Homework: Text Pages 18-19, #4-24 even, and #31

EXAMPLE 2

Use a verbal model to write an expression

A student reads p pages of a 230-page book. Write an expression for the number of unread pages in the book.

Solution

STEP 1 Write a verbal model.

STEP 2 Translate the verbal model into an algebraic expression.

Exercises for Example 2

Write an expression for the situation.

9. Total cost of n notebooks if each notebook costs $1.25
10. The time it takes to get to school and home again if you walk 5 minutes to the bus stop and ride the bus for *m* minutes
11. The length of a building is 20 feet more than its width w.
12. A piece of ribbon x feet long is cut from a ribbon 8 feet long. Write an expression for the length (in feet) of the remaining piece.
13. You and 4 friends meet to have dinner at a restaurant. Everyone orders the special. Write an expression for the total cost of all the meals.
14. You work with 5 other people at an ice cream stand. All the workers split the money in the tip jar equally at the end of the day. Write an expression that shows your share of the tips.

Homework: Text Pages 18-19, #4-24 even, and #31

EXAMPLE 3
Find a unit rate

An airport checks in 460 passengers in 5 hours. Find the unit rate.
(How much **PER** 1 hour)

Exercises for Example 3

Find the unit rate.

15. $\frac{129 \text{ miles}}{6 \text{ gallons}}$	**16.** $\frac{18 \text{ People}}{3 \text{ Tabs}}$
17. $\frac{\$28}{4 \text{ tickets}}$	**18.** $\frac{1500 \text{ meters}}{7.5 \text{ minutes}}$
19. A car travels 120 miles in 2 hours. Find the unit rate in feet per second.	**20.** A runner travels 730 yards in 5 minutes. Find the unit rate in feet oer second.

Homework: Text Pages 18-19, #4-24 even, and #31

1.3 Practice A

Algebra 1

Translate the verbal phrase into an expression.

1. 7 more than a number b	
2. The product of 11 and a number x	
3. 70 divided by a number m	
4. $\frac{1}{3}$ of a number y	
5. The difference of 18 and a number c	
6. The sum of a number t and 20	
7. The quotient of a number n and 15	
8. 25 times a number p	

Write an expression for the situation.

9. The height of a wall that is b bricks tall if each brick is 3 inches tall	
10. The number of miles in a 4-mile walk left to walk if you've already walked m miles	
11. The total number of lawns you will mow today if you've already mowed 4 lawns and will mow w more lawns	
12. Each person's share if p people share 3 gallons of water equally	

Find the unit rate.

13. $\frac{40\ flowers}{5 vases}$	**14.** $\frac{6 cups}{3 servings}$	**15.** $\frac{\$120}{10\ admission\ tickets}$

16. Photographs You can print color photos from your digital camera at a photo printing kiosk. The cost is \$.25 per photo. Write an expression for the total cost if you print p photos. How much does it cost you to print 12 photos?

17. T-Shirts You and three friends are making tie-dyed T-shirts. The local craft store sells a tie-dye kit for \$10 and T-shirts for \$3 each.

a. Use the verbal model below to write an expression that can be used to find the total cost for making the T-shirts.

Cost of one tie-dye kit	+	Number of T-shirts	•	Cost of one T-shirt

b. You and your friends make 6 T-shirts. What is the total cost of the T-shirts?

Translating Words into Algebraic Expressions

Operation	Word Expression	Algebraic Expression
Addition	*Add, Added to, the sum of, more than, increased by, the total of, plus*	+
	Add x to y	**x + y**
	y added to 7	**7+ y**
	The sum of a and b	**a + b**
	m more than n	**n + m**
	p increased by 10	**p + 10**
	The total of q and 10	**q + 10**
	9 plus m	**9 + m**
Subtraction	*Subtract, subtract from, difference, between, less, less than, decreased by, diminished by, take away, reduced by, exceeds, minus*	-
	Subtract x from y	**y - x**
	From x, subtract y	**x - y**
	The difference between x and 7	**x -7**
	10 less m	**10 - m**
	10 less than m	**m - 10**
	p decreased by 11	**p - 11**
	8 diminished by w	**8 - w**
	y take away z	**y - z**
	p reduced by 6	**p - 6**
	x exceeds y	**x - y**
	r minus s	**r - s**
Multiplication	*Multiply, times, the product of, multiplied by, times as much, of*	×
	7 times y	**7y**
	The product of x and y	**xy**
	5 multiplied by y	**5y**
	one-fifth of p	$\frac{1}{5}$**p**
Division	*Divide, divides, divided by, the quotient of, the ratio of, equal amounts of, per*	÷
	Divide x by 6	$\frac{x}{6}$ **or** $x \div 6$
	7 divides x	$\frac{x}{7}$ **or** $x \div 7$
	7 divided by x	$\frac{7}{x}$ **or** $7 \div x$

Division *(continued)*	*The quotient of y and 5*	$\frac{y}{5}$ or $y \div 5$
	The ratio of u to v	$\frac{u}{v}$ or $u \div v$
	u separated into 4 equal parts	$\frac{u}{4}$ or $u \div 4$
	5 parts per 100 parts	$\frac{5}{100}$
Power	*The square of y*	y^2
	The cube of k	k^3
	t raised to the fourth power	t^4
Equals	*Is equal to, the same as, is, are, the result of, will be, are, yields*	=
	x is equal to y	x = y
	p is the same as q	p = q
Multiplication by 2	*Two, two times, twice, twice as much as, double*	2
	Twice z	2z
	y doubled	2y
Multiplication by ½	*Half of, one-half of, half as much as, one-half times*	$\frac{1}{2}$
	Half of u	$\frac{u}{2}$
	one-half times m	$\frac{1}{2}m$

Geometry Problems

Concept	Word Expression	Algebraic Expression
Area of a square	*Side Squared*	$A = s^2$
Perimeter of a square	*Four times the side*	P = 4s
Area of a rectangle	*Length times width*	A = L x W
Perimeter of a rectangle	*Two lengths plus two widths*	P = 2L + 2W
Angles of a Triangle	*The sum of the angles is 180°*	$\angle A + \angle B + \angle C = 180$

Word Problem Relationships

Consecutive Integer	*Three consecutive integers*	x, x + 1, x+ 2
	Three consecutive odd (even) integers	x, x + 2, x + 4
Motion	*Rate times Time equals Distance*	R x T = D
Mixture	*Price times Quantity equals Total Value*	P x Q = T
% Mixture	*% Strength times Quantity equals Total Amount*	P x Q = T
Digits	*A two digit number*	10t + u