Essential Question: How do we write algebraic expressions to model situations?

Do Now: Write an algebraic expression to model each of the following scenarios.

a) Express the total amount earned if a person works h hours and gets paid $5 per hour.

$$5h$$

b) Express the total number of animals in a pet store if there are c cats d dogs and m mice.

$$c + d + m$$

c) Express the total cost of 2 drinks and 3 slices of pizza if d represents the cost of one drink and p represents the cost of one pizza slice.

$$2d + 3p$$

STOP HERE

1) Last month, Lizzie volunteered 20 hours at her local library. Starting this month, she plans to volunteer 5 hours per week for w weeks at the library. Write an algebraic expression to represent the total number of hours she will have volunteered after w weeks.

Variable	Meaning	
W	number of weeks	
Terms		
20	number of hours already volunteered	
5w	total number of hours after volunteering for "w" weeks	

Expression: ___$20 + 5w$___   Units: ___hours___

IT'S YOUR TURN NOW:

1) How would you express the cost of three hamburgers if each hamburger costs *d* dollars? What are the units associated with the expression?

$$3d$$

2) It costs $20 per hour to bowl and $3 for shoe rental. Write an algebraic expression to represent the total cost for *n* hours of bowling. What are the units associated with the expression?

$$20n + 3 \qquad units = dollars.$$

3) Express the price of a sweater (*p*) with an 8% sales tax.

$$p + .08p \qquad or \qquad 1.08p$$

4) Express the price of a meal (*m*) plus an 18% tip for the meal.

$$m + .18m \qquad or \qquad 1.18m$$

Think about this:

One of the most famous amusement parks in our country is Hershey Park. This past summer, Mr. and Mrs. Smith took their daughter on a trip to Hershey, Pennsylvania to visit the historic site and go on some rides. Admission to enter the park was $25, while low thrill rides cost $2 each and high thrill rides cost $3 each.

The expression 3a + 2b + 25 represents the cost of one person visiting the park.

a) Identify the **variables** of the expression and the **terms**.

Variables: _____ a, b _____   Terms: $3a, 2b, 25$

b) If Mrs. Smith went on 5 **low thrill** rides and 2 **high thrill** rides, how much money did she spend?

$$3(2) + 2(5) + 25$$
$$6 + 10 + 25$$
$$\$41$$

Remember: Admission to enter the park was $25, while **low thrill rides** cost $2 each and **high thrill rides** cost $3 each. The expression 3a + 2b + 25 represents the cost of one person visiting the park.

Let's take a closer look at the "Think about this question".

Term/Variable	Meaning
a	number of high thrill rides
b	number of low thrill rides
3a	cost of high thrill rides
2b	cost of low thrill rides
25	initial fee / admission fee

Let's try this...

Aidan works at Abercrombie in the Roosevelt Field mall. With every customer he assists, he earns a 3% commission of their purchase in addition to his regular salary.

a) On Monday, he assisted a customer who purchased a sweater for $49.99. How much did he earn in commission?

$$C = .03(49.99)$$
$$C = 1.4997$$
$$C = \$1.50$$

b) If Aidan only assisted that one customer on Monday and he earns a salary of $25 per day, what were his total earnings for the day?

$$total = 25 + 1.50$$
$$= \$26.50$$

Interpreting Expressions

Samantha works at a furniture store and earns commission on the items she sells. She earns a base pay of $80 plus 5% of the value of any merchandise she sells. Samantha uses the expression 80 + .05*t*, where *t* represents her total sales in dollars, to calculate her total earnings.

$$80 + .05t$$

A. Identify the terms of the expression. What does each term in the expression represent?

Term	Meaning
80	base pay / initial pay
.05t	Amount earned in commission

B. If Samantha sells $475 in merchandise, compute the total amount of money that she will earn.

$$80 + .05(475)$$
$$80 + 23.75$$

$103.75

Jordan works for the same company. Since he was just hired, he earns 5% of the value of merchandise he sells that exceeds $200. Jordan uses the expression 80 + .05(*t* – 200), where *t* represents his total sales in dollars, in order to calculate his total earnings.

C. How does Jordan's expression differ from Samantha's expression?

Jordan only makes commission if he sells more than $200 worth of merchandise.

D. How much would Jordan earn if he sold $475 worth of merchandise?

$$80 + .05(475 - 200)$$
$$80 + .05(275)$$
$$80 + 13.75$$
$$93.75$$

The TAKE AWAY

1. Algebraic expressions help us represent relationships symbolically. When writing an algebraic expression, identify the words that translate into ___variables___, ___terms___ and ___operations___.

2. Algebraic expressions help us represent relationships. When analyzing an expression, identify the ___variables___ and ___terms___ of the expression and *interpret* their meaning.