

Algebra RH

Essential Questions: How do we interpret algebraic expressions? How do we translate words to symbols?

Do Now:

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

$t = \text{total sales}$



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

80
base pay

$.05t$
commission

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

$$\begin{aligned}80 + .05t \\80 + .05(475) \\ \$103.75\end{aligned}$$

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

$t = \text{total sales}$

C. Can Jordan's expression be simplified?

$$\begin{aligned}80 + .05(t - 200) \\80 + .05t - 10 \\70 + .05t\end{aligned}$$

D. How does Jordan's expression differ from Jaime's expression?

Total sales had $\$200$ subtracted from it
(Jordan doesn't earn commission on the first

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

$$\begin{aligned}80 + .05(t - 200) \\80 + .05(475 - 200) \\80 + .05(275) \\93.75\end{aligned} \quad \text{or} \quad \begin{aligned}70 + .05t \\70 + .05(475) \\ \$93.75\end{aligned}$$

Let's Translate!

Write an algebraic expression for each verbal expression.

(1) A ballpoint pen sells for $\$0.39$. Represent the cost of x pens.

$.39x$ ← cost (value) of one item
← how many (quantity)

(2) If the distance from Hilda's school to her home is 145 miles,

represent the distance she has traveled after m miles.

$145 - m$



Now let's try some more complex expressions!

(3) Write an expression for the price of a sweater x

(a) with an 8% sales tax

$$1x + .08x \rightarrow 1.08x$$

(b) with a 20% discount

$$x - \frac{x(.2)}{\quad} \rightarrow .8x$$

$.8x + .08(.8x)$ (c) with a 20% discount and then an 8% sales tax

$$\frac{(.8x)(1.08)}{\quad} \rightarrow .864x$$

(d) identify the units associated with this expression

dollars

You need to define any variable you want to use

(4) Write an expression for a taxi ride that charges an initial fee of $\$5.50$ and $\$0.50$ for each mile.

$m =$ number of miles

$$5.5 + .5m$$

(5) Write an expression for a taxi ride that costs $\$2.50$ for the 1st mile and $\$0.75$ for each additional mile.

$m =$ # of miles

$m =$ # of additional miles

1st mile $\rightarrow 2.5 + .75(m-1)$

$$2.5 + .75m$$

(6) Alex purchased a 6 hour calling card. He has used x minutes of access time. Write an algebraic expression to represent how much time he has remaining, and identify the units associated with the expression.

$$6(60) - x$$

$$360 - x$$

minutes are units

make sure the units you are combining are the same (change units of measurement)

(7) Charlie has 3 fewer $\$20$ -bills than he has $\$10$ -bills. Write an algebraic expression to represent how much money Charlie has in total.

$b =$ number of $\$10$ bills

$b - 3 =$ number of $\$20$ bills

$$10b + 20(b-3)$$

value for one \$10 bill quantity (number of \$10 bills) value for one \$20 bill quantity (number of \$20 bills)

Now You Try!!!!

Translate each statement into an algebraic expression.

1. The number of kilometers traveled by a bus is represented by x . If a train traveled 200 kilometers farther than the bus, represent the number of kilometers traveled by the train.

$$200 + x$$

2. Mr. Gold invested \$1,000 in stocks. If he lost d dollars when he sold them, represent the amount he received for them.

$$1000 - d$$

3. The cost of a fur coat is 5 times the cost of a cloth coat. If the cloth coat costs x dollars, represent the cost of the fur coat.

$$5x$$

4. The length of a rectangle is represented by L . If the width of the rectangle is one-half of its length, represent its width.

$$\frac{1}{2}L \text{ or } \frac{L}{2}$$

5. After 12 centimeters had been cut from a piece of lumber, there were c centimeters left. Represent the length of the original piece of lumber.

$$12 + c$$

6. Paul and Martha saved \$100. If the amount saved by Paul is represented by x , represent the amount saved by Martha.

$$100 - x$$

7. The sum of two numbers is s . If one number is represented by x , represent the other number in terms of s and x .

$$s - x$$

8. A suit costs \$150. Represent the cost of n suits.

$$150n$$

9. A man spent \$250 for a suit and a coat. If he spent y dollars for the coat, represent the amount he spent for the suit.

$$250 - y$$

10. The width of a rectangle is x centimeters. Represent the length of the rectangle if it exceeds twice the width by 3 centimeters.

$$x = \text{width}$$

$$2x + 3 = \text{length}$$

11. Represent the total number of calories in x peanuts and y potato chips if each peanut contains 15 calories and each potato chip contains 18 calories.

<u>15</u>	<u>x</u>	+	<u>18</u>	<u>y</u>
Calories in one peanut	# of peanuts		Calories in one chip	# of chips

12. The charges for a long distance telephone call are \$0.45 for the first 3 minutes and \$0.09 for each additional minute. Represent the cost of a telephone call that lasts m minutes when m is greater than or equal to 3.

$$m \geq 3$$

<u>.45</u>	+	<u>.09(m-3)</u>
1st 3 minutes		additional minutes of the phone call

↑
this is
the
total
number
of
minutes