## Warm up (5 minutes):

Solve the following algebraic equations:

1) $-3x + 5 = 17$

2) $^{(x+2)}/_{3} = 9$

3) $-3x + 4 = 6x - 5$

## Translating Word Problems:

Objective: By the end of today's lesson, I will be able to translate and solve 3 word problems correctly

The BIG DEAL: We need to turn word phrases into algebraic expressions, then solve them!

Note: The phrase "a number" should be substituted for a variable like "x" or "n"

## Some of the Key Phrases:

Addition: Increased by, Combined, Plus, Together, Total of, Sum, Added to

Subtraction: Decreased by, Minus, Less, Difference of/ between, Less than, Fewer Than

Multiplication: Of, Times, Multiplied by, Product of

Division: Per, Out of, Ratio of, Quotient of, Percent

Equals: is, are, was, were, will be, gives, yields, sold for

Be careful with "less than" and "fewer than" in the subtraction category– in those cases, the numbers are reversed!

## Let's Try One:

Translate "The sum of 8 and y is 23" into an algebraic equation and solve.

- "Sum" says that the next two quantities will be added
- "Is" means that the total will be 23

Rewritten, our new equation is $8 + y = 23$

$y = 15$

## One More for Funsies!:

Translate "The difference of 5 and y equals 14" into an algebraic equation and solve.

- "Difference" means subtraction of the next two numbers
- "Equals" means equals.

$5 - y = 14$

$y = -9$

## Everyone Join in!:

Ex. 1) X multiplied by 13 will be 39.

Ex. 2) 4 less than a number is 16.

Ex. 3) Nine less than the total of a number and two.

## EXAMPLE Translate Equations into Sentences

**4** Translate each equation into a verbal sentence.

**a.** $3m + 5 = 14$

| $3m$ | $+$ | $5$ | $=$ | $14$ |
|---|---|---|---|---|
| Three times $m$ | plus | five | equals | fourteen. |

**b.** $w + v = y^2$

| $w + v$ | $=$ | $y^2$ |
|---|---|---|
| The sum of $w$ and $v$ | equals | the square of $y$. |

**CHECK Your Progress**

**4A.** $13 = 2 + 6t$ Thirteen equals two plus the product of six and $t$.

**4B.** $\frac{1}{4}n + 5 = n - 7$ One fourth of a number plus five equals the number minus seven.

## EXAMPLE Write a Problem

**5** Write a problem based on the given information.

$a$ = Rafael's age $\quad a + 5$ = Tierra's age $\quad a + 2(a + 5) = 46$

The equation adds Rafael's age $a$ plus twice Tierra's age $(a + 5)$ to get 46.

Sample problem:
Tierra is 5 years older than Rafael. The sum of Rafael's age and twice Tierra's age equals 46. How old is Rafael?

**CHECK Your Progress** See margin.

**5.** $p$ = price of jeans $\quad 0.2p$ = discount $\quad p - 0.2p = 31.20$

★ indicates multi-step problem

## CHECK Your Understanding

Example 1 (p. 70)

Translate each sentence into an equation. & Solve

1. Twice a number $t$ decreased by eight equals seventy.
2. Five times the sum of $m$ and $n$ is the same as seven times $n$.
3. Half of $p$ is the same as $p$ minus three.
4. A number squared is as much as twelve more than the number.

Example 2 (p. 71)

5. **SAVINGS** Misae has $1900 in the bank. She wishes to increase her account to a total of $2500 by depositing $30 per week from her paycheck. Write and use an equation to find how many weeks she needs to reach her goal.

Example 3 (p. 72)

Translate each sentence into a formula. $A = \frac{1}{2}bh$

6. The area $A$ of a triangle equals one half times the base $b$ times the height $h$.
7. The circumference $C$ of a circle equals the product of 2, $\pi$, and the radius $r$. $C = 2\pi r$

Example 4 (p. 72)

Translate each equation into a verbal sentence. 8–10. See margin.

8. $1 = 7 + \frac{z}{5}$
9. $14 + d = 6d$
10. $\frac{1}{3}b - 4 = 2a$

Example 5 (p. 73)

Write a problem based on the given information. 11–12. See margin.

11. $c$ = cost of a suit
$c - 25 = 150$

12. $p$ = price of a new backpack
$0.055p$ = tax; $p + 0.055p = 31.65$



## DIFFERENTIATED HOMEWORK OPTIONS

| Level | Assignment | Two-Day Option | |
|---|---|---|---|
| BL Basic | 13–34, 48–68 | 13–33 odd, 50, 51 | 14–34 even, 48, 49, 52–68 |
| OL Core | 13–33 odd, 35–68 | 13–34, 50, 51 | 35–47, 48, 49, 52–68 |
| AL Advanced/Pre-AP | 35–62 (optional: 63–67) | | |

**Tips for New Teachers — Reading Tip**

Remind students that there is often more than one way to translate an equation into a verbal sentence. For example, $3m + 5 = 14$ could also be translated as, "The sum of three times $m$ and 5 is 14."

## ADDITIONAL EXAMPLES

**4** Translate each equation into a verbal sentence.

**a.** $12 - 2x = -5$ Twelve minus two times $x$ equals negative five.

**b.** $a^2 + 3b = \frac{c}{6}$ $a$ squared plus three times $b$ equals $c$ divided by 6.

**5** Write a problem based on the given information.

$f$ = cost of fries

$f + 1.50$ = cost of burger

$4(f + 1.50) - f = 8.25$

The cost of a burger is $1.50 more than the cost of fries. Four times the cost of a burger minus the cost of fries equals $8.25. How much do fries cost?

**Additional Answer (Check Your Progress)**

**5.** Sample answer: The price of a pair of jeans is $p$ dollars, and the discount is $0.2p$. If the total cost of the jeans minus the discount is $31.20, what is the price of the jeans before the discount?

## 3 Practice

**Formative Assessment**

Use Exercises 1–12 to check for understanding.

Use the chart at the bottom of this page to customize assignments for your students.

For answers 8–12, see p. 74.

## Warm – up (5 minutes)

Convert the following phrases into algebraic expressions:

a) Three times g equals 21

b) Seven times y plus six is thirty- four

c) Five more than two times n is fifteen

d) Two less than x equals 14

## Translating Algebraic Expressions into Words

Objective: By the end of today's lesson, I will be able to translate 3 algebraic expressions into words correctly.

The BIG DEAL: We need to be comfortable working with both WORDS AND NUMBERS! YEAH!

Yesterday, we began by translating phrases into algebraic expressions, so today, we will be doing the opposite.

## Some of the Key Phrases:

Addition: Increased by, Combined, Plus, Together, Total of, Sum, Added to

Subtraction: Decreased by, Minus, Less, Difference of/ between, Less than, Fewer Than

Multiplication: Of, Times, Multiplied by, Product of

Division: Per, Out of, Ratio of, Quotient of, Percent

Equals: is, are, was, were, will be, gives, yields, sold for

Be careful with "less than" and "fewer than" in the subtraction category– in those cases, the numbers are reversed!

## We Should Try Some Together:

Ex. 1) $3r = 18$

- 3 times r equals 18
- The product of 3 and r is 18
- 3 multiplied by a number is the same as 18

The neat part about these is that we have some creative freedom to write these, and still have the same response.

## Let's Try it Again:

Ex. 2) $2m - 1$

- Two times m minus one
- The product of 2 and a number subtracted by 1
- One less than the product of 2 and a number

## Are You... Board?:

Write a verbal expression for the following algebraic expressions:

$\frac{b}{11}$

$6 - y = 12$

$3r + 8 = 42$

OPINION L.A. OBSERVATIONS AND PROVOCATIONS FROM THE TIMES' OPINION STAFF

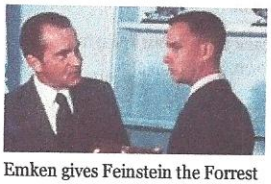
# Does Sen. Dianne Feinstein's age matter?




Sen. Dianne Feinstein, if reelected, would be 85 at the conclusion of an additional term. (Tom Williams / Roll Call / Getty Images)




**Endorsement:** It's an easy call: Sen. Feinstein


Emken gives Feinstein the Forrest Gump treatment

By Michael McGough
*October 30, 2012 | 11:25 a.m.*

In her uphill campaign against Sen. Dianne Feinstein, Republican Elizabeth Emken, albeit obliquely, has made an issue of Feinstein's age. The senator turned 79 on June 22 and if reelected she would be 85 at the conclusion of one more term.

Would that be unusual? Yes, but not unprecedented. In the current Senate, Feinstein is the fifth oldest member. Three senators are 88: Frank Lautenberg of New Jersey and Daniel Inouye and Daniel Akaka of Hawaii. No. 4 is 80-year-old Richard Lugar of Indiana, who was defeated in his bid for renomination in this year's Republican primary.

## Comments (0)

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*Comments are filtered for language and registration is required. The Times makes no guarantee of comments' factual accuracy. Readers may report inappropriate comments by clicking the Report Abuse link next to a comment. Here are the full legal terms you agree to by using this comment form.*

## Videos



## In Case You Missed It...

Name: Date: Per:

Warm – up (5 minutes): After reading the article on Dianne Feinstein, consider that she is currently 79. Her first term as senator began in 1992 (many of you had not been born yet!). Do you feel that her age helps her as a senator (experience), or does it hurt her (is she out of touch with the people she represents)? Will you vote for her? Respond in a paragraph. Your paragraph must be (a minimum of) four sentences. The sentences should be complete, with correct spelling, grammar, punctuation, etc.

Directions: You will be given 6 minutes to work on a problem (or set of problems) at each station. Use this sheet to answer the questions in the given space according to the station at which you are seated. When the time signal is given, please move to the next station (in numerical order). Should you finish early at a given station, use the extra time to complete an unfinished problem from an earlier station. If you have any questions, please work with your station- mates, or raise your hand.

Station 1)

Station 2)

Station 3)

Station 4)

Station 5)

Station 6)

## Station #1

Solve the following equations:

a) $20c + 5 = 5c + 65$

b) $3(a - 5) = -6$

c) $2(w - 3) + 5 = 3(w - 1)$

## Station #2

Convert the following into algebraic expressions:

a) X increased by 12

b) The product of 5 and y

c) The sum of 2 and three times a number

d) 7 decreased by the quotient of x and 2

## Station #3

Multiplication *M a N i A* (no phones or calculators – do these by hand!):

a) $15 \times 83 =$
b) $54 \times 43 =$
c) $91 \times 41 =$
d) $57 \times 56 =$
e) $22 \times 66 =$

## Station #4

Solve the following fraction problems:

a) $^{2}/_{3} + {}^{1}/_{8} =$

b) $^{4}/_{9} - {}^{6}/_{7} =$

c) $^{4}/_{5} + {}^{7}/_{10} =$

## Station #5

Convert the following algebraic expressions into English:

a) 20n

b) 5k + 2

c) (d – 2) + 14

d) Create your own expression, then write the English expression for it.

## Station #6

Rearrange the following equations into y = mx + b form:

a) x = -y + 3

b) -8x + 4y = 8

c) 3 – 5y = 2x