WIN Week 2 Day 1 – Kahn Academy Work Day

Warm up

Solve.

1. $n - 3 = 42$

$+3 \quad +3$

$n = 45$

2. $-2 - \frac{5}{8}x = 20$

$+2 \quad +2$

$\frac{8}{5}\left(-\frac{5}{8}x\right) = 22 \cdot \frac{8}{5}$

$x = -32$

3. $5(x + 3) + 2(1 - x) = 14$

$5x + 15 + 2 - 2x = 14$

$3x + 17 = 14$

$-17 \quad -17$

$3x = -3$

$x = -1$

4. $-10x + 3(4x - 2) = 6$

$-10x + 12x - 6 = 6$

$2x - 6 = 6$

$+6 \quad +6$

$\frac{2x}{2} = \frac{12}{2}$

$x = 6$

5. $-5(1 - 5x) + 5(-8x - 2) = -4x - 8x$

$-5 + 25x - 40x - 10 = -12x$

$-15x - 15 = -12x$

$+15x \quad +15x$

$\frac{-15}{3} = \frac{3x}{3}$

$-5 = x$

WIN Week 2 Day 2

Learning Target – Students will translate sentences into algebraic expressions and equations.

An **algebraic expression** consists of sums and/or or products of numbers and variables.

In the algebraic expression 2d+3, the letter d is called a **variable**. It varies because it represents an unknown value. Why do you think it's called a variable?

A **term** of an expression may be a number, variable, or product/quotient of numbers and variables. The example 2d+3 has two terms, 2d and 3. The term that contains the variable is called the variable term and the term without is called the constant term. Why do you think it's called a constant?

In an expression containing multiplication, the quantities being multiplied are called **factors**, and the result is the **product**.

An expression like x^n is called a **power**. The **exponent** (little number) indicates the number of times the **base** is multiplied by itself. The expression above is read x to the nth power. x is the base and n is the exponent. What if no exponent is shown?

Sometimes we are given a verbal expression and asked to translate it into an algebraic expression, like in a word problem. The chart below contains some common phrases to help you. You can add any to it that you learn throughout the lesson.

Operation	Phrases
Addition	More than, sum, plus, increased by, added to
Subtraction	Less than, subtracted from, difference, decreased by, minus
Multiplication	Product of, multiplied by, time, of
Division	Quotient of, divided by

Write an algebraic expression to represent each verbal expression

1. 2 more than 4 times the cube of a number $2+4x^3$
2. The quotient of five less than a number and twelve. $\frac{x-5}{12}$
3. A number t more than 6 $t+6$
4. 10 less than the product of 7 and f $7f-10$

Sometimes we will write equations rather than expressions. Equations must contain an equals sign. Write an algebraic equation to represent each verbal equation.

5. Twelve more than a number is 17. $12+x=17$
6. Five less than two times a number is the same as 7. $2x-5=7$
7. The sum of three times a number and 4 is 19. $3x+4=19$
8. Three times the sum of a number and 4 is 19. $3(x+4)=19$

Write a verbal sentence to represent each expression.

9. 6x The product of 6 and a number, x.
10. N+15 The sum of a number, N, and 15.
11. $3x^4$ three times a number raised to the fourth power
12. $5z^2 + 16$ five times a number squared plus 16.
13. $\frac{1}{2}a - \frac{6b}{7}$ one half of a number minus six sevenths of a different number.

Write a verbal sentence to represent each equation.

14. $2x - 3 = 1$ The difference of twice a number and 3 is 1.
15. $2(x - 3) = 1$ Twice the difference of a number and 3 is 1.

16. Mr. Matinez orders 250 keys chains printed with his athletic team's logo and 500 pencils printed with their Web address. Write an algebraic expression that represents the cost of the order. Be sure to define your variables. $250k + 500p$

k = cost of a key chain
p = cost of a pencil

17. One half of a number is 24. Write an equation to represent the situation and determine the number.

Let x = the number $\frac{1}{2}x = 24$

$x = 48$

18. The product of a number and 2.4 is 0.48. Write an equation to represent the situation and determine the number.

Let x = the number $2.4x = 0.48$

$x = 0.2$

19. Eight more than three times a number is 29. Write and equation and use it to find the number.

Let x = the number $8 + 3x = 29$

$-8 \quad -8$

$\frac{3x}{3} = \frac{21}{3}$

$x = 7$

WIN Homework Week 2 Day 1

Translate each verbal phrase into an algebraic expression or equation.

1) Seven less than a number is 15

$x - 7 = 15$

2) The total of 5 and c

$5 + c$

3) 7 less than m

$m - 7$

4) The sum of a number and 16 is 23

$x + 16 = 23$

5) the score increased by 8 points

$x + 8$

6) The quotient of w and 10 is equal to 7

$\frac{w}{10} = 7$

7) 17 more than some number is 57 $17 + x = 57$

8) $12 less than the original price is $48

$x - 12 = 48$

Translate each verbal phrase into an algebraic expression or equation.

13) Seven more than the quotient of a number and 2 is 10.

$7 + \frac{x}{2} = 10$

14) Five less than twice a number is 7.

$2x - 5 = 7$

15) One less than the product of four and a number is 11.

$4x - 1 = 11$

16) Six less than six times a number is 12.

$6x - 6 = 12$

17) Ten more than the quotient of a number and 3 is 12.

$10 + \frac{x}{3} = 12$

18) Seven more than twice a number is 1.

$2x + 7 = 1$

19) The sum of 9 and the quotient of x and 7 is 11.

$9 + \frac{x}{7} = 11$

20) The product of 8 and the difference of n and 3.

$8(n - 3)$

WIN Week 2 Day 3

Kahn Work time – first half of class

Students will solve word problems involving multistep equations.

1. 14. Alex and Cassie saved money to go on their honeymoon. Cassie works for an airline, so she can fly for free. Alex's ticket will cost $265. Alex has saved $50 more than Cassie. They have exactly enough for the airline ticket. How much money did each person save?

x = amount Cassie saved

x + 50 = amount Alex saved

$265 = x + (x + 50)$

$265 = 2x + 50$

$215 = 2x$

$107.5 = x$

So Cassie saved $107.50 and Alex saved $157.50

2. ~~15.~~ Mrs. Blanton is buying porch furniture. She has budgeted $1500. She already spent $400 on a table. Her husband says she has expensive taste because each chair she picked out costs $220. How many chairs can she afford to buy? Write and solve an equation to answer the question.

x = # of chairs

$1500 = 400 + 220x$

$1100 = 220x$

$5 = x$

She can buy 5 chairs.

3. Tickets for a fundraiser are $14 if purchased ahead of time and $25 if purchased at the door. The total amount raised from all the tickets was $625. If eleven tickets were purchased at the door, how many tickets were purchased ahead of time?

x = # of tickets purchased ahead of time

$14x + 25(11) = 625$

$14x + 275 = 625$

$14x = 350$

$x = 25$

25 tickets sold ahead of time

4. On Friday you raked leaves for 4 neighbors, on Saturday you raked leaves for 5 neighbors and on Sunday you raked leaves for 3 neighbors. You were paid a total of $135. Write and solve an equation to determine how much money you earned per house.

x = cost per house

$4x + 5x + 3x = 135$

$12x = 135$

$x = \$11.25$

You earned $11.25 per house

5. The Hershey company donated candy bars to your school for a fundraiser. You set a personal goal of raising $200 for your school and you met that goal. You sold a total of 120 candy bars and one neighbor gave you a $20 donation. Write and solve an equation to determine how much each candy bar sold for.

x = cost of each bar

$200 = 120x + 20$

$180 = 120x$

$1.5 = x$

Each bar sold for $1.50

HW WIN Week 2 Day 3

4) Joe earns **$425 a week** for working 40 hours **and** an additional **$20 an hour for each hour over 40. Last week, Joe made $485. Write and solve an equation to determine how many hours over 40 he worked.** (Don't forget to define your variable and answer in a complete sentence.)

How many **total hours** did Joe work last week?

x = # of hours over 40 he worked

$425 + 20x = 485$

$20x = 60$

$x = 3$

He worked 3 hours over 40.

5) A window is **34 inches wide** and its **perimeter is 188 inches. Write and solve an equation to determine the length of the window.** (Don't forget to define your variable and answer in a complete sentence.) You may want to draw a picture to help you set this up. Remember: P = 2L + 2W

L = length

$2L + 2(34) = 188$

$2L + 68 = 188$

$2L = 120$

$L = 60$

2. Tim is choosing between two cell phone plans that offer the same amount of free minutes. Cingular's plan charges $39.99 per month with additional minutes costing $0.45. Verizon's plan costs $44.99 with additional minutes at $0.40. How many additional minutes, a, will it take for the two plans to cost the same?

$39.99 + 0.45a = 44.99 + 0.40a$

$-5 + 0.45a = 0.40a$

$-5 = -0.05a$

$100 = a$

100 minutes

5. UPS charges $7 for the first pound, and $0.20 for each additional pound. FedEx charges $5 for the first pound and $0.30 for each additional pound. How many pounds, p, will take for UPS and FedEx to cost the same?

$7 + .20p = 5 + 0.30p$

$2 = .10p$

$20 = p$

20 lbs

WIN Week 2 Day 4 Review

Solve the equation.

1. $14 = x + (+6)$

$8 = x$

2. $3 + (+x) = 19$

$x = 16$

3. $4 - x = 5$

$x = -1$

4. $\frac{3}{8}y = 12$

$y = 32$

5. $15x = -3$

$x = -\frac{1}{5}$

6. $\frac{x}{7} = 21$

$x = 147$

Write and solve an equation.

7. You owed \$34 to your sister. You paid *x* dollars back and you now owe \$12. How much did you pay back?

$34 - x = 12$

$x = \$22$ — you owe \$22

8. You estimate that you spend \$115 on groceries each month. How much money do you spend on groceries each week?

x = amount per week

$115 = 4x$

$\$38.75 = x$

\$38.75 per week

Solve the equation.

9. $5x + 7 - 2x = 22$

$3x = 15$

$x = 15$

10. $4(x - 5) = 4x - 20$

$4x - 20 = 4x - 20$

infinitely many solutions

11. $12 - (4x + 10) = 54$

$12 - 4x - 10 = 54$

$-4x + 2 = 54$

$-4x = 52$

$x = -13$

12. $\frac{2}{3}(x + 4) = 8$

$3\left(\frac{2}{3}x + \frac{8}{3} = 8\right)$

$2x + 8 = 24$

$2x = 16$

$x = 8$

13. $8x - 10(3 - x) = 42$

$8x - 30 + 10x = 42$

$18x = 72$

$x = 4$

14. $-3(x - 5) = -3x + 16$

$-3x + 15 = -3x + 16$

$\emptyset$

Solve each problem.

15. Mary Alice and her friends are celebrating 4th of July. They spend $50 on fireworks. They bought 1 "sparkle spectacle" for $21 and 4 "fantastic fireworks". How much did each "fantastic firework" cost?

x = cost of a fantastic firework

$50 = 21 + 4x$

$x = \$7.25$

16. Mary Alice is buying a prom dress. The sale price of the dress is $190. The dress is on-sale for five sevenths of the original cost. What is the original cost of the dress?

x = original cost of dress

$190 = \frac{5}{7}x$

$x = \$266$

17. Mary Alice is saving to buy a car. She is buying her neighbor's used Altima so her car will cost $2600. She earns $110 per week. Before she can buy the car she must pay the first six months of insurance for $400. How many weeks will pass before she has enough money to buy the car?

$2600 = 110x - 400$

$x = 27.27$

So 28 weeks

18. Mary Alice is laying sod in her yard. Sod is only sold in full pallets. 3 pallets of sod covers 1512 square feet of the yard. How many pallets does she need purchase to cover a yard that is 4000 square feet?

$\frac{3}{1512} =$