

- 1) Bell Ringer:page 20a -20b
- 2) Go over homework page 23
- 3) Lesson 4: Solving Equations using the Distributive Property
- 4) Homework: page 37b (1-8)

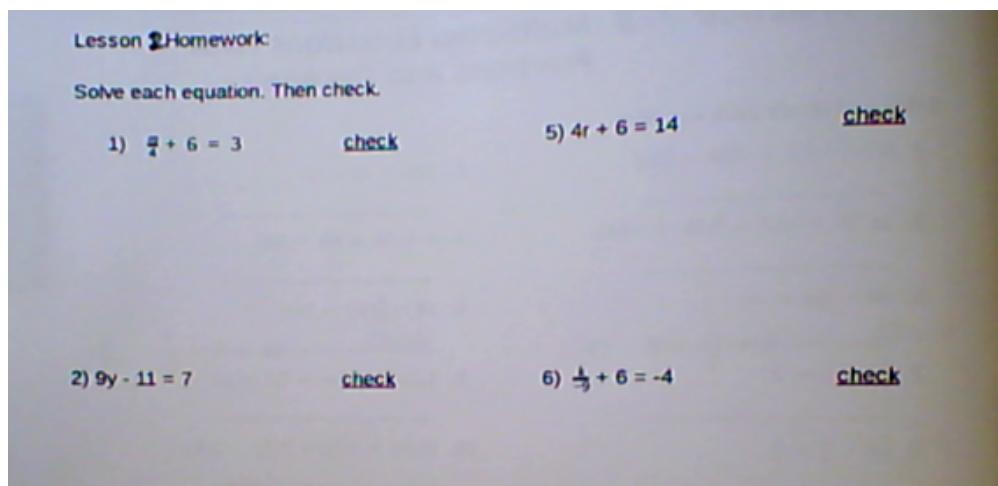
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Lesson 4 Homework

Solve each equation. Then check.

1) $\frac{y}{4} + 6 = 3$ [check](#) 5) $4r + 6 = 14$ [check](#)

2) $9y - 11 = 7$ [check](#) 6) $\frac{1}{3}y + 6 = -4$ [check](#)



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3) $15w - 21 = -111$

check

7) $\frac{2}{3} - 14 = -9$

check

4) $\frac{3}{4}x - 5 = 10$

check

8) $\frac{4}{5}n - 1 = 11$

check

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O	Equation	Solution
1	$2x = 32$	
2	$9d = 27$	
3	$3r = 36$	
4	$2w = 44$	
5	$7p = 42$	
6	$3n = 69$	
7	$36 = 2q$	
8	$108 = 9u$	
9	$5x = -25$	
10	$15a = -90$	
11	$-7y = 28$	
12	$-4t = 32$	

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12	$-4t = 32$	
13	$-3n = 39$	
14	$13r = -39$	
15	$45 = 5e$	
16	$x = 12$ 2	
17	$x = 5$ 2	
18	$c = 6$ 7	
19	$34 = r$ 6	
20	$x = -7$ 3	

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Q	Equation	Solution
21	$5x = 40$	
22	$15a = 45$	
23	$7y = 35$	
24	$4t = 36$	
25	$4t = 48$	
26	$17r = 51$	
27	$144 = 6e$	
28	$2x = -12$	
29	$9d = -18$	
30	$3r = -27$	
31	$-2w = 24$	
32	$-7p = 77$	
33	$4t = 80$	

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34	$-30 = 2q$
35	$72 = -9u$
36	$\underline{x} = 4$ 3
37	$\underline{k} = 2$ 4
38	$9 = \underline{h}$ 7
39	$5 = \underline{d}$ 9
40	$\underline{k} = -9$ 4

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Combining Like TermsP. 18**Terms:** a number, variable or the product/quotient of both**Like Terms:** two or more terms containing the same variables or variables having the same exponents.**Unlike Terms:** terms that do not contain the same variables.

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Combining Like Terms for Addition and Subtraction

1.) $2a + 15a + 3a$

20a

2.) $7x + 19x + 13x$

39x

3.) $5y - 13y + 4$

-8y + 4

4.) $-22c - 6c + 12c$

-28c + 12c
-16c

5.) $35x + 5x + 4$

40x + 4

6.) $7y - 10 - 11y$

-4y - 10

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7.) $7a + 6c + 9a - 15c$

16a - 9c

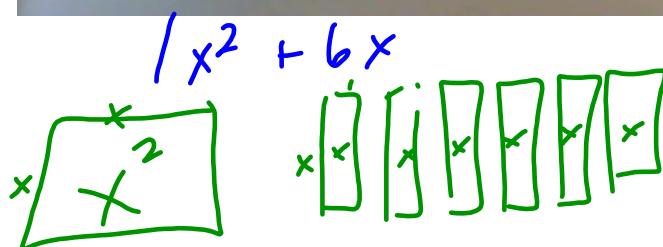
8.) $7r + 8 + 10r - 19r$

-2r + 8

9.) $4x^2 + 2x - 3x^2 + 4x$

10.) $4xy - 2x^2y + 6xy$

10xy - 2x²y



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P. 21

SOLVING MULTI-STEP EQUATIONS

A(n) multi-step equation is an equation that requires two or more steps to solve.

Remember: Before solving an equation, simplify it by following the steps listed below.

Ex: $-9 - x + 8x = -23$

$$\begin{array}{r} -9 - x + 8x = -23 \\ \underline{+9} \qquad \qquad \qquad +9 \\ 7x = -14 \end{array}$$

Step 1: Combine like terms.
Step 2: Add 9 to both sides.

Simplify.

$$\frac{7x}{7} = \frac{-14}{7}$$

Step 3: Divide both sides by 7.

$$x = -2$$

Simplify.

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P. 23

Solve each of the following equations.

1.) $5x + 2 - 8x = 17$

$$\begin{array}{r} 5x + 2 - 8x = 17 \\ \underline{-3x} \qquad \underline{-2} \qquad \underline{= 17} \\ -3x = 15 \\ \underline{-3} \qquad \underline{-3} \\ x = -5 \end{array}$$

Step 1
Step 2
Step 3

2.) $7x + 3x - 4 = 12 + 39$

$$\begin{array}{r} 7x + 3x - 4 = 12 + 39 \\ \underline{+4} \qquad \underline{+4} \\ 10x = 55 \\ \underline{10} \qquad \underline{10} \\ x = 5.5 \end{array}$$

Step 1
Step 2
Step 2

3.) $3x + 15 - 2x = 26$

$$\begin{array}{r} 3x + 15 - 2x = 26 \\ \underline{-15} \qquad \underline{-15} \\ x = 11 \end{array}$$

Step 1
Step 2

4.) $3y + 5y - 3 = 21$

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check for #1

$$\textcircled{1} \quad 5x + 2 - 8x = 17$$

$$5(-5) + 2 - 8(-5) = 17$$

$$-25 + 2 + 40 = 17$$

$$-23 + 40 = 17$$

$$17 = 17 \checkmark$$

check for #2

$$\textcircled{2} \quad 7x + 3x - 4 = 12 + 39$$

$$7(5.5) + 3(5.5) - 4 = 12 + 39$$

$$38.5 + 16.5 - 4 = 12 + 39$$

$$55 - 4 = 12 + 39$$

$$51 = 51 \checkmark$$

$$\textcircled{3} \quad *3x + 15 - 2x = 26$$

$$3(11) + 15 - 2(11) = 26$$

$$33 + 15 - 22 = 26$$

$$48 - 22 = 26$$

$$26 = 26 \checkmark$$

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5.) $13a + 2a + 5a + 85 = 95$

check

$$\textcircled{6} \quad 18x - 1 - 9x - 4 = 4$$

$$9x - 5 = 4$$

$$+5 \quad +5$$

$$9x = 9$$

$$\frac{9}{9} x = \frac{9}{9}$$

$$x = 1$$

7.) $5a - 7a + 4 = 26$

8.) $9 + 3x - 6x = 18$

$$-2a + 4 = 26$$

$$-4 \quad -4$$

$$\frac{-2}{-2} a = \frac{22}{-2}$$

$$a = -11$$

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Check for #6

$$18x - 1 - 9x - 4 = 4$$

$$18(1) - 1 - 9(1) - 4 = 4$$

$$18 - 1 - 9 - 4 = 4$$

$$\underbrace{18 - 9}_{8} - 4 = 4$$

$$8 - 4 = 4$$

$$4 = 4 \checkmark$$

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Check for #7

$$5a - 7a + 4 = 26$$

$$5(-11) - 7(-11) + 4 = 26$$

$$\underbrace{-55 + 77}_{22} + 4 = 26$$

$$22 + 4 = 26$$

$$26 = 26 \checkmark$$

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Homework 7: Combining Like Terms	
Directions: Simplify each expression by combining like terms.	
1. $8y - 9y$	$-1y$
2. $3x - 7x + 1$	$-4x + 1$
3. $8a - 6 + a - 1$	$-7 + 9a$
4. $-2y + 1 - 9y + 5$	$-11y + 19$
5. $-x - 2 + 15x$	$14x + (-2)$
6. $-7w - 5 - 7w + 9$	$14w + 4$
7. $8d - 1 - d - 2$	$7d + (-6)$
8. $40 - 9x - 4x + 5$	$45 - 5x$
9. $9a + 8 - 2a - 3 - 5a$	$2a + 5$
10. $4xy - 6xy + 5y - 9x$	$-2xy + 5y - 9x$
11. $7x + 2y + 5 - 5x - 9y - 1$	$2x - 7y + 4$
12. $-5f - 7g + f - 5g - 4 + f$	$-3f - 12g - 4$

$4 + 11y + 2x$

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 Remember: In some cases, it is necessary to use the distributive property (for example, when solving a multi-step equation).

Ex: $-3(x - 6) = 6$

$$\begin{array}{rcl} -3x + 18 & = & 6 \\ -18 & & -18 \\ \hline -3x & = & -12 \\ \frac{-3x}{-3} & = & \frac{-12}{-3} \\ x & = & 4 \end{array}$$

Use the distributive property.
Subtract 18 from both sides.
Simplify.
Divide both sides by -3.
Simplify.

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Ex: $4(x + 11) - x = 8$

$$\begin{array}{rcl}
 4x + 44 - x & = & 8 \\
 3x + 44 & = & 8 \\
 -44 & & \\
 \hline
 3x & = & -36 \\
 \frac{3x}{3} & = & \frac{-36}{3} \\
 x & = & -12
 \end{array}$$

Use the distributive property.
 Combine like terms.
 Subtract 44 from both sides.
 Simplify.
 Divide both sides by 4.
 Simplify.

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Warm Up -

p. 24a

Use the distributive property to simplify.

1) $6(x + 4)$ $6x + 24$

2) $3(x + 5)$ $3x + 15$

3) $9(a - 2)$ $9a - 18$

4) $(x + 3)10$ $10x + 30$

5) $5(2x - 3)$ $10x - 15$

6) $4(a + b)$ $4a + 4b$

7) $-5(2x + 4)$ $-10x - 20$

8) $-10(5b - 1)$ $-50b + 10$

9) $c(y - 3)$ $cy - 3c$

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10) $-6(5x + 5)$ $-30x - 30$
 11) $5(c - 2)$ $5c - 10$
 12) $8(4n - 3)$ $32n - 24$
 13) $-2(8r + 7)$ $-16r - 14$
 14) $12(t + v)$ $12t + 12v$
 15) $a(x + 2)$ $ax + a^2$
 16) $4(3x + 2)$ $12x + 8$
 17) $(c + 5)^2$ $2c + 10$
 18) $(t + 1)^7$ $7t + 7$
 19) $12(t + 3v)$ $12t + 36v$
 20) $-3(4x - 6y)$ $-12x + 18y$

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Solving Equations with the Distributive Property

When we are solving equations, we are attempting to isolate the variable in order to determine what specific value that variable has in the given equation. We do this using inverse operations. Sometime we refer to this as "undoing" the operations that have happened to the variable. Let's review the basics of solving one- and two-step equations.

Solving with the Distributive Property

Another way to simplify a problem before applying inverse operations is to use the distributive property. It is true that we can solve without using the distributive property, but often it is easier to use it.

Remember that the distributive property says $a(b + c) = ab + ac$ which means whenever you multiply a number, a in this case, by a set of parentheses, you multiply by everything in the parentheses. So to multiply the parentheses by a we actually multiply a by b and then a by c before adding those. Note that subtraction would work the same way so we get $a(b - c) = ab - ac$.

p.24b

Let's look at this example which we should verify has a solution of $x = 6$:

check

$$\begin{aligned} 3(x - 2) &= 12 \\ 3(6 - 2) &= 12 \\ 3(4) &= 12 \\ 12 &= 12 \end{aligned}$$

Step 1 distribute

$$\begin{aligned} 3(x - 2) &= 12 \\ 3 \cdot x - 3 \cdot 2 &= 12 \\ 3x - 6 &= 12 \end{aligned}$$

Step 2 add

$$\begin{aligned} 3x - 6 &= 12 \\ 3x &= 18 \\ x &= 6 \end{aligned}$$

Step 3 divide

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There may also be times where we have to use the distributive property and then combine like terms. In that case, we follow the order of operations and do our multiplication before combining like terms with addition. Consider the following example which we should verify has a solution of $x = 3$:

$$\begin{aligned} 3(x+2) - 7 + 2x &= 14 \\ 3x + 6 - 7 + 2x &= 14 \\ 5x - 1 &= 14 \\ +1 &+1 \\ 5x &= 15 \\ \frac{5x}{5} &= \frac{15}{5} \\ x &= 3 \end{aligned}$$

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The screenshot shows the HUE Intuition software interface. At the top, there is a toolbar with buttons for "HIDE CONTROLS (F12)", "WINDOWED (ESC)", and "QUIT". On the right side, there is a vertical column of buttons labeled "VIDEO", "PLAYBACK", "SCAN", "DOCUMENT CAMERA", "IMAGE CAPTURE", "SETTINGS", and "SKYPE". The main area displays a math worksheet titled "Lesson 5.2" with instructions: "Solve each equation by using the distributive property and combining like terms." It contains 15 numbered math problems. Below the worksheet are input options for camera and microphone selection.

Lesson 5.2
Solve each equation by using the distributive property and combining like terms.

1. $2(x+7) + x = 20$

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

3. $3(m+1) - 2m = 0$

4. $x + 4(2x+3) = 15$

5. $-\frac{1}{2}(b+2) + 3b = -1$

6. $4(n+2) - 2n = 0$

7. $4 + 2(1+x) = 12$

8. $-(x+3) + \frac{1}{3}x + 5 = 0$

11. A gym charges \$15 per month for membership. How many months do you have to pay to make up the cost of a t-shirt?

12. Suppose you go to a concert and buy 2 shirts for \$20 each. You also buy a ticket for \$50 and a program for \$10. How much does each T-shirt cost?

13. A store had homemade sweatshirts for \$20. They bought a sweater for all 15 members. What was the original price of each sweater?

14. After an oil pipeline burst one night, 10 gallons of gas for \$53.90, what was the price per gallon?

15. For Christmas, Maryland purchased 100 magazine subscriptions for her children. She paid \$10 per month plus a \$15 sign-up fee. If she paid a total of \$1200, how many subscriptions did she purchase?

INPUT OPTIONS

CAMERA: HUE HD Camera

MICROPHONE: Microphone (HUE HD Camera)

1280x720 10 Frames Per Second

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Solve each equation by using the distributive property and combining like terms.

$$1. 2(x + 7) + x = 20$$

$$2. 2(\textcolor{red}{x} - 1) + 3x = 3$$

$$3. 3(m + 1) - 2m = 0$$

$$4. \textcolor{blue}{z} + 4(2\textcolor{red}{z} + 3) = 15$$

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$$5. -\frac{1}{2}(b + 2) + 3b = -1$$

$$6. 4(n + 2) - 2n = 0$$

$$7. 4 + 2(1 + x) = 12$$

$$8. -(x + 3) + \frac{3}{4}x + 5 = 0$$

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1) $2(x + 5) = 16$

2) $3(t + 1) = 18$

3) $2(3x - 5) = 14$

4) $4(3t - 2) = 88$

5) $2(3x + 1) = 11$

6) $6(3k + 5) = 39$

7) $9(3x - 5) = 9$

8) $3(t + 7) = 15$

$$\begin{aligned} 1) \quad & 2(x+5) = 16 \\ & 2x + 10 = 16 \\ & \underline{-10} \quad \underline{-10} \\ & 2x = 6 \\ & \underline{2} \quad \underline{2} \\ & x = 3 \end{aligned}$$

$$\begin{aligned} \text{check } & 2(x+5) = 16 \\ & 2(3+5) = 16 \\ & 2(8) = 16 \\ & 16 = 16 \checkmark \end{aligned}$$

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$$\begin{aligned} ② \quad & 3(t+1) = 18 \\ & 3t + 3 = 18 \\ & \underline{-3} \quad \underline{-3} \\ & 3t = 15 \\ & \underline{3} \quad \underline{3} \\ & t = 5 \end{aligned}$$

$$\begin{aligned} \text{check } & 3(t+1) = 18 \\ & 3(5+1) = 18 \quad 3(5+1) = 18 \\ & 15+3 = 18 \quad 3(6) = 18 \\ & 18 = 18 \quad 18 = 18 \checkmark \end{aligned}$$

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$$2(3y - 5) = 14$$

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(b) $6(3k + 5) = 39$
 $18k + 30 = 39$
 $\underline{-30} \quad \underline{-30}$
 $\frac{18k}{18} = \frac{9}{18}$
 $k = \frac{1}{2}$

check
 $6(3k + 5) = 39$
 $6(3 \cdot \frac{1}{2} + 5) = 39$
 $6\left(\frac{1}{2} + 5\right) = 39$
 $6\left(\frac{11}{2}\right) = 39$
 $39 = 39 \checkmark$

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