Solving Equations with Distributive Property and Combining Like Terms

Activity

Name Class Notes

Date _____ Period____

At their planning meeting, the organizers of the walkathon for Children's Hospital discussed expenses and income. They made the following estimates:

- Expense for advertising: $500
- Expense for souvenir t-shirts for participants: $6 per child, $8.50 per adult
- Income from business sponsors whose logos will appear on t-shirts and signs: $1000
- Expense for paramedics in case participants have health problems: $250
- Income from registration fees: $5 per child, $15 per adult

Jana wrote an equation showing the profit, P, as the total income minus the total expenses:

$$P = (1000 + 5c + 15a) - (500 + 6c + 8.50a + 250)$$

1. When Brad simplified the profit equation, he found a different result. Study the steps in his reasoning and correct any mistakes.

$P = (1000 + 5c + 15a) - (500 + 6c + 8.50a + 250)$ A didn't distribute the negative (subtraction) to all terms inside parentheses

$P = 1000 + 5c + 15a - 500 \neq 6c \neq 8.50a \neq 250$

$P = (1000 - 500 \neq 250) + (5c \neq 6c) + (15a \neq 8.50a)$

$P = \cancel{750} + 11c + 23.50a$

$250 - c + 6.50a$

2. Sharona found a different simplified equation. Study the steps in her reasoning and correct any mistakes.

$P = (1000 + 5c + 15a) - (500 + 6c + 8.50a + 250)$ She is correct

$P = 1000 + 5c + 15a - 500 - 6c - 8.50a - 250$

$P = 1000 - 500 - 250 + 5c - 6c + 15a - 8.50a$

$P = 250 - c + 6.50a$

3. Who wrote the equation in a correct simplified form?

Sharona did. Her equation is in the correct simplified form.

Solve each equation and check your answers. Show all steps for solving the equations and checking the solutions.

4. $15x + 17x = 66 - 1x$

$32x = 66 - 1x$
$+x \quad +x$
$\frac{33x}{33} = \frac{66}{33}$
$x = 2$

$x = 2$

Check: $15x + 17x = 66 - 1x$
$15(2) + 17(2) = 66 - 1(2)$
$30 + 34 = 66 - 2$
$64 = 64$ ✓

5. $\frac{5}{6}x + 4 = 9$

$-4 \quad -4$
$\frac{5}{6}x = 5$
$\frac{6}{5} \quad \frac{6}{5}$
$x = 6$

$x = 6$

Check: $\frac{5}{6}x + 4 = 9$
$\frac{5}{6}(6) + 4 = 9$
$9 = 9$ ✓

6. $\frac{6+m}{3} + 7 = 10$

$-7 \quad -7$
$\frac{(6+m)}{3} = 3$
$3 \quad 3$
$6 + m = 9$
$-6 \quad -6$
$m = 3$

$m = 3$

Check: $\frac{6+m}{3} + 7 = 10$
$\frac{6+3}{3} + 7 = 10$
$10 = 10$ ✓

7. $5(4x - 2) = 70$

$20x - 10 = 70$
$+10 \quad +10$
$\frac{20x}{20} = \frac{80}{20}$
$x = 4$

Check: $5(4x - 2) = 70$
$5(4(4) - 2) = 70$
$70 = 70$ ✓

8. $3(5 + 2y) = 23 + 2y$

$15 + 6y = 23 + 2y$
$-15 \quad -15$
$6y = 8 + 2y$
$-2y \quad -2y$
$\frac{4y}{4} = \frac{8}{4}$

$y = 2$

Check: $3(5 + 2y) = 23 + 2y$
$3(5 + 2(2)) = 23 + 2(2)$
$3(9) = 23 + 4$
$27 = 27$ ✓

9. $4(3g + 2) = 36 + 2(g - 3)$

$12g + 8 = 36 + 2g - 6$
$12g + 8 = 30 + 2g$
$-8 \quad -8$
$12g = 22 + 2g$
$-2g \quad -2g$
$10g = 22$

$\frac{10g}{10} = \frac{22}{10}$
$g = 2.2$

Check: $4(3g + 2) = 36 + 2(g - 3)$
$4(3(2.2) + 2) = 36 + 2(2.2 - 3)$
$34.4 = 34.4$ ✓

10. $4(x + 2) = 2x - (x + 1)$

$4x + 8 = 2x - x - 1$
$4x + 8 = x - 1$
$-x \quad -x$
$3x + 8 = -1$
$-8 \quad -8$
$3x = -9$

$\frac{3x}{3} = \frac{-9}{3}$
$x = -3$

Check: $4(x + 2) = 2x - (x + 1)$
$4(-3 + 2) = 2(-3) - (-3 + 1)$
$4(-1) = -6 - (-2)$
$-4 = -4$ ✓

11. If $(\overset{x}{4}, y)$ is a solution to the equation $y = -x + 3$, what is the value of y?

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$y = -x + 3$

$y = -(4) + 3$

$\boxed{y = -1}$

12. If (x, 4) ~~is a solution to~~ the equation $y = -\frac{1}{4}x + 3$, what is the value of x?

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$y = -\frac{1}{4}x + 3$

$4 = -\frac{1}{4}x + 3$

$-3 \quad -3$

$1 = -\frac{1}{4}x$

$1 = -\frac{1}{4}x$

$\frac{1}{4} \quad \frac{1}{4}$

$\boxed{-4 = x}$

13. If (x, -4) is a solution to the equation $4x - 5y = 8$, what is the value of x?

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$4x - 5y = 8$

$4x - 5(-4) = 8$

$4x + 20 = 8$

$-20 \quad -20$

$\frac{4x}{4} = \frac{-12}{4}$

$\boxed{x = -3}$

14. If (6, y) is a solution to the equation $-x - 2y = 7$, what is the value of y?

$-x - 2y = 7$

$-(6) - 2y = 7$

$+6 \quad +6$

$\frac{-2y}{-2} = \frac{13}{-2}$

$y = -6.5$