Solving Multi Step Equations

Unit 2: Equations and Inequalities

Solve each equation:

1. $0 = -3r + 3r$

$0 = 0$

Since no variable and it's a true statement,

ALL REAL NUMBERS

2. $2n + 1 + 8n = 11$

$10n + 1 = 11$

$-1 \quad -1$

$\frac{10n}{10} = \frac{10}{10}$

$n = 1$

3. $8x + 3x = 3x + 8x$

$11x = 11x$

Since the left and right side are EXACTLY the same,

ALL REAL NUMBERS

4. $-p - 15 = p + 2 - 7$

$-p - 15 = p - 5$

$+p + 5 \quad +p + 5$

$\frac{-10}{2} = \frac{2p}{2}$

$-5 = p$

5. $-8(-6 - 8x) = 176$

$48 + 64x = 176$

$-48 \quad -48$

$\frac{64x}{64} = \frac{128}{64}$

$x = 2$

6. $-84 = -7(r + 4)$

$-84 = -7r - 28$

$+28 \quad +28$

$\frac{-56}{-7} = \frac{-7r}{-7}$

$8 = r$

7. $6(1 - 8a) = 102$

$6 - 48a = 102$

$-6 \quad -6$

$\frac{-48a}{-48} = \frac{96}{-48}$

$a = -2$

8. $2n + 8(n + 2) = 86$

$2n + 8n + 16 = 86$

$10n + 16 = 86$

$-16 \quad -16$

$\frac{10n}{10} = \frac{70}{10}$

$n = 7$

9. $3x - 39 = -5(1 - 4x)$

$3x - 39 = -5 + 20x$

$-3x + 5 \quad +5 - 3x$

$\frac{-34}{17} = \frac{17x}{17}$

$-2 = x$

10. $-7(n - 6) + 8 = 25 - 2n$

$-7n + 42 + 8 = 25 - 2n$

$-7n + 50 = 25 - 2n$

$+7n - 25 \quad -25 + 7n$

$\frac{25}{5} = \frac{5n}{5}$

$5 = n$

11. $7x + 40 = -7 + 5(1 - 7x)$

$7x + 40 = -7 + 5 - 35x$

$7x + 40 = -2 - 35x$

$+35x \quad -40 \qquad -40 \quad +35x$

$\frac{42x}{42} = \frac{-42}{42}$

$\boxed{x = -1}$

12. $-4(1 + 2x) + 5 = 1 - 8x$

$-4 - 8x + 5 = 1 - 8x$

$1 - 8x = 1 - 8x$

Same on both sides,

$\boxed{\text{ALL REAL NUMBERS}}$

13. $64 = -6(2x - 4) + 5(8 - 7x)$

$64 = -12x + 24 + 40 - 35x$

$64 = -47x + 64$

$-64 \qquad -64$

$\frac{0}{-47} = \frac{-47x}{-47}$

$\boxed{0 = x}$

14. $-3(x + 4) - 6(x + 3) = -75$

$-3x - 12 - 6x - 18 = -75$

$-9x - 30 = -75$

$+30 \quad +30$

$\frac{-9x}{-9} = \frac{-45}{-9}$

$\boxed{x = 5}$

15. $-8(6n + 7) - 5(1 - 7n) = 4$

$-48n - 56 - 5 + 35n = 4$

$-13n - 61 = 4$

$+61 \quad +61$

$\frac{-13n}{-13} = \frac{65}{-13}$

$\boxed{n = -5}$

16. $2(1 + 5b) - 2(1 + 4b) = -2$

$2 + 10b - 2 - 8b = -2$

$0 + 2b = -2$

$\frac{2b}{2} = \frac{-2}{2}$

$\boxed{b = -1}$

17. $-2(x + 1) + 4(6x - 5) = x + 1 - 2$

$-2x - 2 + 24x - 20 = x - 1$

$22x - 22 = x - 1$

$-x \quad +22 \qquad -x \quad +22$

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

$\boxed{x = 1}$

18. $8(3a + 2) - 2 = 5(4a - 6)$

$24a + 16 - 2 = 20a - 30$

$24a + 14 = 20a - 30$

$-20a \quad -14 \qquad -20a \quad -14$

$\frac{4a}{4} = \frac{-44}{4}$

$\boxed{a = -11}$

19. $3 - (k - 4) = -7(-k + 7)$

$3 - k + 4 = 7k - 49$

$7 - k = 7k - 49$

$+49 + k \qquad +k \quad +49$

$\frac{56}{8} = \frac{8k}{8}$

$\boxed{7 = k}$

20. $8a - 4(2a + 5) = -4(a + 3) + 4a - 8$

$8a - 8a - 20 = -4a - 12 + 4a - 8$

$0a - 20 = 0a - 20$

$-20 = -20$

True statement with no variable

$\boxed{\text{ALL REAL NUMBERS}}$