Multi-Step Equations

A **multi-step equation** requires **more than one operation** to solve. To find the value of the variable, use **inverse operations** to undo each operation in the correct order.

Steps for Solving Multi-Step Equations

1. **Simplify each side** of the equation if needed (combine like terms or use the distributive property).
2. **Move variable terms** to one side of the equation.
3. **Move constant numbers** to the other side.
4. **Divide or multiply** to isolate the variable.
5. **Check your answer** by substituting it back into the original equation.

Example 1 – Two-Step Equation
Solve:

$3x + 5 = 20$

Step 1: Subtract 5 from both sides.

$3x = 15$

Step 2: Divide both sides by 3.

$x = 5$

Check:

$3(5) + 5 = 15 + 5 = 20$ ✓

Example 2 – Variables on Both Sides
Solve:

$4x + 6 = 2x + 18$

Subtract 2x2x2x from both sides.

$2x + 6 = 18$

Subtract 6.

$2x = 12$

Divide by 2.

$\boxed{x = 6}$

Example 3 – Distributive Property
Solve:

$2(x + 4) = 18$

Distribute.

$2x + 8 = 18$

Subtract 8.

$2x = 10$

Divide by 2.

$\boxed{x = 5}$

Part A – Solve Two-Step Equations

1. $2x + 7 = 19$
   $x = \square$
2. $5y - 10 = 20$
   $y = \square$
3. $3m + 9 = 30$
   $m = \square$
4. $6a - 12 = 24$
   $a = \square$
5. $4n + 16 = 36$
   $n = \square$
6. $8p - 24 = 40$
   $p = \square$
7. $9q + 18 = 63$
   $q = \square$
8. $7r - 14 = 28$
   $r = \square$

Part B – Variables on Both Sides

9. $5x + 4 = 2x + 19$
   $x = \square$
10. $6y - 3 = 4y + 11$
    $y = \square$
11. $8m + 6 = 5m + 24$
    $m = \square$
12. $9a - 7 = 6a + 11$
    $a = \square$
13. $7b + 12 = 3b + 28$
    $b = \square$
14. $10c - 15 = 6c + 13$
    $c = \square$
15. $4d + 20 = d + 35$
    $d = \square$
16. $12e - 9 = 8e + 11$
    $e = \square$

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Part C – Use the Distributive Property

17. $2(x+5)=24$

$x=7$

18. $3(y-4)=18$

$y=\square$

19. $4(m+6)=40$

$m=\square$

20. $5(a-2)=35$

$a=\square$

21. $6(n+3)=42$

$n=\square$

22. $7(p-5)=28$

$p=\square$

23. $8(q+2)=48$

$q=\square$

24. $9(r-1)=54$

$r=\square$

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