2-4 Solve Equations with Two Operations

Name _____ Date _____

Solve: $4y + 9 = 21$

$4y + 9 - 9 = 21 - 9$ ← Undo the addition first.

$4y = 12$ ← Simplify.

$\frac{4y}{4} = \frac{12}{4}$ ← Undo the multiplication.

$y = 3$ ← Simplify.

Check: $4y + 9 = 21$

$4(3) + 9 \stackrel{?}{=} 21$ ← Substitute 3 for y.

$12 + 9 \stackrel{?}{=} 21$

$21 = 21$ **True**

Solution set: $\{3\}$

Solve: $\frac{t}{3} - 4 = -11$

$\frac{t}{3} - 4 + 4 = -11 + 4$ ← Undo the subtraction first.

$\frac{t}{3} = -7$ ← Simplify.

$3\left(\frac{t}{3}\right) = 3(-7)$ ← Undo the division.

$t = -21$ ← Simplify.

Check: $\frac{t}{3} - 4 = -11$

$\frac{-21}{3} - 4 \stackrel{?}{=} -11$ ← Substitute -21 for t.

$-7 - 4 \stackrel{?}{=} -11$

$-11 = -11$ **True**

Solution set: $\{-21\}$

Solve each equation. Write a justification for each step. Then check each solution. Write your solution.

1. $7 = 2r - 3$

$7 + 3 = 2r - 3 + 3$

$10 = 2r$

$\frac{10}{2} = \frac{2r}{2}$

$5 = r$

Check: $7 = 2r - 3$

$7 \stackrel{?}{=} 2(5) - 3$

$7 = 7$ True

$\{5\}$

2. $3d - 9 = 12$

3. $-9 = 5w + 1$

4. $-23 = 7s + 5$

5. $\frac{m}{2} - 2 = 5$

6. $\frac{j}{3} - 6 = -8$

7. $3 = \frac{p}{-5} + 1$

8. $9 = \frac{q}{-3} + 5$

9. $1.2 - \frac{k}{4} = 8.4$

10. $7.6 - \frac{v}{8} = -2.3$

11. $7.3 = 10.2 - \frac{2w}{3}$

12. $3.2 = 22.45 - \frac{4x}{11}$

13. $-4.1 + \frac{5y}{11} = -\frac{2}{5}$

14. $-7.08 + \frac{8z}{15} = -\frac{3}{8}$

15. $-0.23 = \frac{2}{3} - \frac{4}{5}x$

Solve each equation. Write a justification for each step. Then check each solution. Write your solution.

16. $2a - 5a + 6 = 24$

17. $29 = 5z - 9z + 25$

18. $16 = 4n - 3 + 2n + 7$

19. $8m - 5 + 3m + 12 = 40$

20. $-27 = 11v - 24 - 2v + 15$

21. $-43 = 9h - 39 - 4h + 16$

Write and solve an equation for each problem.

22. The sum of three consecutive odd integers is 75. Find these integers.

23. The sum of three consecutive integers is -30. Find these integers.

24. Geometry The measure of angle A in triangle ABC is 3 times the measure of angle B, and the measure of angle C is half the measure of angle B. Find the measure of each angle.

25. Jacob worked 68 hours this week. He worked 4 hours less than 3 times the number of hours he worked last week. How many hours did Jacob work last week?

26. When a number is divided by -7 and the quotient is increased by 12, the result is 3. What is the number?

27. Nancy is 10 years less than 3 times her daughter's age. If Nancy is 41 years old, how old is her daughter?

28. Geometry An isosceles triangle has a perimeter of 35 feet. The third side is one-third the length of one of the congruent sides. What are the lengths of the sides of this isosceles triangle?

29. A rectangular field has a perimeter of 126 feet. If the length of the field is 12 feet less than twice the width, what is the area of the field?
Hint: Perimeter (rectangle) $= \ell + w + \ell + w$, Area (rectangle) $= \ell w$

CHALLENGE

30. The expression $2n + 1$ will always yield odd numbers for all integers n. Using this expression, find the sum of ten consecutive odd integers. Then use your answer to find the ten odd integers whose sum is 620.