

Solving Equations

Name KEY

Solve each of the following

1. $k + (-12) = -19$
 $k - 12 = -19$
 $k = -19 + 12$
 $k = -7$

1. $k = -7$

2. $p - (-3) = 14$
 $p + 3 = 14$
 $p = 14 - 3$
 $p = 11$

2. $p = 11$

3. $g - 2\frac{3}{5} = -3\frac{4}{5}$
 $g = -3\frac{4}{5} + 2\frac{3}{5}$
 $g = -3\frac{4}{5} + 2\frac{3}{5}$
 $g = -1\frac{1}{5}$

3. $g = -1\frac{1}{5}$

4. $1\frac{3}{8}f = -2\frac{5}{11}$
 $\frac{11}{8}f = \frac{-27}{11}$
 $\frac{121}{8}f = \frac{-216}{121}$

$\frac{5 \cdot 27}{216}$

$\frac{121}{-121} \frac{216}{95}$

$f = -1\frac{95}{121}$

4. $f = -1\frac{95}{121}$

5. $\frac{-4}{5}z = -3$

5 $\left[\frac{-4}{5}z = -3 \right]$
 $\frac{-4z}{-4} = \frac{-15}{-4}$

$z = 3\frac{3}{4}$

5. $z = 3\frac{3}{4}$

6. $5g + 2 = 37$
 $5g = 37 - 2$
 $\frac{5g}{5} = \frac{35}{5}$
 $g = 7$

6. $g = 7$

7. $15 = \frac{y}{3} + 7$

$15 - 7 = \frac{y}{3}$

$8 = \frac{y}{3}$

$3[8 = \frac{y}{3}]$

$24 = y$

7. $y = 24$

8. $-3 = \frac{c}{5} + 2$

$-3 - 2 = \frac{c}{5}$

5 $\left[-5 = \frac{c}{5} \right]$

$-25 = c$

8. $c = -25$

$$9. \left[\frac{2-7d}{3} = 8 \right] 3$$

$$2-7d = 24$$

$$-7d = 24-2$$

$$\frac{-7d}{-7} = \frac{22}{-7}$$

$$d = -3\frac{1}{7}$$

$$9. \underline{d = -3\frac{1}{7}}$$

$$10. \left[\frac{3h-11}{2} = -3 \right] 2$$

$$3h-11 = -6$$

$$3h = -6+11$$

$$\frac{3h}{3} = \frac{5}{3}$$

$$h = 1\frac{2}{3}$$

$$10. \underline{h = 1\frac{2}{3}}$$

$$11. \frac{3}{7}(21m+35) - 7m = 32$$

$$\underline{9m} + 15 - \underline{7m} = 32$$

$$11. \underline{m = 8\frac{1}{2}}$$

$$2m + 15 = 32$$

$$2m = 32 - 15$$

$$\frac{2m}{2} = \frac{17}{2}$$

$$m = 8\frac{1}{2}$$

$$12. \frac{2}{11}(44a-55) + 2 = -5$$

$$8a - 10 + 2 = -5$$

$$8a - 8 = -5$$

$$8a = -5 + 8$$

$$\frac{8a}{8} = \frac{3}{8}$$

$$a = \frac{3}{8}$$

$$12. \underline{a = \frac{3}{8}}$$

$$13. 7(b+4) - 5b = -24$$

$$\underline{7b} + 28 - \underline{5b} = -24$$

$$2b + 28 = -24$$

$$2b = -24 - 28$$

$$\frac{2b}{2} = \frac{-52}{2}$$

$$b = -26$$

$$13. \underline{b = -26}$$

$$14. -5k + 3(6-2k) = 11(3-k)$$

$$-5k + 18 - 6k = 33 - 11k$$

$$-11k + 18 = 33 - 11k$$

$$-11k + 11k = 33 - 18$$

$$0 = 15 \quad \{ \}$$

$$14. \underline{\{ \}}$$

{ }

$$\begin{aligned}
 15. \quad & -3k + 5(6 - k) = 4(1 - 2k) \\
 & -3k + 30 - 5k = 4 - 8k \\
 & -8k + 30 = 4 - 8k \\
 & -8k + 8k = 4 - 30 \\
 & 0 = -26
 \end{aligned}$$

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$$15. \quad \underline{\quad \{ \} \quad}$$

$$\begin{aligned}
 16. \quad & \left[\frac{2}{3}z + \frac{1}{4} = \frac{1}{12}z - \frac{3}{4} \right] 12 \\
 & 8z + 3 = z - 9 \\
 & 8z - z = -9 - 3 \\
 & \frac{7z}{7} = \frac{-12}{7}
 \end{aligned}$$

$$16. \quad \underline{z = -1\frac{5}{7}}$$

$$\begin{aligned}
 17. \quad & \left[\frac{2m-1}{3} = \frac{5m+2}{2} + \frac{3m-4}{5} \right] 30 \\
 & 10(2m-1) = 15(5m+2) + 6(3m-4) \\
 & 20m - 10 = 75m + 30 + 18m - 24 \\
 & 20m - 10 = 93m + 6 \\
 & -10 - 6 = 93m - 20m \\
 & -16 = 73m
 \end{aligned}$$

$$\begin{aligned}
 & \frac{-16}{73} = \frac{73m}{73} \\
 & -16/73 = m
 \end{aligned}$$

$$17. \quad \underline{-16/73 = m}$$

$$\begin{aligned}
 18. \quad & \left[\frac{2w-1}{3} = \frac{3w+5}{7} - \frac{2w-3}{3} \right] 21 \\
 & 7(2w-1) = 3(3w+5) - 7(2w-3) \\
 & 14w - 7 = 9w + 15 - 14w + 21 \\
 & 14w - 7 = -5w + 36 \\
 & 14w + 5w = 36 + 7 \\
 & \frac{19w}{19} = \frac{43}{19}
 \end{aligned}$$

$$w = 2\frac{5}{19}$$

$$18. \quad \underline{w = 2\frac{5}{19}}$$

Translate Each of The Following (DO NOT SOLVE THESE)

19. Three times a number, increased by four, is equal to nine times the number, decreased by five. (Use "n" to represent the number)

$$3n + 4 = 9n - 5$$

$$19. \quad \underline{3n + 4 = 9n - 5}$$

20. Four times the difference of a three times a number and two, is the same as, eight times the number, increased by twenty-four. (Use "n" to represent the number)

$$4(3n - 2) = 8n + 24$$

$$20. \quad \underline{4(3n - 2) = 8n + 24}$$

21. Twenty-five decreased by three times the sum of a five time a number and three, is the same as, five less than six times the number. (Use "n" to represent the number)

$$25 - 3(5n + 3) = 6n - 5$$

$$21. \quad \underline{25 - 3(5n + 3) = 6n - 5}$$

Declare the variable(s), write an equation and SOLVE the problem.

22. The sum of three consecutive odd integers is 129. Find the three odd integers.

$$\begin{array}{l} \text{FIRST: } 2n+1=41 \\ \text{SECOND: } 2n+3=43 \\ \text{THIRD: } 2n+5=45 \end{array}$$

$$\text{FIRST} + \text{SECOND} + \text{THIRD} = 129$$

$$2n+1 + 2n+3 + 2n+5 = 129$$

$$6n + 9 = 129$$

$$6n = 129 - 9$$

$$\frac{6n}{6} = \frac{120}{6}$$

$$n = 20$$

$$\begin{array}{l} \text{FIRST: } 41 \\ \text{SECOND: } 43 \\ \text{THIRD: } 45 \end{array}$$

23. The sum of four consecutive even integers is thirty six. Find the even integers.

$$\begin{array}{l} \text{FIRST: } 2n = 6 \\ \text{SECOND: } 2n+2 = 8 \\ \text{THIRD: } 2n+4 = 10 \\ \text{FOURTH: } 2n+6 = 12 \end{array}$$

$$\text{FIRST} + \text{SECOND} + \text{THIRD} + \text{FOURTH} = 36$$

$$2n + 2n+2 + 2n+4 + 2n+6 = 36$$

$$8n + 12 = 36$$

$$8n = 36 - 12$$

$$\frac{8n}{8} = \frac{24}{8}$$

$$n = 3$$

$$\begin{array}{l} \text{FIRST: } 6 \\ \text{SECOND: } 8 \\ \text{THIRD: } 10 \\ \text{FOURTH: } 12 \end{array}$$

24. Find four consecutive even integers so that **three times** the least, increased by **four times** the greatest, is equal to **ninety four**. Find the four even integers.

$$\begin{array}{l} \text{FIRST: } 2n = 10 \\ \text{SECOND: } 2n+2 = 12 \\ \text{THIRD: } 2n+4 = 14 \\ \text{FOURTH: } 2n+6 = 16 \end{array}$$

$$3[\text{FIRST}] + 4[\text{FOURTH}] = 94$$

$$3(2n) + 4(2n+6) = 94$$

$$6n + 8n + 24 = 94$$

$$14n + 24 = 94$$

$$14n = 94 - 24$$

$$14n = 70$$

$$n = 5$$

$$\begin{array}{l} \text{FIRST: } 10 \\ \text{SECOND: } 12 \\ \text{THIRD: } 14 \\ \text{FOURTH: } 16 \end{array}$$

25. The sum of two numbers is 30. Twice one number increased by **three times** another is **eighty two**. Find the two numbers.

$$\begin{array}{l} \text{ONE: } x = 8 \\ \text{ANOTHER: } 30 - x = 22 \end{array}$$

$$2[\text{ONE}] + 3[\text{ANOTHER}] = 82$$

$$2x + 3(30 - x) = 82$$

$$2x + 90 - 3x = 82$$

$$-x + 90 = 82$$

$$-x = 82 - 90$$

$$-x = -8$$

$$x = 8$$

$$\begin{array}{l} \text{ONE: } 8 \\ \text{ANOTHER: } 22 \end{array}$$

26. The difference of two numbers is twelve. Three times the larger, minus the twice smaller is equal to 51. Find the two numbers.

ONE: $x+12=27$ ANOTHER: $x=15$	$3[\text{ONE}] - 2[\text{ANOTHER}] = 51$ $3(x+12) - 2x = 51$ $3x+36-2x=51$ $x+36=51$ $x=51-36$ $x=15$	ONE: 27 ANOTHER: 15
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27. Twice a number, decreased by three times the sum of five times the number and two, is equal to, thirteen more than, six times the number. Find the number.

NUMBER: y $2y - 3(5y+2) = 6y + 13$ $2y - 15y - 6 = 6y + 13$ $-13y - 6 = 6y + 13$ $-6 - 13 = 6y + 13y$ $-19 = 19y$ $-1 = y$	$-1 = y$
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28. The attendance at a tennis match was 300 people. Student tickets cost \$3.00 and adult tickets cost \$5.00. If \$1140 was collected how many of each type of ticket was sold.

Type	Amount	Price \$	Total
Adult	x	5	$5x$
Student	$300-x$	3	$3(300-x)$
<hr style="border-top: 1px dashed black;"/>			
 		 	
		300	1140

$T_A + T_S = T_M$
 T_A
 T_S
 T_M

$T_A + T_S = T_M$ $5x + 3(300-x) = 1140$ $5x + 900 - 3x = 1140$ $2x + 900 = 1140$ $2x = 1140 - 900$	$2x = 240$ $x = 120$	ADULTS: 120 STUDENTS: 180
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More equations to Solve

29. $7g + 5 = 29$ 29. $g = 3\frac{3}{7}$

$7g = 29 - 5$ $\frac{7g}{7} = \frac{24}{7}$

$7g = 24$ $g = 3\frac{3}{7}$

30. $11 = \frac{w}{3} + 2$ 30. $27 = w$

$11 - 2 = \frac{w}{3}$ $9 = \frac{w}{3}$

$9 = \frac{w}{3}$ $27 = w$

31. $\frac{2h-11}{5} = -3$ 31. $h = -2$

$5 \left[\frac{2h-11}{5} = -3 \right]$ $h = -2$

$2h - 11 = -15$

$2h = -15 + 11$

$2h = -4$

$$32. \frac{3}{9}(81m + 72) - 7m = 32$$

$$27m + 24 - 7m = 32$$

$$20m + 24 = 32$$

$$20m = 32 - 24$$

$$20m = 8$$

$$\frac{20m}{20} = \frac{8}{20}$$

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

$$32. \underline{m = \frac{2}{5}}$$

$$33. 4(2a - 8) = \frac{1}{7}(49a + 70)$$

$$8a - 32 = 7a + 10$$

$$8a - 7a = 10 + 32$$

$$a = 42$$

$$33. \underline{A = 42}$$

$$34. \left[\frac{4}{5}z + \frac{1}{3} = \frac{2}{3}z - \frac{3}{5} \right] 15$$

$$12z + 5 = 10z - 9$$

$$12z - 10z = -9 - 5$$

$$\frac{+2z}{+2} = \frac{-14}{+2}$$

$$z = -7$$

$$34. \underline{z = -7}$$

$$35. \left[\frac{2g-1}{5} = \frac{4g+5}{2} - \frac{5g-3}{4} \right] 20$$

$$4(2g-1) = 10(4g+5) - 5(5g-3)$$

$$8g - 4 = 40g + 50 - 25g + 15$$

$$8g - 4 = 15g + 65$$

$$-4 - 65 = 15g - 8g$$

$$\frac{-69}{7} = \frac{7g}{7}$$

$$\rightarrow -9\frac{6}{7} = g$$

$$35. \underline{-9\frac{6}{7} = g}$$

$$36. \frac{2}{11}(44y - 121) - \frac{3}{5}(30y - 15) = \frac{9y+5}{15} - \frac{2y-3}{3} + \frac{7y+1}{6}$$

$$8y - 22 - 18y + 9 = \frac{9y+5}{15} - \frac{2y-3}{3} + \frac{7y+1}{6}$$

$$30 \left[\frac{-10y-13}{1} = \frac{9y+5}{15} - \frac{2y-3}{3} + \frac{7y+1}{6} \right]$$

$$30(-10y-13) = 2(9y+5) - 10(2y-3) + 5(7y+1)$$

$$-300y - 390 = 18y + 10 - 20y + 30 + 35y + 5$$

$$-300y - 390 = 33y + 45$$

$$-390 - 45 = 33y + 300y$$

$$-435 = 333y$$

$$\frac{-435}{333} = \frac{333y}{333}$$

$$\rightarrow -1\frac{34}{111} = y$$

$$36. \underline{-1\frac{34}{111} = y}$$

Hint: Simplify the left side of equation first, then worry about the fractions on the right side of the equation.

$$-1 \frac{102 \div 3}{333 \div 3} = -1 \frac{34}{111}$$