

Solving Equations

Name KEY

Solve each of the following

1. $f + (-17) = -10$

$$\begin{aligned} f - 17 &= -10 \\ f &= -10 + 17 \\ f &= 7 \end{aligned}$$

1. $f = 7$

2. $h - (-7) = 22$

$$\begin{aligned} h + 7 &= 22 \\ h &= 22 - 7 \\ h &= 15 \end{aligned}$$

2. $h = 15$

3. $9\frac{3}{4} - g = -3\frac{2}{5}$

$$\begin{aligned} -g &= -3\frac{2}{5} - 9\frac{3}{4} \\ -g &= -12\frac{8}{20} - 15\frac{15}{20} \\ -g &= -12\frac{23}{20} \\ g &= 13\frac{3}{20} \end{aligned}$$

3. $g = 13\frac{3}{20}$

4. $2\frac{2}{3}f = -2\frac{4}{9}$

$$\begin{aligned} \frac{11}{3}f &= -\frac{22}{9} \\ 9\left[\frac{11}{3}f = -\frac{22}{9}\right] \\ \frac{33f}{33} &= -\frac{22}{33} \Rightarrow f = -\frac{2}{3} \end{aligned}$$

4. $f = -\frac{2}{3}$

5. $\frac{-4}{5}z = -20$

$$\begin{aligned} 5\left[\frac{-4}{5}z = -20\right] \\ -4z &= -100 \\ \frac{-4z}{-4} &= \frac{-100}{-4} \\ z &= 25 \end{aligned}$$

5. $z = 25$

6. $7g + 5 = 29$

$$\begin{aligned} 7g &= 29 - 5 \\ 7g &= 24 \\ \frac{7g}{7} &= \frac{24}{7} \\ g &= 3\frac{3}{7} \end{aligned}$$

6. $g = 3\frac{3}{7}$

7. $11 = \frac{w}{3} + 2$

$$\begin{aligned} 11 - 2 &= \frac{w}{3} \\ 9 &= \frac{w}{3} \\ \left[9 = \frac{w}{3}\right] 3 \end{aligned}$$

7. $27 = w$

8. $-5 = \frac{c}{9} + 7$

$$\begin{aligned} -5 - 7 &= \frac{c}{9} \\ \left[-12 = \frac{c}{9}\right] 9 \\ -108 &= c \end{aligned}$$

8. $-108 = c$

$$9. \frac{5-3d}{2} = 7 \quad \Rightarrow \quad \boxed{\frac{5-3d}{2} = 7}$$

$$\begin{aligned} 5-3d &= 14 \\ -3d &= 14-5 \\ \frac{-3d}{-3} &= \frac{9}{-3} \end{aligned}$$

$$9. \underline{d = -3}$$

$$10. \frac{2h-11}{5} = -3$$

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

$$2h-11 = -15$$

$$2h = -15 + 11$$

$$D = -3$$

$$2h = -4$$

$$\frac{2h}{2} = \frac{-4}{2}$$

$$h = -2$$

$$10. \underline{h = -2}$$

$$11. \frac{3}{9}(81m+72) - 7m = 32$$

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

$$20m + 24 = 32$$

$$20m = 32 - 24$$

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

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

$$11. \underline{m = \frac{2}{5}}$$

$$12. \frac{3}{11}(55a-33) + 8 = -5$$

$$15a - 9 + 8 = -5$$

$$15a - 1 = -5$$

$$15a = -5 + 1$$

$$\frac{15a}{15} = \frac{-4}{15}$$

$$a = -\frac{4}{15}$$

$$12. \underline{a = -\frac{4}{15}}$$

$$13. 5(b+4) - 6b = -24$$

$$5b + 20 - 6b = -24$$

$$-b + 20 = -24$$

$$-b = -24 - 20$$

$$-b = -44$$

$$b = 44$$

$$13. \underline{b = 44}$$

$$14. 4(2a-8) = \frac{1}{7}(49a+70)$$

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

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

$$a = 42$$

$$14. \underline{a = 42}$$

$$15. -3k + 5(6 - k) = 4(1 - 2k)$$

$$-3k + 30 - 5k = 4 - 8k$$

$$-8k + 30 = 4 - 8k$$

$$-8k + 8k = 4 - 30$$

$$0 = -26$$

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$$16. \frac{4}{5}z + \frac{1}{3} = \frac{2}{3}z - \frac{3}{5}$$

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

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

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

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

$$z = -7$$

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

$$16. \underline{z = -7}$$

$$17. \left[\frac{11h-1}{2} = \frac{5h+2}{3} + \frac{3h-4}{6} \right] 12$$

$$6(11h-1) = 4(5h+2) + 2(3h-4)$$

$$66h - 6 = 20h + 8 + 6h - 8$$

$$66h - 6 = 26h$$

$$66h - 26h = 6$$

$$40h = 6$$

$$\frac{40h}{40} = \frac{6}{40}$$

$$h = \frac{3}{20}$$

$$17. \underline{h = \frac{3}{20}}$$

$$18. \left[\frac{2g-1}{5} = \frac{4g+5}{2} - \frac{5g-3}{4} \right] 20$$

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

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

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

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

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

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

$$18. \underline{-9\frac{6}{7} = g}$$

Translate Each of The Following (DO NOT SOLVE THESE)

19. Five times a number, increased by seven, is equal to eleven times the number, decreased by nine. NUMBER: N

$$5N + 7 = 11N - 9$$

$$15. \underline{5N + 7 = 11N - 9}$$

20. Nine times the difference of a three times a number and five, is the same as, seven times the number, increased by twenty-one.

$$9(3N - 5) = 7N + 21$$

$$16. \underline{9(3N - 5) = 7N + 21}$$

21. Twenty decreased by four times the sum of a twice a number and three, is the same as, five less than sixteen times the number.

$$24 - 4(2N + 3) = 16N - 5$$

$$17. \underline{24 - 4(2N + 3) = 16N - 5}$$

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

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

$$\begin{aligned} \text{FIRST: } & 2n+1 \\ \text{SECOND: } & 2n+3 \\ \text{THIRD: } & 2n+5 \\ \text{FIRST+SECOND+THIRD} & = 75 \\ 6n+9 & = 75 \\ 6n & = 75-9 \\ 6n & = 66 \\ n & = 11 \end{aligned}$$

$$\begin{aligned} \text{FIRST: } & 23 \\ \text{SECOND: } & 25 \\ \text{THIRD: } & 27 \end{aligned}$$

23. The sum of four consecutive even integers is 68. Find the **even integers**.

$$\begin{aligned} \text{FIRST: } & 2n \\ \text{SECOND: } & 2n+2 \\ \text{THIRD: } & 2n+4 \\ \text{FOURTH: } & 2n+6 \\ \text{FIRST+SECOND+THIRD+FOURTH} & = 68 \\ 8n+12 & = 68 \\ 8n & = 68-12 \\ 8n & = 56 \\ n & = 7 \end{aligned}$$

$$\begin{aligned} \text{FIRST: } & 14 \\ \text{SECOND: } & 16 \\ \text{THIRD: } & 18 \\ \text{FOURTH: } & 20 \end{aligned}$$

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

24. Find four consecutive even integers so that **three** times the least, increased by **four** times the greatest, is equal to 178. Find the four **even integers**.

$$\begin{aligned} \text{FIRST: } & 2n \\ \text{SECOND: } & 2n+2 \\ \text{THIRD: } & 2n+4 \\ \text{FOURTH: } & 2n+6 \\ 3[\text{FIRST}] + 4[\text{FOURTH}] & = 178 \\ 3(2n) + 4(2n+6) & = 178 \\ 6n + 8n + 24 & = 178 \\ 14n + 24 & = 178 \\ 14n & = 154 \\ n & = 11 \end{aligned}$$

$$\begin{aligned} \text{FIRST: } & 22 \\ \text{SECOND: } & 24 \\ \text{THIRD: } & 26 \\ \text{FOURTH: } & 28 \end{aligned}$$

25. The sum of two numbers is 30. **Twice** the smaller increased by the larger is 40. Find the two numbers.

$$\begin{aligned} \text{(L) ONE: } & x \\ \text{(S) ANOTHER: } & 30-x \\ & \underline{\hspace{2cm}} \\ & 30 \\ 2[\text{ANOTHER}] + [\text{ONE}] & = 40 \\ 2(30-x) + x & = 40 \\ 60 - 2x + x & = 40 \\ 60 - x & = 40 \\ -x & = 40 - 60 \\ -x & = -20 \\ x & = 20 \end{aligned}$$

$$\begin{aligned} \text{ONE: } & 20 \\ \text{ANOTHER: } & 10 \end{aligned}$$

26. The difference of two numbers is seven. Three times the larger, minus the twice smaller is equal to 39. Find the two numbers.

$$\begin{array}{l} \text{ONE: } x+7 \\ \text{ANOTHER: } x \\ \hline 7 \end{array}$$

$$\begin{aligned} 3[\text{ONE}] - 2[\text{ANOTHER}] &= 39 \\ 3(x+7) - 2x &= 39 \\ 3x+21 - 2x &= 39 \\ x+21 &= 39 \\ x &= 39-21 \\ x &= 18 \end{aligned}$$

ONE: 25
ANOTHER: 18

27. Twice a number, increased by three times the sum of four times the number and eleven, is equal to, seven less than, six times the number. Find the number.

NUMBER: z

$$\begin{aligned} 2z + 3(4z+11) &= 6z - 7 \\ 2z + 12z + 33 &= 6z - 7 \\ 14z + 33 &= 6z - 7 \\ 14z - 6z &= -7 - 33 \\ 8z &= -40 \end{aligned}$$

$$\begin{aligned} \frac{8z}{8} &= \frac{-40}{8} \\ z &= -5 \end{aligned}$$

$z = -5$

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	A	5	5A	T _A
Student	300-A	3	3(300-A)	T _S
 	300	 	1140	T _M

$$T_A + T_S = T_M$$

$$5A + 3(300-A) = 1140$$

$$5A + 900 - 3A = 1140$$

$$2A + 900 = 1140$$

$$2A = 1140 - 900$$

$$2A = 240$$

$$A = 120$$

ADULTS: 120
STUDENTS: 180