Solving Equations of One Variable

Worksheet 2

The Goal

Determine the value of the unknown variable that makes the equation true.

Strategy

Move all variables to one side of the equation and all the numbers to the other side of the equation simplifying as you go.

Example

4(10-u)	=	-5(u+5)+15	
40-4u	=	-5u-25+15	(Expand to isolate variable)
40-4u	=	-5u-10	(consolodate the numbers on the rhs)
+10		+10	(Move all numbers to the left by adding 10 to both sides.)
50-4u	=	-5u	
+4u		+4u	(Move all variables to the right by adding 4u to both sides.)
50	=	-u	
× -1		× -1	(Multiply both sides by -1 to solve for u.)
-50	=	u	

Now check the solution by plugging $u = -50$ back into the original equation

$$4(10-u) = -5(u+5)+15$$

to get

$$\begin{aligned} 4(10-u) &= 4(10-(-50)) = 4\times 60 = 240 \quad \text{and} \\ -5(u+5)+15 &= -5((-50)+5)+15 = -5(-45)+15 = 5\times 45+15 = 225+15 = 240\ . \end{aligned}$$

This checks out so the solution is correct.

1. 5(x-1)=5(x+5)-x
2. 5(x+1)=2t+4
3. 2(v-3)=-2v-3
4. 4(f-1)=2(f+1)-1
5. $\dfrac{3L+2}{5} = \dfrac{3-2L}{3}$
6. 8(a+2)=4(7-a)+3a
7. $\dfrac{2p+1}{2} = \dfrac{2(p+3)-3}{10}$
8. 5(z+1)=5(x-1)+x
9. 5(3r+5)-9=-2(r+9)+9
10. 10(4-H)+10=4(20H-10)
11. $\dfrac{c+1}{2} = \dfrac{c-1}{4}$
12. 4(10-u)=-5(u+5)+15
13. 3(3r+1)=-2(2+r)+10
14. $\dfrac{q+2}{3} = \dfrac{q-7}{10}$

Some solutions: 1. $x = 30$, 3. $v = 3/4$, 5. $L = 9/19$, 7. $p = 1/8$, 9. $r = -7/25$, 11. $c = -3$, 13. $r = 3/11$