Name: Key	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples

Types of Solutions

Most equations we have solved so far have only one solution. However, there are **two special cases**: no solution and infinite solution. Solve the equations below to see what happens.

One Solution	No Solution	Infinite Solution
$3(2x+9) = -5-2x$	$7x-9-3x = 4(x+3)+1$	$-2(3x-5) = 2x+10-8x$
$6x+27 = -5-2x$ $+2x \quad +2x$ $8x+27 = -5$ $-27 \quad -27$ $\frac{8x}{8} = \frac{-32}{8}$ $x = -4$	$4x-9 = 4x+12+1$ $4x-9 = 4x+13$ $-4x \quad -4x$ $-9 = 13$ No Solution	$-6x+10 = 2x+10-8x$ $-6x+10 = -6x+10$ $+6x \quad +6x$ $10 = 10$ Infinite
What does this mean?	This is the **ONLY SOLUTION** that will make the equation true.	There is **NO SOLUTION** that will make the equation true. **Symbol:** $\emptyset$	**ALL SOLUTIONS** will make the equation true. **Symbol:** ∞

Examples

Directions: Solve each equation. Check all solutions.

1. $5x-3 = 3(2x-1)-x$

$5x-3 = 6x-3-x$
$5x-3 = 5x-3$
$-5x \quad -5x$
$-3 = -3$
∞

2. $2n-5 = 9n+37$

$-2n \quad -2n$
$-5 = 7n+37$
$-37 \quad -37$
$\frac{-42}{7} = \frac{7n}{7}$
$n = -6$

3. $2(4-a) = -2(a-8)$

$8-2a = -2a+16$
$+2a \quad +2a$
$8 \neq 16$
$\emptyset$

4. $4(2k-3)+1 = 8k-11$

$8k-12+1 = 8k-11$
$8k-11 = 8k-11$
$-8k \quad -8k$
$-11 = -11$
∞

5. $3(3c+5)+1=2(c-20)$

$9c+15+1=2c-40$

$9c+16=2c-40$

$-2c \quad -2c$

$7c+16=-40$

$-16 \quad -16$

$\frac{7c}{7}=\frac{-56}{7}$

$c=-8$

6. $3-(4w+5)=\frac{1}{2}(8w+28)$

$3-4w-5=4w+14$

$-4w-2=4w+14$

$+4w \quad +4w$

$-2=8w+14$

$-14 \quad -14$

$\frac{-16}{8}=\frac{8w}{8}$

$w=-2$

7. $-13+12p-4=6(2p-1)$

$-13+12p-4=12p-6$

$12p-17=12p-6$

$-12p \quad -12p$

$-17 \neq -6$

$\emptyset$

8. $-7(m-5)=4(4-m)+1$

$-7m+35=16-4m+1$

$-7m+35=-4m+17$

$-17 \quad -17$

$-7m+18=-4m$

$+7m \quad +7m$

$\frac{18}{3}=\frac{3m}{3}$

$m=6$

9. $2(8r+5)-3=4(4r-1)+11$

$16r+10-3=16r-4+11$

$16r+7=16r+7$

$-16r \quad -16r$

$7=7$

∞

10. $12-4(2x+9)=-8(x+3)$

$12-8x-36=-8x-24$

$-8x-24=-8x-24$

$+8x \quad +8x$

$-24=-24$

∞

11. $3(8k-3)=-6(7-4k)$

$24k-9=-42+24k$

$-24k \quad -24k$

$-9 \neq -42$

$\emptyset$

12. $7v-(2v-16)=5(v+4)$

$7v-2v+16=5v+20$

$5v+16=5v+20$

$-5v \quad -5v$

$16 \neq 20$

$\emptyset$