8.AF.1 I-Step Review

Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. Represent real-world problems using linear equations.

Coefficient is: numerical quantity placed before the variable

One Solution means only one value makes the equation work

Infinite Solutions means: any value works in the equation

No Solution means: no value works in the equation

Solve the following equations and explain its solution. Show all work.

Solve: $3x+5=-20$ $-5 \quad -5$ $\frac{3x}{3}=\frac{-25}{3}$ $x=-8\frac{1}{3}$ or $-8.\overline{3}$	Solve: $10=-2z+24$ $-24 \quad -24$ $\frac{-14}{-2}=\frac{-2z}{-2}$ $z=7$
Solve: $\frac{3}{4}x+1=13$ $-1 \quad -1$ $\frac{4}{3}\cdot\frac{3}{4}x=12\cdot\frac{4}{3}$ $x=16$	Solve: $5(x-7)+3=13$ $5x-35+3=13$ $5x-32=13$ $+32 \quad +32$ $5x=45$ $x=9$
Solve: $3(2x+9)=-5-2x$ $6x+27=-5-2x$ $+2x \quad +2x$ $8x+27=-5$ $-27 \quad -27$ $\frac{8x}{8}=\frac{-32}{8}$ $x=-4$	Solve: $\frac{1}{2}(10k-16)+11=-2$ $5k-8+11=-2$ $5k+3=-2$ $-3 \quad -3$ $5k=-5$ $k=-1$
Solve: $4(3q+10)=6(2q-9)$ $12q+40=12q-54$ $-12q \quad -12q$ $40\neq-54$ $\emptyset$ No Solution	Solve: $3x-14=3(x-5)+1$ $3x-14=3x-15+1$ $3x-14=3x-14$ $-3x \quad -3x$ $-14=-14$ ✓ Infinite solutions ∞
Solve: $2(12-y)=23-(2y-1)$ $24-2y=23-2y+1$ $24-2y=24-2y$ $+2y \quad +2y$ $24=24$ ✓ ∞	Solve: $4(2r+3)=15r-11+1-7r$ $8r+12=8r-10$ $-8r \quad -8r$ $12\neq-10$ $\emptyset$

Solve:

$\frac{3}{4}(20h-4)=8h-45$

$15h-3=8h-45$
$-8h \qquad -8h$

$7h-3=-45$
$+3 \qquad +3$

$\frac{7h}{7}=\frac{-42}{7}$

$h=-6$

Solve:

$-2(3x-5)=2x+10-8x$

$-6x+10=2x+10-8x$

$-6x+10=-6x+10$
$+6x \qquad +6x$

$10=10$ ✓

∞

**Consider the equation,

$3(x-2)=3x-2$

Part A:
Determine whether the equation has one solution, no solutions, or an infinite number of solutions. Use words, numbers and/or symbols to justify your answer.

SHOW ALL WORK

$3x-6=3x-2$
$-3x \qquad -3x$

$-6 \neq -2$

No Solutions because -6 does not equal -2.

Part B:

Create a linear equation that has one solution. Include the variable on BOTH sides of the equal sign.

Equation: $2x+4=4x-6$

Part C:

Solve your equation from Part B.

SHOW ALL WORK

$2x+4=4x-6$
$-4x \qquad -4x$

$-2x+4=-6$
$-4 \qquad -4$

$\frac{-2x}{-2}=\frac{-10}{-2}$

$x=5$

Two fifths of the sum of a number and 4, plus -7 is 16. Write an equation that can be used to determine the number and then determine the number.

Equation: $\frac{2}{5}(x+4)+(-7)=16$

SHOW ALL WORK

Solution: $x=53\frac{1}{2}$

$\frac{2}{5}(x+4)+(-7)=16$

$\frac{2}{5}x+\frac{8}{5}+(-7)=16$
$+7 \qquad +7$

$\frac{2}{5}x+\frac{8}{5}=23=\frac{115}{5}$
$-\frac{8}{5} \qquad -\frac{8}{5}=\frac{9}{5}$

$\frac{5}{2}\cdot\frac{2}{5}x=\frac{107}{5}\cdot\frac{5}{2}$

$x=53\frac{1}{2}$

23
$\times 5$
115