Solving Equations

Review: Writing improper fractions as mixed number

Directions: Rewrite $\frac{21}{5}$ as a mixed number.

Step 1: Divide the numerator by the denominator.

$\frac{21}{5} = 4$ with a remainder of 1. (4 x 5 = 20 with one left over to get to 21.)

Step 2: The whole number is your whole number in the mixed number and the remainder becomes the numerator of the fraction. The denominator ALWAYS stays the same!

$4\frac{1}{5}$

Example: Write $\frac{32}{7}$ as a mixed number

Example: Write $\frac{19}{3}$ as a mixed number

Review: Writing mixed numbers as improper fractions

Multiply the whole number by the denominator and add the numerator.

Keep the same denominator.

Then add.

$$4\frac{1}{3} = \frac{13}{3}$$

Multiply.

Example: Write $3\frac{7}{9}$ as an improper fraction

Example: Write $6\frac{2}{11}$ as an improper fraction

Review: Adding and Subtracting Fractions

1. Rename fractions using least common denominator (LCD).
2. Add or subtract numerators. Keep denominator.
3. Simplify.

EXAMPLE

Find $\frac{3}{4} + \frac{1}{5}$.

x 5 x 4

$$\frac{15}{20} + \frac{4}{20}$$

$$\frac{15+4}{20} = \frac{19}{20}$$

4 x 1 = 4	5 x 1 = 5
4 x 2 = 8	5 x 2 = 10
4 x 3 = 12	5 x 3 = 15
4 x 4 = 16	5 x 4 = 20
4 x 5 = 20	

Example: Add $\frac{2}{7} + \frac{2}{3} =$

Example: Subtract $\frac{3}{5} - \frac{1}{4}$

Solving one-step equations:

One Step Addition Example

The Opposite of Addition is Subtraction

$y + 14 = 20$

$-14 \quad -14$

$y = 6$ ✓

The value which makes the equation true is 6.

ONE STEP SUBTRACTION EXAMPLE

The Opposite of Subtraction is Addition

$x - 120 = 80$

$+120 \quad +120$

$x = 200$ ✓

The value which makes the equation true is 200.

Multiplication Example

The Opposite of Multiplication is Division

$3n = 12$

$\frac{\cancel{3}n}{\cancel{3}} = \frac{12}{3}$ 3/3 cancels down to become 1/1 =1

$n = 4$ ✓ 1n is simply "n"

The value which makes the equation true is 4.

One Step Division Example

The Opposite of Division is Multiplication.

$\frac{k}{2} = 16$ K is divided by 2, so we need to multiply both sides by 2

$\frac{k}{\cancel{2}} \times \cancel{2} = 16 \times 2$ 2/2 cancels down to become 1/1 =1

$k = 32$ ✓ 1k is simply "k"

The value which makes the equation true is 32.

Examples:

a.) Solve $a + 14 = -3$ for a

b.) $\frac{b}{3} = 7$ for b

c.) Solve $-4c = 44$ for c

Solving multi-step equations:

1. Combine all like terms onto one side of the equation
2. Isolate the term with the variable you are solving for
3. Use “opposite operations” to get the variable by itself
4. Plug your answer back into the problem to make sure it works!

Examples: Solve the following for the variable.

d.) $7x - 41 = -13$

e.) $7x + 13 = 9x - 5$

f.) $\frac{x}{2} + 3 = 5$

g.) $7(x + 4) = 84$

h.) $12 + 2b = -2(b - 2)$

i.) $7(x - 2) = -x - 14$

j.) $\frac{1}{2}(6x - 4) = 7x$

k.) $\frac{1}{2}x - 3 = 2 - \frac{3}{4}x$

l.) $-\frac{3}{4}x + \frac{1}{4} = \frac{1}{2}$

m.) $5 + 4x - 7 = 4x - 2 - x$

n.) $\frac{1}{2}x + \frac{2}{3} = \frac{1}{3}x - \frac{5}{2}$

o.) $\frac{1}{4}x = \frac{3}{4}$

Lets practice some basic simplification. Simplify the following.

o.) $(3-6)-(5-7)$

p.) $\left(-\frac{1}{2}\right)^3 - \frac{2}{3}$

q.) $-1\frac{2}{9} + 6\frac{5}{6}$

r.) $3.53 - 4.27$