Algebra RH

Essential Question: How do we solve equations involving fractions?

Do Now: Solve each equation.

(a) $3(x + 2) = 3x + 6$

$3x+6 = 3x+6$

$6 = 6$

infinitely many Solutions

(b) $3x + 2 - 2x = 0.5(2x + 8)$

$x + 2 = x + 4$

$x = x + 2$

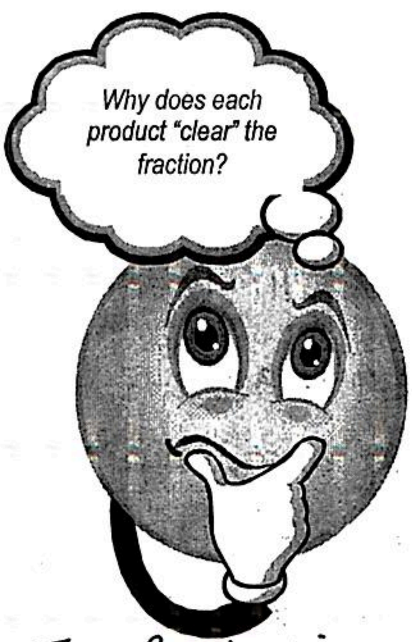
$0 \neq 2$

no solution

Identity Equations	No Solution Equations
an equation in which the variable has infinitely many solutions. $a = a$	an equation in which NO value for the variable will make the statement true. $a \neq b$

Solving Equations with Fractions

Simplify each expression.



a. $\frac{\cancel{20}^{\,5}}{1}\left(\frac{1}{\cancel{4}_{\,1}}\right)$

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b. $\frac{\cancel{15}^{\,3}}{1}\left(\frac{x}{\cancel{5}_{\,1}}\right)$

$3x$

c. $\frac{\cancel{16}^{\,2}}{1}\left(\frac{x+1}{\cancel{8}_{\,1}}\right)$

$2(x+1)$

$2x+2$

d. $12\left(\frac{x}{6} - \frac{x}{3}\right)$

$\cancel{12}^{\,2}\left(\frac{x}{\cancel{6}_{\,1}}\right) - \cancel{12}^{\,4}\left(\frac{x}{\cancel{3}_{\,1}}\right)$

$2x - 4x$

$-2x$

The factor is a MULTIPLE of the denominator therefore the denominator becomes 1.

How do we solve equations with fractions?

2 Methods:

1) Multiply the Equation by the LCD (Least Common Denominator)

- Find the LCD of all denominators.
- Multiply both sides of the equation by the LCD.
- Simplify and solve.
- Check solution.

A) $\frac{2x}{6}=\frac{2x-6}{4}+1$ LCD = 12

$$\overset{2}{\cancel{12}}\left(\frac{2x}{\underset{1}{\cancel{6}}}\right)=\overset{3}{\cancel{12}}\left(\frac{2x-6}{\underset{1}{\cancel{4}}}\right)+12(1)$$

$$2(2x)=3(2x-6)+12$$

$$4x=6x-18+12$$

$$4x=6x-6$$

$$-2x=-6$$

$$x=3$$

B) $\frac{3x}{5}-\frac{x+1}{2}=6$ LCD = 10

$$\overset{2}{\cancel{10}}\left(\frac{3x}{\underset{1}{\cancel{5}}}\right)-\overset{5}{\cancel{10}}\left(\frac{x+1}{\underset{1}{\cancel{2}}}\right)=10(6)$$

$$2(3x)-5(x+1)=60$$

$$6x-5x-5=60$$

$$x-5=60$$

$$x=65$$

2) Use Cross Products (only works when an equation is a proportion)

$$\boxed{\frac{a}{b}=\frac{c}{d} \quad \textit{then} \quad ad=cb}$$

C) $\frac{2x}{9}=\frac{x-1}{6}$

$$12x=9(x-1)$$

$$12x=9x-9$$

$$3x=-9$$

$$x=-3$$

D) $\frac{4x-2}{11}=\frac{3x-4}{7}$

$$7(4x-2)=11(3x-4)$$

$$28x-14=33x-44$$

$$-14=5x-44$$

$$30=5x$$

$$6=x$$