I can solve equations and justify my reasoning

Solving Equations

Property/Justification Word Bank

Commutative Property	Associative Property	Distributive Property
Identity Property	Combining Like Terms	Inverse Property

Properties of Equality

Addition Property of Equality	Subtraction Property of Equality
Multiplication Property of Equality	Division Property of Equality

Equation:	Justification
$10x-2x-3 = 3(2x+3)$ $8x-3 = 3(2x+3)$ $8x-3 = 6x+9$ $-6x \quad -6x$ $2x-3 = 0+9$ $2x-3 = 9$ $+3 \quad +3$ $2x-0 = 12$ $2x = 12$	

Some tougher ones...

1. $\frac{x}{-4}=5$

2. $-\frac{x}{4}=5$

3. $\frac{-x}{4}=5$

4. $\frac{2x}{5}=2$

5. $\frac{2}{5}x=2$

6. $\frac{2}{5x}=2$

Fractional Equations

We can solve Fractional Equations several different ways. Here are three common ways.

1. Calculator Plug and Chug $\frac{3}{4}x-7=6.5$	Use the Calculator strategy to solve this problem $\frac{x}{3}+\frac{x+1}{2}=x$
2. Proportion $\frac{x-1}{4}=\frac{x}{5}$	Use the Calculator strategy to solve this problem $\frac{x}{3}+\frac{x+1}{2}=x$

3. Common Denominators	Use the Calculator strategy to solve this problem
$\frac{3}{5}(x+2)=x-4$	$\frac{x}{3}+\frac{x+1}{2}=x$

Homework:

$\frac{x}{5}+\frac{x}{2}=14$	$\frac{3}{4}x+2=\frac{5}{4}x-6$	$\frac{x-3}{5}+\frac{4x}{3}=4$

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Equation:	Justification
$10x-2x-3 = 3(2x+3)$	← 1. Given
$8x-3 = 3(2x+3)$	← 2. CLT
$8x-3 = 6x+9$	← 3. Distributive Prop
$-6x \quad -6x$	← 4. Sub. Prop of =
$2x-3 = 0+9$	← 5. Inverse Prop
$2x-3 = 9$	← 6. Identity Prop
$+3 \quad +3$	← 7. Add Prop of =
$2x-0 = 12$	← 8. Inverse Prop.
$2x = 12$	← 9. Identity Prop
$\frac{2}{2} \quad \frac{12}{2}$	← 10. ÷ Prop of =
$1x = 6$	← 11. Identity Prop
$x = 6$	

Some tougher ones...

1. $\frac{x}{-4}=5$

$x=-20$

2. $-\frac{x}{4}=5$

$x=-20$

3. $\frac{-x}{4}=5$

$-x=20$

$x=-20$

4. $\frac{2x}{5}=2$ $\quad \frac{2x}{5}=\frac{2}{5}x$

$2x=10$

$x=5$

5. $\frac{2}{5}x=2$

$\div\frac{2}{5} \quad \div\frac{2}{5}$

$x=5$

6. $\frac{2}{5x}=2 \cdot 5x$

$2 = 10x$

$\frac{2}{10} \quad \frac{10}{10}$

$\frac{1}{5}=x$

Fractional Equations

We can solve Fractional Equations several different ways. Here are three common ways.

1. Calculator Plug and Chug

$$\frac{3}{4}x - 7 = 6.5$$

$$+7 \quad +7$$

$$\frac{4}{3} \cdot \frac{3}{4}x = 13.5 \cdot \frac{4}{3}$$

$$\boxed{X = 18}$$

Use the Calculator strategy to solve this problem

$$\frac{1x}{3} + \frac{1(x+1)}{2} = x$$

$$\frac{1}{3}x + \frac{1}{2}(x+1) = x$$

$$\frac{1}{3}x + \frac{1}{2}x + \frac{1}{2} = x$$

$$\frac{5}{6}x + \frac{1}{2} = 1x$$

$$-\frac{5}{6}x \qquad -\frac{5}{6}x$$

$$6 \cdot \frac{1}{2} = \frac{1}{6}x \cdot 6$$

$$\boxed{3 = x}$$

2. Proportion

$$\frac{x-1}{4} = \frac{x}{5}$$

$$4x = 5x - 5$$

$$\frac{-1x}{-1} = \frac{-5}{-1}$$

$$X = 5$$

Use the ~~Calculator~~ Proportion strategy to solve this problem

$$\frac{2}{2} \cdot \left(\frac{x}{3}\right) + \left(\frac{x+1}{2}\right) = \frac{3}{3}x$$

CD: 6

$$\frac{2x}{6} + \frac{3x+3}{6} = \frac{x}{1}$$

$$\frac{5x+3}{6} = \frac{x}{1}$$

$$6x = 5x + 3$$

$$-5x \qquad -5x$$

$$\boxed{x = 3}$$

Common Denominators

3. Common Denominators

$$\frac{3}{5}(x+2)=x-4$$

$$\frac{3x}{5}+\frac{6}{5}=\left(\frac{x-4}{1}\right)\frac{5}{5}$$

$$\frac{5}{1}\left(\frac{3x}{5}+\frac{6}{5}\right)=\left(\frac{5x-20}{5}\right)\frac{5}{1}$$

$$3x+6=5x-20$$
$$-3x \qquad -3x$$
$$6=2x-20$$
$$+20 \qquad +20$$
$$\frac{26}{2}=\frac{2x}{2}$$
$$13=x$$

Use the ~~Calculator~~ strategy to solve this problem

$$\frac{2}{2}\cdot\left(\frac{x}{3}\right)+\left(\frac{x+1}{2}\right)\frac{3}{3}=x$$

$$\frac{6}{1}\left(\frac{2x}{6}+\frac{3x+3}{6}\right)=\left(\frac{6x}{6}\right)\frac{6}{1}$$

$$2x+3x+3=6x$$

$$5x+3=6x$$
$$-5x \qquad -5x$$
$$3=x$$

Homework:

$$\frac{x}{5}+\frac{x}{2}=14$$

$$\frac{2}{2}\cdot\frac{x}{5}+\frac{5}{5}\cdot\frac{x}{2}$$

$$\frac{2x}{10}+\frac{5x}{10}=\frac{14}{1}$$

$$\frac{7x}{10}=\frac{14}{1}$$

$$\frac{140}{7}=\frac{7x}{7}$$

$$20=x$$

$$\frac{3}{4}x+2=\frac{5}{4}x-6$$

CD: 4

$$\frac{4}{1}\cdot\left(\frac{3x}{4}+\frac{8}{4}\right)=\left(\frac{5x}{4}-\frac{24}{4}\right)\frac{4}{1}$$

$$3x+8=5x-24$$
$$-3x \qquad -3x$$
$$8=2x-24$$
$$+24 \qquad +24$$
$$\frac{32}{2}=\frac{2x}{2}$$
$$16=x$$

$$\frac{x-3}{5}+\frac{4x}{3}=4$$

$$\frac{x-3}{5}=\frac{4}{1}-\frac{4x}{3}$$

$$\frac{x-3}{5}=\frac{12}{3}-\frac{4x}{3}$$

$$3x-9=60-20x$$
$$-3x \qquad -3x$$
$$-9=60-23x$$
$$-60 \qquad -60$$
$$\frac{-69}{-23}=\frac{-23x}{-23}$$
$$3=x$$