Warm-Up

CST/CAHSEE:

5. $\frac{11}{12} - \left(\frac{1}{3} + \frac{1}{4}\right) =$

A $\frac{1}{3}$

B $\frac{3}{4}$

C $\frac{5}{6}$

D $\frac{9}{5}$

Review: Grade

Write each improper fraction as a mixed number in simplest form.

$\frac{20}{8}$

$\frac{56}{12}$

Current: Grade 5/6

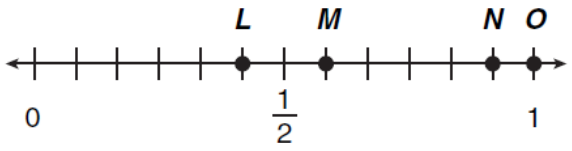
Solve for x.

$23 + x = 45$

$2x + 5 = 15$

Other: Grade

22 **Which point is located at $\frac{7}{12}$ on the number line below?**



A L

B M

C N

D O

Find the locations of the remaining points on the number line.

Adding & Subtracting Fractions from an Equation Perspective (Clearing the Denominator)

A method for simplifying an addition or subtraction expression is to set it equal to a variable and turn it into an equation.

Example #1

$$\frac{3}{8}+\frac{1}{12}=$$

$$Let\_x=\frac{3}{8}+\frac{1}{12}$$

$$24(x)=24\left(\frac{3}{8}\right)+24\left(\frac{1}{12}\right)$$

$$24(x)=\frac{24}{1}\left(\frac{3}{8}\right)+\frac{24}{1}\left(\frac{1}{12}\right)$$

$$24x=\frac{3\cdot 8\cdot 3}{1\cdot 8}+\frac{2\cdot 12\cdot 1}{1\cdot 12}$$

$$24x=9+2$$

$$24x=11$$

$$\frac{24x}{24}=\frac{11}{24}$$

$$x=\frac{11}{24}$$

Set the expression equal to a variable.

Use the bubble method to find the Least Common Multiple. The LCM is multiplied by each term to clear the denominator.

Decompose each factor so as to find equivalent forms of one.

Combine like terms.

Isolate the variable by dividing both sides of the equation by 24.

We try:

Lead students through the process with questioning.

$\frac{11}{12}-\frac{1}{3}=$

Example #2

$$\frac{11}{12}-\frac{1}{3}=$$

$$Let\_x=\frac{11}{12}-\frac{1}{3}$$

$$12(x)=12\left(\frac{11}{12}\right)-12\left(\frac{1}{3}\right)$$

$$12(x)=\left(\frac{12}{1}\bullet\frac{11}{12}\right)-\left(\frac{12}{1}\bullet\frac{1}{3}\right)$$

$$12x=\frac{12\cdot 11}{1\cdot 12}-\frac{4\cdot 3\cdot 1}{1\cdot 3}$$

$$12x=7$$

$$\frac{12x}{12}=\frac{7}{12}$$

$$x=\frac{7}{12}$$

Once I set $\frac{11}{12}-\frac{1}{3}$ equal to x, how do we clear the denominators?
[multiply each term by the LCM]

What is the LCM of 12 and 3? [12]

Now that we've multiplied each term, what do we do now? [factor each term]

Are there any equivalent forms of one?
[$\frac{12}{12},\frac{3}{3},\frac{1}{1}$]

How do we isolate the variable? [divide both sides of the equation by 12]

You Try:

Have students work through the next problem independently or in pairs.

You Try:

$$\frac{3}{4}-\frac{3}{16}=$$

$$Let\_x=\frac{3}{4}-\frac{3}{16}$$

$$16(x)=16\left(\frac{3}{4}\right)-16\left(\frac{3}{16}\right)$$

$$16x=\frac{4\cdot 4\cdot 3}{1\cdot 4}-\frac{16\cdot 3}{1\cdot 16}$$

$$16x=12-3$$

$$16x=9$$

$$\frac{16x}{16}=\frac{9}{16}$$

$$x=\frac{9}{16}$$

This strategy also works to solve mixed number expressions.

Example #3:

$$3\frac{2}{5}+1\frac{1}{3}=$$

Set the expression equal to x.

$$Let\_x=3\frac{2}{5}+1\frac{1}{3}$$

Turn each mixed number into an improper fraction.

$$x=\frac{17}{5}+\frac{4}{3}$$

Find the LCM. Multiply each term by the LCM.

$$15(x)=15\left(\frac{17}{5}\right)+15\left(\frac{4}{3}\right)$$

Factor each term. Find equivalent forms of one.

$$15x=\left(\frac{3\cdot 5\cdot 17}{1\cdot 5}\right)+\left(\frac{5\cdot 3\cdot 4}{3}\right)$$

Combine like terms.

$$15x=51+20$$

$$15x=71$$

Isolate the variable.

$$\frac{15x}{15}=\frac{71}{15}$$

Decompose the improper fraction into its wholes and fractional parts.

$$x=\frac{15}{15}+\frac{15}{15}+\frac{15}{15}+\frac{15}{15}+\frac{11}{15}$$

Put the wholes and fractional part back together.

$$x=4\frac{11}{15}$$

You Try:

You Try #2:

$$4\frac{1}{4}-2\frac{1}{2}=$$

$$Let\_x=4\frac{1}{4}-2\frac{1}{2}$$

$$x=\frac{17}{4}-\frac{5}{2}$$

$$4(x)=4\left(\frac{17}{4}\right)-4\left(\frac{5}{2}\right)$$

$$4x=\left(\frac{4}{1}\bullet\frac{17}{4}\right)-\left(\frac{4}{1}\bullet\frac{5}{2}\right)$$

$$4x=\left(\frac{4\cdot17}{1\cdot4}\right)-\left(\frac{2\cdot2\cdot5}{2\cdot1}\right)$$

$$4x=17-10$$

$$4x=7$$

$$\frac{4x}{4}=\frac{7}{4}$$

$$x=\frac{7}{4}$$

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

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

Additional You Tries:

Have students work through 2 problems using the Think-Pair-Share strategy. Student A will dictate how to solve as Student B works as the scribe. Student B doesn't talk….only writes. They switch roles for the second you try. Both students must have all work written in their notebooks. Pick students to debrief problems for the class.

You Try #3:

$$10-4\frac{3}{5}=$$

$$Let\_x=10-4\frac{3}{5}$$

$$x=10-\frac{23}{5}$$

$$5(x)=5(10)-5\left(\frac{23}{5}\right)$$

$$5(x)=50-\left(\frac{5}{1}\bullet\frac{23}{5}\right)$$

$$5x=50-23$$

$$5x=27$$

$$\frac{5x}{5}=\frac{27}{5}$$

$$x=\frac{25+2}{5}$$

$$x=\frac{25}{5}+\frac{2}{5}$$

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

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

You Try #4:

$$1\frac{1}{9}+1\frac{5}{6}=$$

$$Let\_x=1\frac{1}{9}+1\frac{5}{6}$$

$$x=\frac{10}{9}+\frac{11}{6}$$

$$18(x)=18\left(\frac{10}{9}\right)+18\left(\frac{11}{6}\right)$$

$$18x=\left(\frac{18}{1}\bullet\frac{10}{9}\right)+\left(\frac{18}{1}\bullet\frac{11}{6}\right)$$

$$18x=\left(\frac{2\cancel{9}\cdot 10}{\cancel{9}}\right)+\left(\frac{3\cancel{6}\cdot 11}{\cancel{6}}\right)$$

$$18x=20+33$$

$$18x=53$$

$$\frac{\cancel{18}x}{\cancel{18}}=\frac{53}{18}$$

$$x=\frac{53}{18}$$

$$x=\frac{\cancel{18}}{\cancel{18}}+\frac{\cancel{18}}{\cancel{18}}+\frac{17}{18}$$

$$x=1+1+\frac{17}{18}$$

$$x=2\frac{17}{18}$$