

**OBJECTIVE 1: Solving Equations Containing Rational Expressions**

**STEPS:**

1. Factor or GCF everything first!
2. Find the LCD
3. Restrict the domain (what can the denominator not be)
4. Make equivalent fractions by multiplying the numerator by what is missing in the denominator to match the LCD
5. If subtraction, distribute the - 1 and add the numerators while keeping the denominators. If addition, add the numerators and keep the denominators
6. Cross out the denominators (only when an = is present)
7. Solve for the variable (use SADMEP)
8. Check your solutions(s), some can be extraneous (think about your domain)

**TASK 1:** Follow the steps above to solve the following equations. State your LCD, Domain, & Solutions to earn full credit.

a)  $\frac{4x}{x^2+x-30} + \frac{2}{x-5} = \frac{1}{x+6}$   
 LCD:  $(x-5)(x+6)$   
 D:  $(-\infty, -6) \cup (-6, 5) \cup (5, \infty)$

$4x + 2(x+6) = 1(x-5)$   
 $4x + 2x + 12 = x - 5$   
 $6x + 12 = x - 5$   
 $5x = -17$   
 $x = -\frac{17}{5}$

$0.385 = 0.385 \checkmark$

b)  $\frac{6x}{x^2-5x-14} - \frac{3}{x+2} = \frac{1}{x-7}$   
 LCD:  $(x-7)(x+2)$   
 D:  $(-\infty, -2) \cup (-2, 7) \cup (7, \infty)$

$6x - 3(x-7) = 1(x+2)$   
 $6x - 3x + 21 = x + 2$   
 $3x + 21 = x + 2$   
 $2x = -19$   
 $x = -\frac{19}{2}$

$-0.06 = -0.06 \checkmark$



c)  $\frac{2x}{x-4} = \frac{8}{x-4} + 1$  LCD:  $(x-4)$   
 D:  $(-\infty, 4) \cup (4, \infty)$

$2x = 8 + 1(x-4)$   
 $2x = 8 + x - 4$   
 $2x = 4 + x$   
 $x = 4$   
 $x \neq 4 \rightarrow \emptyset$

d)  $\frac{7x}{x-2} = \frac{14}{x-2} + 4$  LCD:  $x-2$   
 D:  $(-\infty, 2) \cup (2, \infty)$

$7x = 14 + 4(x-2)$   
 $7x = 14 + 4x - 8$   
 $7x = 6 + 4x$   
 $3x = 6$   
 $x = 2$   
 $x \neq 2 \rightarrow \emptyset$

e)  $x + \frac{14}{x-2} = \frac{7x}{x-2} + 1$  LCD:  $x-2$   
 D:  $(-\infty, 2) \cup (2, \infty)$

$x(x-2) + 14 = 7x + 1(x-2)$   
 $x^2 - 2x + 14 = 7x + x - 2$   
 $x^2 - 10x + 16 = 0$   
 $(x-8)(x-2) = 0$   
 $x-8=0$      $x-2=0$   
 $x=8$          $x \neq 2$   
 $x=8$

f)  $x + \frac{x}{x-5} = \frac{5}{x-5} - 7$  LCD:  $(x-5)$   
 D:  $(-\infty, 5) \cup (5, \infty)$

$x(x-5) + x = 5 - 7(x-5)$   
 $x^2 - 5x + x = 5 - 7x + 35$   
 $x^2 + 3x - 40 = 0$   
 $(x+8)(x-5) = 0$   
 $x = -8, 5$   
 $x = -8$

Common Mistakes:

Still need help with: