

Lesson: Solving Equations with Fractions

Example 1

$$\frac{2x}{5} + 2 = \frac{4}{15}$$

move 2 to RS

$$\frac{2x}{5} = \frac{4}{15} - \frac{2 \cdot 15}{1 \cdot 15} \quad \text{LCD: 15}$$

$$\frac{2x}{5} = \frac{4}{15} - \frac{30}{15}$$

$$\frac{2x}{5} = \frac{4-30}{15}$$

$$\frac{2x}{5} = \frac{-26}{15} \quad \text{you can reduce the numerators and denominators. OR cross multiply}$$

$$x = \frac{-13}{3}$$

Example 2

$$\frac{1}{1} = \frac{2p-3}{5}$$

cross multiply

$$5 = 2p - 3$$

$$5 + 3 = 2p$$

$$\frac{8}{2} = \frac{2p}{2}$$

$$4 = p$$

or

$$p = 4$$

CHECK: sub 4 for 'p'

LS	RS
1 ✓	$\frac{2(4)-3}{5}$
	$= \frac{8-3}{5}$
	$= \frac{5}{5} = 1 \quad \checkmark$

Example 3

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

$$\frac{(x-3)}{4} = -2 \quad \text{cross multiply}$$

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

$$x-3 = -8$$

$$x = -8 + 3$$

$$x = -5$$

CHECK

sub -5 for x

LS	RS
$\frac{(-5-3)}{4}$	-2
$= \frac{-8}{4}$	
-2	
LS = RS	

Example 4

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

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

$$\frac{3x+15}{4} = \frac{-6}{1} \quad \text{cross X}$$

$$3x+15 = -24$$

$$3x = -24 - 15$$

$$\frac{3x}{3} = \frac{-39}{3}$$

$$x = -13$$

Example 5

$$\frac{h-4}{5} = \frac{h-3}{6}$$

cross multiply

$$6(h-4) = 5(h-3)$$

$$6h-24 = 5h-15$$

$$6h-5h = 24-15$$

$$h = 9$$

Practice: Solving Equations with Fractions

a. $\frac{x}{2} + \frac{4}{5} = \frac{23}{10} - x$

$$\frac{x}{2} + \frac{x \cdot 2}{1 \cdot 2} = \frac{23}{10} - \frac{4 \cdot 2}{5 \cdot 2}$$

$$\frac{x+2x}{2} = \frac{23-8}{10}$$

$$\frac{3x}{2} = \frac{15}{10} \quad \text{cross mult.}$$

$$\frac{30x}{30} = \frac{30}{30}$$

$$\boxed{x=1}$$

b. $-\frac{1}{2}x - \frac{1}{8} = x + \frac{5}{8}$

$$-\frac{5}{8} - \frac{1}{8} = \frac{1 \cdot x}{2 \cdot 1} + \frac{x}{2}$$

$$\frac{-5-1}{8} = \frac{2x+x}{2}$$

$$\frac{-6}{8} \times \frac{3x}{2}$$

$$\frac{-12}{24} = \frac{24x}{24}$$

$$-\frac{1}{2} = x \quad \text{or } -0.5$$

c. $-\frac{4}{5}x + 1 = -x + \frac{9}{5}$

$$\frac{-4x}{5} + \frac{x \cdot 5}{1 \cdot 5} = \frac{9}{5} - \frac{1 \cdot 5}{1 \cdot 5}$$

$$\frac{-4x+5x}{5} = \frac{9-5}{5}$$

$$\frac{x}{5} = \frac{4}{5} \quad \text{reduce the denominators}$$

$$\boxed{x=4}$$

d. $6 = -\frac{3}{5}(a-7)$

$$6 = \frac{-3(a-7)}{5}$$

$$\frac{6}{1} \times \frac{-3a+21}{5} \quad \text{cross X}$$

$$30 = -3a + 21$$

$$3a = 21 - 30$$

$$\frac{3a}{3} = \frac{-9}{3}$$

$$\boxed{a=-3}$$

e. $\frac{1}{3}(p+2) = -5$

$$\frac{(p+2)}{3} = \frac{-5}{1} \quad \text{cross X}$$

$$p+2 = -15$$

$$p = -15 - 2$$

$$\boxed{p=-17}$$

f. $\frac{1}{3}(x+4) = \frac{1}{5}(x+2)$

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

$$5(x+4) = 3(x+2)$$

$$5x+20 = 3x+6$$

$$5x-3x = 6-20$$

$$\frac{2x}{2} = \frac{-14}{2}$$

$$\boxed{x=-7}$$

g. $\frac{3x+9}{5} = 12$

$$3x+9 = 60$$

$$3x = 60 - 9$$

$$\frac{3x}{3} = \frac{51}{3}$$

$$\boxed{x=17}$$

h. $\frac{5x+4}{5} = \frac{5x+13}{10}$

$$2(5x+4) = 5x+13$$

$$10x+8 = 5x+13$$

$$10x-5x = 13-8$$

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

$$\boxed{x=1}$$

i. $\frac{3(s-4)}{4} = \frac{2(s-3)}{3}$

$$9(s-4) = 8(s-3)$$

$$9s-36 = 8s-24$$

$$9s-8s = 36-24$$

$$\boxed{s=12}$$

ANSWERS: a) $x=1$, b) $x=-0.5$, c) $x=4$, d) $a=-3$, e) $p=-17$, f) $x=-7$, g) $x=17$, h) $x=1$, i) $s=12$