Review Exercise Set 13

Exercise 1: Solve for x.

$$\frac{3x-7}{10}=\frac{2}{x}$$

Exercise 2: Solve for n.

$$\frac{n}{70-n}=7+\frac{6}{70-n}$$

Exercise 3: Solve for x.

$$\frac{x+2}{5}+\frac{x-1}{6}=\frac{3}{5}$$

Exercise 4: Solve for x.

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

Exercise 5: Solve for a.

$$\frac{a}{a^2-1}+\frac{a+3}{a-2}=\frac{a^2+4a+3}{a^2-a-2}$$

Review Exercise Set 13 Answer Key

Exercise 1: Solve for x.

$$\frac{3x-7}{10}=\frac{2}{x}$$

Find the LCD for both fractions

LCD: 10x

Multiply each side of the equation by the LCD

$$\frac{3x-7}{10}\times 10x=\frac{2}{x}\times 10x$$
$$(3x-7)\times x=2\times 10$$
$$3x^2-7x=20$$

Solve for x

$$3x^2-7x-20=0$$
$$(3x+5)(x-4)=0$$
$$3x+5=0 \quad or \quad x-4=0$$
$$3x=-5 \quad or \quad x=4$$
$$x=-\frac{5}{3} \quad or \quad x=4$$

Check:

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

$$\frac{3\left(-\frac{5}{3}\right)-7}{10}=\frac{2}{-\frac{5}{3}}$$
$$\frac{-5-7}{10}=2\times\left(-\frac{3}{5}\right)$$
$$\frac{-12}{10}=-\frac{6}{5}$$
$$-\frac{6}{5}=-\frac{6}{5}$$

$x=4$

$$\frac{3(4)-7}{10}=\frac{2}{4}$$
$$\frac{12-7}{10}=\frac{1}{2}$$
$$\frac{5}{10}=\frac{1}{2}$$
$$\frac{1}{2}=\frac{1}{2}$$

Exercise 2: Solve for n.

$$\frac{n}{70-n}=7+\frac{6}{70-n}$$

Find the LCD for both fractions

LCD: 70 - n

Multiply each side of the equation by the LCD

$$\frac{n}{70-n}\times(70-n)=\left(7+\frac{6}{70-n}\right)\times(70-n)$$

$$\frac{n}{70-n}\times(70-n)=(7)\times(70-n)+\left(\frac{6}{70-n}\right)\times(70-n)$$

$$n=490-7n+6$$

Solve for n

$$n=490-7n+6$$
$$n+7n=490+6$$
$$8n=496$$
$$n=\frac{496}{8}$$
$$n=62$$

Check:

$$\frac{n}{70-n}=7+\frac{6}{70-n}$$
$$\frac{62}{70-62}=7+\frac{6}{70-62}$$
$$\frac{62}{8}=7+\frac{6}{8}$$
$$7\frac{3}{4}=7+\frac{3}{4}$$
$$7\frac{3}{4}=7\frac{3}{4}$$

Exercise 3: Solve for x.

$$\frac{x+2}{5}+\frac{x-1}{6}=\frac{3}{5}$$

Find the LCD all three fractions

5: 5
6: 2 * 3
LCD: 2 * 3 * 5 = **30**

Multiply each side of the equation by the LCD

$$\left(\frac{x+2}{5}+\frac{x-1}{6}\right)\times 30=\left(\frac{3}{5}\right)\times 30$$
$$\left(\frac{x+2}{5}\right)\times 30+\left(\frac{x-1}{6}\right)\times 30=\left(\frac{3}{5}\right)\times 30$$
$$(x+2)\times 6+(x-1)\times 5=3\times 6$$

Solve for x

$$6x+12+5x-5=18$$
$$11x+7=18$$
$$11x=18-7$$
$$11x=11$$
$$x=1$$

Check:

$$\frac{x+2}{5}+\frac{x-1}{6}=\frac{3}{5}$$
$$\frac{1+2}{5}+\frac{1-1}{6}=\frac{3}{5}$$
$$\frac{3}{5}+\frac{0}{6}=\frac{3}{5}$$
$$\frac{3}{5}+0=\frac{3}{5}$$
$$\frac{3}{5}=\frac{3}{5}$$

Exercise 4: Solve for x.

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

Use the cross multiplication property

$$3\times(3x+2)=5\times(2x-1)$$

Solve for x

$$\begin{aligned}9x+6&=10x-5\\9x-10x&=-5-6\\-x&=-11\\x&=11\end{aligned}$$

Check:

$$\begin{aligned}\frac{3}{2x-1}&=\frac{5}{3x+2}\\\frac{3}{2(11)-1}&=\frac{5}{3(11)+2}\\\frac{3}{22-1}&=\frac{5}{33+2}\\\frac{3}{21}&=\frac{5}{35}\\\frac{1}{7}&=\frac{1}{7}\end{aligned}$$

Exercise 5: Solve for a.

$$\frac{a}{a^2-1}+\frac{a+3}{a-2}=\frac{a^2+4a+3}{a^2-a-2}$$

Factor the denominators $a^2 - 1$ and $a^2 - a - 2$ and the numerator $a^2 + 4a + 3$

$a^2 - 1 = (a + 1)(a - 1)$
$a^2 - a - 2 = (a + 1)(a - 2)$
$a^2 + 4a + 3 = (a + 1)(a + 3)$

Exercise 5 (Continued):

Rewrite the equation with the factored forms of the polynomials

$$\frac{a}{a^2-1}+\frac{a+3}{a-2}=\frac{a^2+4a+3}{a^2-a-2}$$
$$\frac{a}{(a+1)(a-1)}+\frac{a+3}{a-2}=\frac{(a+1)(a+3)}{(a+1)(a-2)}$$

Reduce the fractions if possible

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

Solve for a

$$\frac{a}{(a+1)(a-1)}=\frac{a+3}{a-2}-\frac{a+3}{a-2}$$
$$\frac{a}{(a+1)(a-1)}=0$$
$$\frac{a}{(a+1)(a-1)}\times(a+1)(a-1)=0\times(a+1)(a-1)$$
$$a=0$$

Check:

$$\frac{a}{a^2-1}+\frac{a+3}{a-2}=\frac{a^2+4a+3}{a^2-a-2}$$
$$\frac{(0)}{(0)^2-1}+\frac{(0)+3}{(0)-2}=\frac{(0)^2+4(0)+3}{(0)^2-(0)-2}$$
$$\frac{0}{-1}+\frac{3}{-2}=\frac{3}{-2}$$
$$0-\frac{3}{2}=-\frac{3}{2}$$
$$-\frac{3}{2}=-\frac{3}{2}$$