

NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

1. Consider the equation $\frac{10(x^2 - 49)}{3x(x-4)(x+1)} = 0$. Is $x = 7$ permissible? Which values of x are excluded? (You do not need to solve this equation.)

Excluded values: 0, 4, -1

$$x \neq 0, 4, -1$$

* $x = 7$ will work since it won't make the denominator = 0

Determine the excluding the value(s) of x that lead to a denominator of zero for each equation; then, solve the equation for x .

2. $\frac{2}{x} = \frac{5}{x+1}$ $x \neq$ 0, -1

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

$$2(x+1) = 5(x)$$

$$2x+2 = 5x$$

$$2 = 3x$$

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

3. $\frac{1}{5x} = 10$ $x \neq$ 0

$$\frac{1}{5x} = \frac{10}{1}$$

$$1(1) = 10(5x)$$

$$1 = 50x$$

$$\frac{1}{50} = x$$

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

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

$$1(x+3) = 5(x+3)$$

$$x+3 = 5x+15$$

$$-4x+3 = 15$$

$$-4x = 12$$

$$x = -3$$

Not possible since it is an excluded value

NO SOLUTION

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

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

$$1(x+3) = 1(x+3)$$

$$x+3 = x+3$$

$$3 = 3 \checkmark$$

ALL REAL Numbers

* By looking at equation before, I could have determined answer is no sol. $\frac{x+3}{x+3}$ simplifies to 1 and $1 \neq 5$

* By looking at equation before, I could have determined answer is ALL REAL # $\frac{x+3}{x+3}$ simplifies to 1 and $1 = 1 \checkmark$

For each equation, determine the solution(s) using the Zero Product Property.

6. $(b - 4)(3b - 1) = 0$

$$\begin{aligned} b - 4 &= 0 & 3b - 1 &= 0 \\ \boxed{b = 4} & & 3b &= 1 \\ & & \boxed{b = \frac{1}{3}} & \end{aligned}$$

7. $(n + 3)(6n + 1) = 0$

$$\begin{aligned} n + 3 &= 0 & 6n + 1 &= 0 \\ \boxed{n = -3} & & 6n &= -1 \\ & & \boxed{n = -\frac{1}{6}} & \end{aligned}$$

8. $(r + 5)(r - 3) = 0$

$$\begin{aligned} r + 5 &= 0 & r - 3 &= 0 \\ \boxed{r = -5} & & \boxed{r = 3} & \end{aligned}$$

9. $(v + 8)(2v - 5) = 0$

$$\begin{aligned} v + 8 &= 0 & 2v - 5 &= 0 \\ \boxed{v = -8} & & 2v &= 5 \\ & & \boxed{v = \frac{5}{2}} & \end{aligned}$$

10. $(3p - 5)(p - 2) = 0$

$$\begin{aligned} 3p - 5 &= 0 & p - 2 &= 0 \\ 3p &= 5 & \boxed{p = 2} & \\ \boxed{p = \frac{5}{3}} & & & \end{aligned}$$

11. $(2x + 1)(7x + 5) = 0$

$$\begin{aligned} 2x + 1 &= 0 & 7x + 5 &= 0 \\ 2x &= -1 & 7x &= -5 \\ \boxed{x = -\frac{1}{2}} & & \boxed{x = -\frac{5}{7}} & \end{aligned}$$

12. $(3x - 5)(3x + 1) = 0$

$$\begin{aligned} 3x - 5 &= 0 & 3x + 1 &= 0 \\ 3x &= 5 & 3x &= -1 \\ \boxed{x = \frac{5}{3}} & & \boxed{x = -\frac{1}{3}} & \end{aligned}$$

13. $(x - 2)(x + 3)(x - 4) = 0$

$$\begin{aligned} x - 2 &= 0 & x + 3 &= 0 & x - 4 &= 0 \\ \boxed{x = 2} & & \boxed{x = -3} & & \boxed{x = 4} & \end{aligned}$$

14. $\left(\frac{2}{5}x + 4\right)\left(\frac{1}{3}x - 5\right) = 0$

$$\begin{aligned} \frac{2}{5}x + 4 &= 0 & \frac{1}{3}x - 5 &= 0 \\ \frac{2}{5}x &= -4 & \frac{1}{3}x &= 5 \\ \frac{2}{5}x &= -4 \cdot \frac{5}{2} & \frac{1}{3}x &= 5 \cdot \frac{3}{1} \\ \frac{2}{5}x &= -10 & \frac{1}{3}x &= 15 \\ \boxed{x = -10} & & \boxed{x = 15} & \end{aligned}$$

Determine the excluded value for each equation. You do NOT need to solve the equation.

15. $\frac{3}{x-7} = 5$

$x \neq 7$

16. $-4 = \frac{3}{x+4}$

$x \neq -4$

17. $\frac{(x-2)(x+1)}{(x-1)(x+1)} = 7$

$x \neq 1, -1$

18. $\frac{(x-3)}{(x-3)(x+4)} = \frac{(x+4)}{(x+4)}$

$x \neq 3, -4$

19. $10 = \frac{(x+3)(x+5)}{(x+5)(x+6)}$

$x \neq -5, -6$

20. $-2 = \frac{4-x}{6}$

No excluded values for x

* There is no x in denominator.

21. **Challenge** Write an equation with the restrictions $x \neq 14$, $x \neq 2$, and $x \neq 0$.

possible answer

$$\frac{5(x+3)}{(x-14)(x-2)(x)} = 8$$

22. **Challenge** Use any of the digits 1–9 to create an equation with the smallest solution possible.

possible answer:

$$\frac{\boxed{9}}{\boxed{3}} x - \boxed{2} = \boxed{1}$$