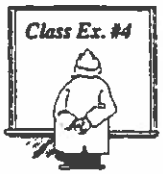
An Equation with No Solution



Show that the equation $\frac{8x+10}{x-3} - 4 = \frac{10x+4}{x-3}$ has no solution.

Complete Assignment Questions #1 - #7

Assignment

In this assignment, a written verification is only required where indicated. All solutions must be checked for nonpermissible values.

1. In each case, state the nonpermissible value(s), solve the equation algebraically, and verify the solution(s).

a) $\frac{4}{x+2} = 3$ $(x+2)$ $x \neq -2$

$4 = 3x + 6$

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

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

verify $\frac{4}{-2/3 + 2} = 3$

$4 \div \frac{4}{3}$

$3 = 3$ ✓

b) $\frac{3}{2x-1} = \frac{4}{x+7}$ $(x+7)(2x-1)$ $x \neq \frac{1}{2}, -7$

$3x + 21 = 8x - 4$

$25 = 5x$

$5 = x$

verify

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

$\frac{3}{9} = \frac{4}{12}$

$\frac{1}{3} = \frac{1}{3}$ ✓

$x = 5$

2. In each case, state the nonpermissible value(s), solve the equation algebraically, and verify the solution(s).

a) $\dfrac{x+3}{x^2+4x+3} = 1$ (x^2+4x+3)

$x \neq -3, -1$ $(x+3)(x+1)$

$x+3 = x^2+4x+3$

$0 = x^2+3x$

$x(x+3)$

$x = 0, -3$ ← NPV

verify $x=0$

$\dfrac{0+3}{0^2+4(0)+3} = 1$ $\boxed{x=0}$

$\dfrac{3}{3} = 1$ ✓

b) $\dfrac{30}{x^2-25} = \dfrac{3}{x-5} - \dfrac{2}{x+5}$ $(x+5)$ $(x-5)$

$(x-5)(x+5)$

$x \neq \pm 5$

$30 = 3x+15-2x+10$

$5 = x$

no solution

3. Solve the following equations algebraically.

a) $\dfrac{(x-1)}{x+1} = \dfrac{2x}{15}$ $(x+1)$ 15 $x \neq -1$

$15x-15 = 2x^2+2x$

$0 = 2x^2-13x+15$ x | $+$; $+30$ | -13 ; $-10, -3$

$= 2x^2-10x-3x+15$

$2x(x-5)-3(x-5)$

$(2x-3)(x-5)$

$\boxed{x = \frac{3}{2}, 5}$

b) $\dfrac{4x}{3x+4} - \dfrac{10}{x+6} = 0$

$\dfrac{4x}{3x+4}(x+6) = \dfrac{10}{x+6}(3x+4)$

$x \neq -\frac{4}{3}, -6$

$4x^2+24x = 30x+40$

$4x^2-6x-40$

$2(2x^2-3x-20)$ x | $+$; -40 | -3 ; $-8, 5$

$2x^2-8x+5x-20$

$2(2x(x-4)+5(x-4))$

$2(2x+5)(x-4)$

$\boxed{x = -\frac{5}{2}, 4}$

4. Determine the roots of the following equations algebraically.

a) $\frac{4x+3}{2x-1} - 2 = \frac{6x+2}{2x-1}$, $x \neq \frac{1}{2}$

$(2x-1)$

$4x+3-4x+2 = 6x+2$

$5 = 6x+2$

$-2 \quad -2$

$3 = 6x$

$\frac{1}{2} = \frac{3}{6} = x$

no solution
b/c $x \neq \frac{1}{2}$

b) $\frac{2}{x} + \frac{1}{6-x} = 1$ $x \neq 0, 6$

$(6-x)(x)$

$12 - 2x + 1x = 6x - x^2$

$-1x$

$x^2 - 7x + 12 = 0$

$(x-3)(x-4)$

$x = 3, 4$

5. Determine the roots of the equation $\frac{8}{x} - 5 = \frac{x}{2}$ in simplest radical form.

$2x\left(\frac{8}{x} - 5 = \frac{x}{2}\right)$ $x \neq 0$

$16 - 10x = x^2$

$x+ \quad = x^2 + 10x - 16$

$-16 \quad 10$

not possible

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$= \frac{-10 \pm \sqrt{(+10)^2 - 4(1)(-16)}}{2(1)}$

$= \frac{-10 \pm \sqrt{164}}{2}$ $4 \cdot 41$ $= \frac{-10 \pm 2\sqrt{41}}{2}$

$= \boxed{-5 \pm \sqrt{41}}$

16
4
64

Multiple Choice **6.** The solution to the equation $\frac{7}{a+6} - \frac{3}{a} = \frac{4}{a+6}$ is

A. $a = 18$
B. $a = -6$
C. $a = 0$
D. no solution

$7a - 3a - 18 = 4a$

$4a - 18 = 4a$

$\frac{-18}{0} = \frac{0a}{0}$

↑ not possible so no solution.

Numerical Response **7.** The roots of the rational equation $\frac{x+3}{2x+1} = \frac{x+7}{5x+1}$ are $x = a$ and $x = -b$, where $a, b > 0$.

The value of $\frac{a}{b}$, to the nearest hundredth, is _____.

(Record your answer in the numerical response box from left to right.)

0	.	7	5

$x \neq -\frac{1}{2}, -\frac{1}{5}$

$5x^2 + 16x + 3 = 2x^2 + 15x + 7$

$3x^2 + x - 4 = 0$

$3x^2 - 3x + 4x - 4$

$3x(x-1) + 4(3x-1)$

$(3x+4)(x-1)$

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

b a

$1 \div \frac{4}{3} = \frac{3}{4} = 0.75$

-2 | 1

4 | -3

Answer Key

1. a) $x = -\frac{2}{3}$ b) $x = 5$ **2.** a) $x = 0$ b) no solution

3. a) $x = \frac{3}{2}, 5$ b) $x = -\frac{5}{2}, 4$ **4.** a) no solution b) $x = 3, 4$

5. $x = -5 \pm \sqrt{41}$ **6.** D **7.**

0	.	7	5