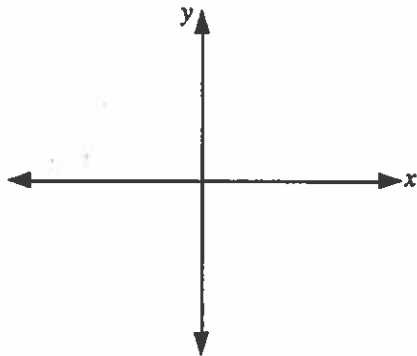


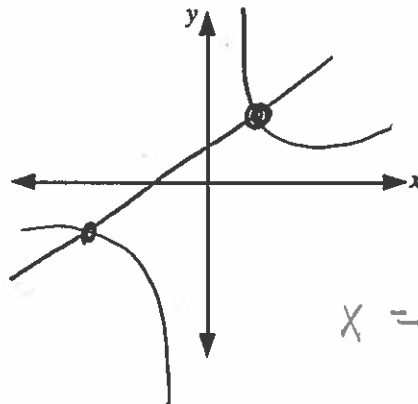
## Assignment

1. Solve the following rational equations using a graphing calculator, using either the intersect method or the  $x$ -intercept method. State a suitable window, and answer to the nearest hundredth where necessary.

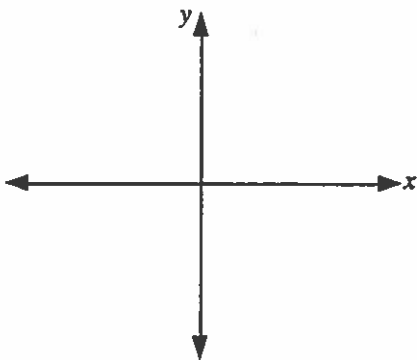
a)  $\frac{2}{x-4} + \frac{6}{x+2} = \frac{1}{2}$



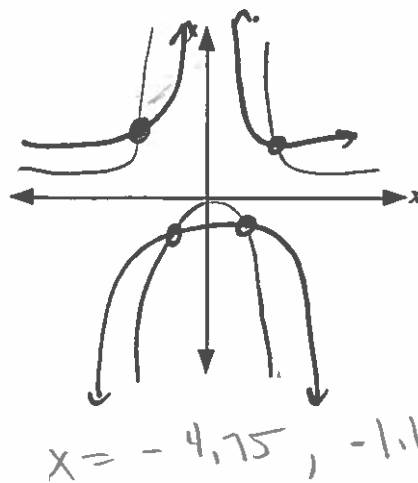
b)  $\frac{8}{x} - 5 = \frac{x}{2}$



c)  $\frac{x+3}{x+1} = \frac{x+7}{5x+1}$



d)  $\frac{x}{x+2} + \frac{x}{x-2} = \frac{16}{x^2-16}$



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

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

$$a \neq \frac{3}{2}$$

$$\text{a) } \frac{6a+3}{2a-3} = \frac{3}{2}$$

$$2(6a+3) = 3(2a-3)$$

$$\begin{array}{r} 12a+6 = 6a-9 \\ -6a \quad -6 \quad -6a \quad -6 \\ \hline 6a = -15 \end{array}$$

$$a = \frac{-15}{6} = \frac{-5}{2}$$

$$\text{b) } \frac{2}{m+1} = \frac{8m}{m+1} - 3 \quad m \neq -1$$

$$2 = 8m - 3(m+1)$$

$$2 = 8m - 3m - 3$$

$$5 = 5m$$

$$m = 1$$

3. Solve.

$$a \neq -7, -1 \quad \text{a) } \frac{5a-3}{a+7} = \frac{5a-14}{a+1}$$

$$(5a-3)(a+1) = (5a-14)(a+7)$$

$$\begin{array}{r} 5a^2+2a-3 = 5a^2+21a-98 \\ -21a \quad +3 \quad -21a \quad +3 \\ \hline -19a = -95 \end{array}$$

$$-19a = -95$$

$$a = 5$$

$$\text{b) } \frac{2x+1}{x-3} - \frac{4x-1}{2x-3} = 0 \quad x = \frac{3}{2}, 3$$

$$(2x+1)(2x-3) - (4x-1)(x-3) = 0$$

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

$$9x - 6 = 0$$

$$x = \frac{6}{9} = \frac{2}{3}$$

c)  $\frac{6y-2}{3y-2} - \frac{2y+6}{y+6} = 0$   $y \neq \frac{2}{3}, 6$       d)  $\frac{4a+9}{2a} - \frac{3}{4} = 2(4a)$   $a \neq 0$

$$(6y-2)(y+6) - (2y+6)(3y-2) = 0$$

$$6y^2 - 34y - 12 - (6y^2 + 14y - 12) = 0$$

$$-20y = 0$$

$$\boxed{y = 0}$$

$$(4a+9)(2) - 3a = 8a$$

$$8a + 18 - 3a = 8a$$

$$18 = 3a$$

$$\boxed{6 = a}$$

e)  $\frac{5}{3x-1} + \frac{3x}{3x+1} = 1$   $x \neq \pm \frac{1}{3}$

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

$$15x + 5 + 9x^2 - 3x = 9x^2 - 1$$

$$12x = -6$$

$$x = -\frac{1}{2}$$

f)  $\frac{8x}{2x+3} - \frac{x+3}{x+7} = 3$   $x \neq -\frac{3}{2}, -7$

$$8x(x+7) - (x+3)(2x+3) = 3(2x+3)(x+7)$$

$$8x^2 + 56x - (2x^2 + 9x + 9) = 3(2x^2 + 17x + 21)$$

$$6x^2 + 47x - 9 = 6x^2 + 51x + 63$$

$$-4x = 72$$

$$x = -18$$

4. Solve and verify the equation  $\frac{1}{x^2 - 9} = \frac{4}{x - 3} - \frac{2(x-3)}{x+3}$ .  $x \neq \pm 3$ .

$$1 = 4(x+3) - 2(x-3)$$

$$1 = 4x + 12 - 2x + 6$$

$$1 = 2x + 18$$

$$-17 = 2x$$

$$x = \frac{-17}{2}$$

**Multiple Choice** 5. If  $\frac{2}{4-y} = 3$ , then  $y$  equals

A.  $\frac{5}{2}$

B.  $\frac{10}{3}$

C.  $-2$

D.  $\frac{14}{3}$

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

$$2 = 12 - 3y$$

$$-10 = -3y$$

$$\frac{10}{3} = y$$

Numerical Response

6. The solution to the rational equation  $\frac{4}{x} + \frac{2x}{x-4} - 2 = 0$ , to the nearest tenth, is \_\_\_\_\_.

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

1	.	3	
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$$\frac{4}{x} + \frac{2x}{x-4} - 2 = 0$$

$$4(x-4) + 2x(x) - 2(x)(x-4) = 0$$

$$4x - 16 + 2x^2 - 2x^2 + 8x = 0$$

$$12x = 16$$

$$x = 16/12 = 1.333$$

7. The root of the rational equation  $\frac{1}{x+3} - \frac{2}{x+7} = \frac{x}{x^2 + 10x + 21}$ , to the nearest tenth, is \_\_\_\_\_.

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

0	.	5	
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$$\frac{1}{x+3} - \frac{2}{x+7} = \frac{x}{(x+3)(x+7)} \quad x \neq -3, -7$$

$$1(x+7) - 2(x+3) = x$$

$$x+7 - 2x-6 = 1x$$

$$-1 = 2x$$

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

**Answer Key**

1. a)  $x = 2$  or  $16$    b)  $x = -11.40$  or  $1.40$    c)  $x = -2.41$  or  $0.41$    d)  $x = -4.75, -1.19, 1.19,$  or  $4.75$

2. a)  $-\frac{5}{2}$    b) 1   3. a) 5   b)  $\frac{2}{3}$    c) 0   d) 6   e)  $-\frac{1}{2}$    f) -18

4.  $x = -\frac{17}{2}$    5. B

6. 

1	.	3	
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7. 

0	.	5	
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