

1. Solve the following rational equations. State your answers using proper set notation.

a.  $\frac{x}{x+3} = 4$

c.  $\frac{x}{5x-30} - \frac{2}{x-6} = 1$

b.  $\frac{-7r+4}{r-4} = -\frac{7r}{r-8}$

d.  $\frac{3}{r} = 0$

$$\text{e. } \frac{t+9}{t^2+15t+54} = 0$$

$$\text{g. } \frac{8}{x+6} - \frac{9}{x+9} = -\frac{9}{x^2+15x+54}$$

$$\text{f. } \frac{1}{y+2} + \frac{2}{y^2+2y} = \frac{1}{5}$$

$$\text{h. } -\frac{6}{r-3} + \frac{8r}{r+9} = -\frac{4}{r^2+6r-27}$$

2. Solve this equation for  $a$ :

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

3. Solve this equation for  $B$ :

$$\frac{1}{A} = \frac{8}{B+2}$$

4. Solve  $2x - \frac{1}{x+4} = \frac{3}{x+6}$  using GeoGebra.

5. Two pipes are being used to fill a tank. Pipe A can fill the tank 4.5 times as fast as Pipe B does. When both pipes are turned on, it takes 18 hours to fill the tank. How long would it take either pipe A to fill the tank alone? What about pipe B?

6. A boat travels from town A downriver 90 miles to town B. It stays overnight and then travels back to town A, taking 4 hours longer as it was now fighting the 3 mile-per-hour current. Supposing the boat used a constant motor speed, determine the boats still-water speed.

7. The winner of a 9 mi race finishes 14.73 minutes ahead of the second-place runner. On average, the winner ran 0.6 miles per hour faster than the second place runner. Find the average running speed of each runner.

8. It takes one employee 2.5 hours longer to mow a football field than it does a more experienced employee. Together they can mow the grass in 1.9 hours. How long does it take each person to mow the field alone?