

Solving Radical Equations

Solve each rational equation algebraically:

1. $\frac{x}{x+4} = -3$
 $x = -3x - 12$
 $12 = -4x$
 $x = -3$

2. $\frac{x}{2x-10} = 3$
 $x = 6x - 30$
 $30 = 5x$
 $x = 6$

3. $\frac{3}{3} \cdot \frac{9}{4x} - \frac{52x}{62x} = \frac{13}{12x}$
 $27 - 10x = -13$
 $40 = 10x$
 $x = 4$

4. $\frac{3(7)(x+1)}{x+1} + \frac{2(x+1)}{7} = \frac{2 \cdot 7(x+1)}{1(7(x+1))}$
 $21 + 2x + 2 = 2$
 $2x = -21$
 $x = -\frac{21}{2}$

5. $\frac{x^2 - 2x - 15}{(x-5)(x+3)} - \frac{6(x-5)(x+3)}{x+3} = \frac{7(x-5)(x+3)}{x-5}$

$56 - 6x + 30 = 7x + 21$

$65 = 13x$

$x = 5$

NO SOLUTION

8. $\frac{5 \cdot 3(x-2)(x-1)}{x^2 - 3x + 2} - \frac{1 \cdot 3(x-2)(x-1)}{x-2} = \frac{x+6}{3(x-1)}$

$15 - 3x + 3 = x^2 + 4x - 12$

$0 = x^2 + 7x - 30$

$0 = (x+10)(x-3)$

$x = -10, 3$

7. $\frac{5 \cdot 6(x+3)(x+4)}{2x+6} - \frac{1 \cdot 6(x+3)(x+4)}{6} = \frac{2 \cdot 6(x+3)(x+4)}{x+4}$

$15x + 60 - (x^2 + 7x + 12) = 2x + 36$

$3x + 24 = x^2 + 7x + 12$

$0 = x^2 + 4x - 12$

$0 = (x+6)(x-2)$

$x = -6, 2$

15. The time required to deliver and install a computer network at a customer's location is $t = 5 + \frac{2d}{r}$, where t is time in hours, d is the distance (in miles), from the warehouse to the customer's location, and r is the average speed of the delivery truck. If it takes 8.2 hours for an employee to deliver and install a network for a customer located 80 miles from the warehouse, what is the average speed of the delivery truck?

$$\frac{8.2}{1} = \frac{5}{1} + \frac{2(80)}{r} \cdot r \quad 3.2r = 160$$

$$\boxed{r = 50}$$

$$8.2r = 5r + 160$$

16. **Art** A glassblower can produce several sets of simple glasses in about 3 hours. When the glassblower works with an apprentice, the job takes about 2 hours. How long would it take the apprentice to make the same number of sets of glasses when working alone?

$$\frac{120x}{3} + \frac{100x}{x} = \frac{300x}{2} \quad 2x + 6 = 3x$$

$$\boxed{6 = x}$$

17. Kelsey is kayaking on a river. She travels 5 miles upstream and 5 miles downstream in a total of 6 hours. In still water, Kelsey can travel at an average speed of 3 miles per hour. What is the average speed of the river's current?

$$\frac{5}{3+r} + \frac{5}{3-r} = 6$$

$$6(9-r^2) = 15-5r + 15+5r$$

$$9-r^2 = 5$$

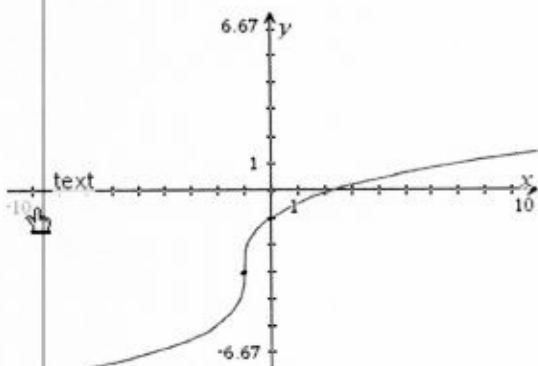
$$-r^2 = -4$$

$$r^2 = 4$$

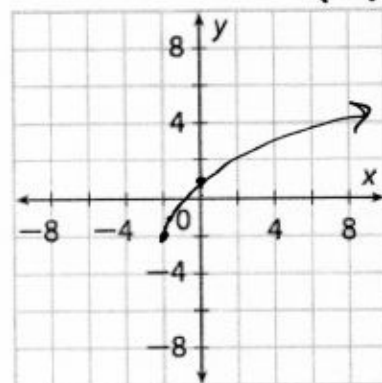
$$\boxed{r = 2 \text{ mph}}$$

Review

1. Write an equation to represent the graphed function



2. Graph the function $g(x) = \sqrt{5x+10} - 2$



$$\boxed{f(x) = 2\sqrt[3]{x+1} - 3}$$