

6.4 Rational Equations

Solving Rational Equations Solving an Equation for a Variable
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Solving Rational Equations*Exercises 1-5: Solve each equation and check your answer.*

1.
$$\frac{3}{4x} - \frac{5}{6x} = -\frac{3}{8}$$

1. _____

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

2. _____

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

3. _____

4.
$$\frac{1}{x-3} + \frac{2}{x+3} = \frac{6}{x^2-9}$$

4. _____

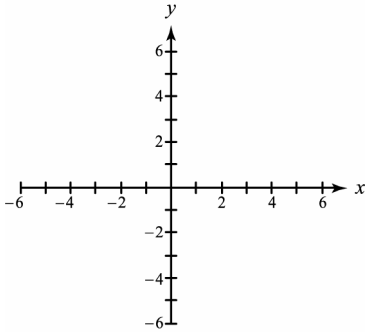
5.
$$\frac{6}{3b+2} = \frac{4}{2b-5}$$

5. _____

Exercises 6-10: Solve each equation graphically.

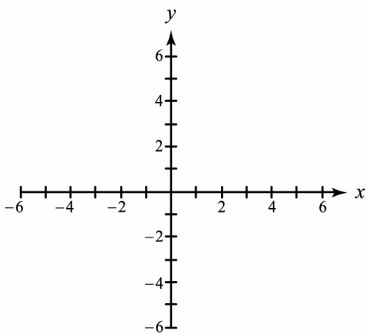
6. $\frac{1}{x-1} = \frac{1}{5}$

6. _____



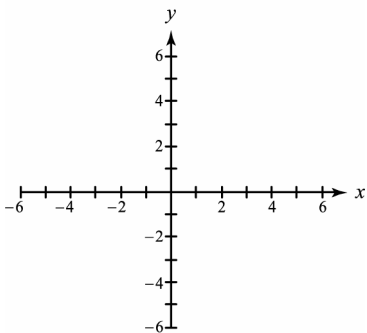
7. $\frac{1}{x+1} = -\frac{1}{2}$

7. _____



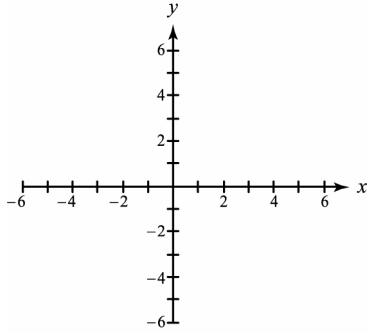
8. $\frac{5}{x-4} = x$

8. _____



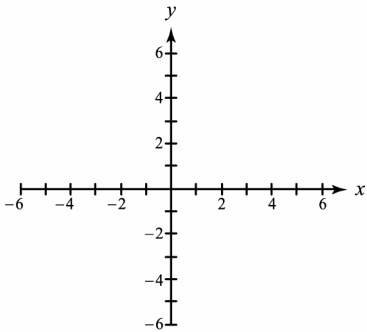
$$9. \frac{2}{x-3} = 2$$

9. _____



$$10. \frac{2}{x} = x + 1$$

10. _____



Exercises 11-20: Solve each equation and check your answer.

$$11. \frac{1}{3} + \frac{x}{5} = \frac{x}{6}$$

11. _____

$$12. \frac{2}{x-4} - 1 = \frac{x}{x-4}$$

12. _____

13.
$$\frac{-2}{x+2} - 3 = \frac{x}{x+2}$$

13. _____

14.
$$\frac{2}{x-1} = \frac{1}{x+1}$$

14. _____

15.
$$\frac{x}{x+3} - \frac{2}{x+3} = \frac{2x}{x+3}$$

15. _____

16.
$$\frac{1}{x} - \frac{1}{x^2} = \frac{3}{4}$$

16. _____

17.
$$\frac{x}{x+3} = \frac{2}{x+1}$$

17. _____

18.
$$\frac{a}{3-a} - \frac{2}{a+3} = \frac{12}{a^2-9}$$

18. _____

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

19. _____

20. $\frac{4}{x+3} = \frac{18}{x^2-9} - \frac{x}{x-3}$

20. _____

21. Suppose that customers are arriving randomly at a drive-in bank window. Tellers can serve x drivers per hour. If customers arrive at an average rate of 40 cars per hour, the average time T in minutes for each customer to wait to talk to a teller is given by the formula $T(x) = \frac{1}{x-40}$, where $x > 40$. How many customers per hour should the tellers serve to keep the average wait time to 0.5 minute?

21. _____

22. A pump can empty a tank in 10 hours. A second pump can empty the tank in 20 hours. How long will it take for both pumps working together to empty the tank?

22. _____

23. It takes one employee twice as long to complete a task as it does a more experienced employee. Together, they can complete the task in 2 hours. How long does it take for each employee, working alone, to complete the task? 23. _____

24. Two friends are training for a marathon. On a ten-mile run, one finishes 15 minutes ahead of the other. If her rate is 2 miles per hour faster, find the average speed of each runner. 24. _____

Solving an Equation for a Variable

Exercises 25-30: Solve for the specified variable.

25. $d = rt$ for t 25. _____

26. $P = VT$ for T 26. _____

27. $C = 2\pi r$ for r 27. _____

28. $P = 2L + 2W$ for L 28. _____

29. $r = \frac{a-b}{c}$ for b 29. _____

30. $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$ for R 30. _____