Division of fractions worksheet. Professor Luis Fernández

Reciprocal of a fraction

Remember: The reciprocal of a number a is the number b so that $a \cdot b = 1$.

Another way to say it: the reciprocal of a is $1 \div a$ (or, written differently, $\frac{1}{a}$).

And yet another way: the reciprocal of a fraction $\frac{p}{q}$ is the fraction $\frac{q}{p}$.

For example: the reciprocal of $\frac{5}{7}$ is $\frac{7}{5}$ because $\frac{5}{7} \cdot \frac{7}{5} = \frac{5 \cdot 7}{7 \cdot 5} = 1$.

Another example: the reciprocal of $\frac{1}{4}$ is 4 because $\frac{1}{4} \cdot 4 = \frac{4}{4} = 1$.

Another example: the reciprocal of 9 is $\frac{1}{9}$ because $9 \cdot \frac{1}{9} = \frac{9}{9} = 1$.

In the following exercises, find the reciprocal of the given number.

1. The reciprocal of $\frac{9}{4}$ is $\frac{4}{9}$ (ex.)

2. The reciprocal of $\frac{6}{7}$ is

3. The reciprocal of $\frac{3}{2}$ is

4. The reciprocal of $\frac{2}{5}$ is

5. The reciprocal of 7 is

6. The reciprocal of 3 is

7. The reciprocal of $\frac{34}{77}$ is

8. The reciprocal of 31 is

9. The reciprocal of $\frac{1}{8}$ is

10. The reciprocal of $\frac{11}{2}$ is

11. The reciprocal of $\frac{1}{9}$ is

12. The reciprocal of 12 is

13. The reciprocal of 1 is

14. The reciprocal of $\frac{1}{2}$ is

15. The reciprocal of 0 is

Division of fractions

Remember: To divide two fractions, change the division sign to a multiplication sign, then change the fraction after the division sign to its reciprocal. Then multiply as you did before. Make sure to leave the final answer in lowest terms.

Examples: $\frac{3}{4} \div \frac{5}{7} = \frac{3}{4} \cdot \frac{7}{5} = \frac{21}{20}$.

$\frac{1}{4} \div 3 = \frac{1}{4} \cdot \frac{1}{3} = \frac{1}{12}$.

$\frac{10}{9} \div \frac{5}{6} = \frac{10}{9} \cdot \frac{6}{5} = \frac{10 \cdot 6}{9 \cdot 5} = \frac{2 \cdot 2}{3 \cdot 1} = \frac{4}{3}$.

In the following exercises, change the division sign to a multiplication sign and change the fraction after the division sign to its reciprocal. **In this exercise, you do not need to multiply yet.**

16. $\frac{5}{6} \div \frac{9}{2} = \frac{5}{6} \cdot \frac{2}{9}$ (ex.)

17. $\frac{6}{5} \div \frac{7}{9} =$

18. $\frac{514}{67} \div \frac{22}{76} =$

19. $4 \div \frac{9}{2} =$

20. $7 \div \frac{6}{4} =$

21. $\frac{5}{6} \div 5 =$

22. $\frac{3}{4} \div 7 =$

23. $\frac{87}{565} \div 13 =$

24. $\frac{1}{3} \div \frac{1}{7} =$

25. $\frac{1}{64} \div \frac{1}{24} =$

26. $54 \div 23 =$

27. $\frac{52}{64} \div \frac{923}{24} =$

28. $\frac{3}{23} \div \frac{4}{22} =$

29. $\frac{2}{11} \div 23 =$

30. $52 \div \frac{13}{5} =$

In the following exercises, divide the fractions completely (that is, after you change the division into multiplication, multiply and simplify. Make sure to leave the final answer in lowest terms.

31. $\frac{3}{7} \div \frac{5}{2} =$ (ex.)

32. $\frac{6}{5} \div \frac{7}{9} =$

33. $\frac{5}{6} \div \frac{2}{9} =$

34. $4 \div \frac{4}{7} =$

35. $7 \div \frac{6}{4} =$

36. $\frac{5}{6} \div 5 =$

37. $\frac{3}{4} \div 7 =$

38. $\frac{8}{5} \div 4 =$

39. $\frac{1}{3} \div \frac{1}{7} =$

40. $\frac{1}{12} \div \frac{1}{6} =$

41. $54 \div 22 =$

42. $\frac{12}{7} \div \frac{4}{7} =$

43. $\frac{3}{5} \div \frac{4}{10} =$

44. $\frac{2}{5} \div 22 =$

45. $10 \div \frac{2}{5} =$

46. $\frac{12}{5} \div \frac{6}{25} =$

47. $\frac{4}{5} \div 4 =$

48. $12 \div \frac{4}{3} =$

49. $\frac{5}{2} \div \frac{5}{2} =$

50. $\frac{6}{5} \div 12 =$

51. $16 \div \frac{8}{3} =$

52. $15 \div 3 =$

53. $5 \div 20 =$

54. $6 \div \frac{6}{7} =$

Fraction notation

The symbol '÷' is rarely used in algebra. Rather, one uses the fraction bar to denote division. For example, generally one does not write $8 \div 4$ but $\frac{8}{4}$.

In this way the exercises above would look like $\dfrac{\frac{2}{3}}{\frac{5}{7}}$ instead of $\frac{2}{3} \div \frac{5}{7}$. But it works the same way: remove the BIG fraction sign and multiply the fraction above the big fraction sign by the reciprocal of the fraction below the big fraction sign:

$$\frac{\frac{2}{3}}{\frac{5}{7}} = \frac{2}{3} \cdot \frac{7}{5} = \frac{14}{15}.$$

In the following exercises, divide the fractions completely (that is, after you change the division into multiplication, multiply and simplify. Make sure to leave the final answer in lowest terms.

55. $\dfrac{\frac{6}{5}}{\frac{2}{7}} =$

56. $\dfrac{\frac{4}{9}}{\frac{5}{9}} =$

57. $\dfrac{\frac{6}{5}}{\frac{12}{5}} =$

58. $\dfrac{\frac{3}{4}}{\frac{3}{4}} =$

59. $\dfrac{\frac{7}{2}}{6} =$

60. $\dfrac{10}{\frac{5}{4}} =$

61. $\dfrac{\frac{6}{5}}{\frac{3}{10}} =$

62. $\dfrac{\frac{16}{5}}{16} =$

63. $\dfrac{10}{\frac{10}{7}} =$