NAME

Module 1 Getting Ready for Algebra
Lesson 3 Simplifying Expressions with Rational Numbers

Simplify each expression.

1. $\frac{2}{5} + \frac{2}{3}$ **$\frac{16}{15}$ or $1\frac{1}{15}$**

2. $\frac{3}{4} + \frac{1}{2}$ **$\frac{5}{4}$ or $1\frac{1}{4}$**

3. $\frac{5}{9} + \frac{5}{6}$ **$\frac{25}{18}$ or $1\frac{7}{18}$**

4. $\frac{2}{3} + \frac{3}{5}$ **$\frac{19}{15}$ or $1\frac{4}{15}$**

5. $\frac{5}{8} + \frac{3}{4}$ **$\frac{11}{8}$ or $1\frac{3}{8}$**

6. $\frac{1}{2} - \frac{1}{5}$ **$\frac{3}{10}$**

7. $\frac{5}{7} - \frac{2}{3}$ **$\frac{1}{21}$**

8. $\frac{3}{5} - \frac{6}{7}$ **$-\frac{9}{35}$**

9. $\frac{4}{7} - \frac{1}{2}$ **$\frac{1}{14}$**

10. $\frac{2}{5} - \frac{2}{3}$ **$-\frac{4}{15}$**

11. $\left(-\frac{2}{5}\right)\left(-\frac{15}{16}\right)$ **$\frac{3}{8}$**

12. $\left(\frac{4}{9}\right)\left(-\frac{9}{16}\right)$ **$-\frac{1}{4}$**

13. $\frac{25}{36} \times \frac{3}{5}$ **$\frac{5}{12}$**

14. $-\frac{1}{3} \times -\frac{15}{17}$ **$-\frac{5}{17}$**

15. $12 \times \frac{3}{4}$ **9**

16. $\frac{1}{3} \div \frac{1}{4}$ **$\frac{4}{3}$ or $1\frac{1}{3}$**

17. $\frac{2}{3} \div \frac{4}{9}$ **$\frac{3}{2}$ or $1\frac{1}{2}$**

18. $-\frac{7}{11} \div \frac{5}{22}$ **$-\frac{14}{5}$ or $-2\frac{4}{5}$**

19. $-1 \div \frac{5}{7}$ **$-\frac{7}{5}$ or $-1\frac{2}{5}$**

20. $9 \div -\frac{4}{5}$ **$-\frac{45}{4}$ or $-11\frac{1}{4}$**

21. 2.7 + 0.03 **2.73**

22. 6.97 + 5.46 **12.43**

23. –6.9 + 2.41 **–4.49**

24. 3.72 + (–5.3) **–1.58**

25. –0.14 + (–3.5) **–3.64**

26. 12.98 – 2.75 **10.23**

27. –4.8 – (–2.03) **–2.77**

28. 14 – (–2.5) **16.5**

29. 0.24 – 6 **–5.76**

30. 5.136 – (–3.1) **8.236**

31. (5.7)(0.1) **0.57**

32. (–3.12)(–2.5) **7.8**

33. (–7)(1.03) **–7.21**

34. (0.25)(9) **2.25**

35. (0.6)(–8.91) **–5.346**

36. $7\overline{)8.82}$ **1.26**

37. $0.3\overline{)9.15}$ **30.5**

38. 27.35 ÷ 2.5 **10.94**

39. –34.612 ÷ 17 **–2.036**

40. –2.356 ÷ –0.02 **117.8**

Journal

1. What is the definition of a rational number? What types of decimal numbers are rational numbers? What integers are rational numbers?
2. If two numbers between 0 and 1 are multiplied, how does the product compare with those numbers? If a number between 0 and 1 is divided by another number between 0 and 1, how does the quotient compare with the first number?
3. Compare and contrast adding integers with adding fractions.
4. Susan says to multiply $\frac{4}{15} \times \frac{5}{8}$, you multiply numerator times numerator and denominator times denominator, producing $\frac{20}{120}$, and then simplify. Kevin says to divide 4 and 8 each by 4, and divide 5 and 15 each by 5, and then multiply numerators and denominators. Who is correct? Explain your answer.
5. For what type of rational numbers would it be impossible to get an exact product or quotient using decimal forms? Explain how to get an exact product or quotient for such numbers.

Cumulative Review

Write each quantity as a decimal.

1. 38%	**2.** 112%	**3.** 7%	**4.** 0.24%	**5.** 5.325%
0.38	**1.12**	**0.07**	**0.0024**	**0.05325**

Write each quantity as a percent.

6. 0.27	**7.** 0.02	**8.** 9.3	**9.** 0.015	**10.** 1
27%	**2%**	**930%**	**1.5%**	**100%**

Possible Journal Responses

1. **A rational number is a number that can be written as the ratio of two integers, $\frac{a}{b}$, where b is nonzero. Terminating decimals and repeating decimals are rational numbers. All integers are rational numbers.**
2. **The product is less than either number. For example, $\frac{2}{3} \times \frac{1}{2} = \frac{1}{3}$.**
   The quotient is greater than the first number. For example, $\frac{2}{3} \div \frac{1}{2} = \frac{2}{3} \cdot \frac{2}{1} = \frac{4}{3} = 1\frac{1}{3}$.
3. **Finding the sign of the sum is the same for adding fractions as it is for adding integers. If the signs of the two addends are the same, add the absolute values of the numbers and take the sign of the addends. If the signs of the addends are different, subtract the absolute values of the addends and take the sign of the addend with the greater absolute value. Adding fractions is different than adding integers in that it requires finding a least common denominator of the addends.**
4. **They are both correct. Multiplying first results in $\frac{20}{120}$, which simplifies to $\frac{1}{6}$. Simplifying first results in $\frac{1}{3} \cdot \frac{1}{2} = \frac{1}{6}$. Simplifying first has the advantage of making the numbers smaller.**
   Susan's way: $\frac{4}{15} \times \frac{5}{8} = \frac{20}{120} = \frac{1}{6}$.
   Kevin's way: $\frac{4}{15} \times \frac{5}{8} = \frac{1\,\cancel{4}}{3\,\cancel{15}} \times \frac{1\,\cancel{5}}{2\,\cancel{8}} = \frac{1}{6}$.
5. **It would be impossible to get an exact product or quotient if the decimal forms of the rational numbers are repeating decimals. To get an exact product or quotient for such numbers, you would need to use their fractional forms. For example, $\frac{1}{3} \cdot \frac{1}{6} = \frac{1}{18}$ and $\frac{1}{3} \div \frac{7}{6} = \frac{1}{3} \cdot \frac{6}{7} = \frac{2}{7}$.**