

EXERCISE SET 5.3 ●●●●●

• Practice Exercises

In Exercises 1–12, reduce each rational number to its lowest terms.

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| 1. $\frac{10}{15}$ | 2. $\frac{18}{45}$ | 3. $\frac{15}{18}$ | 4. $\frac{16}{64}$ |
| 5. $\frac{24}{42}$ | 6. $\frac{32}{80}$ | 7. $\frac{60}{108}$ | 8. $\frac{112}{128}$ |
| 9. $\frac{342}{380}$ | 10. $\frac{210}{252}$ | 11. $\frac{308}{418}$ | 12. $\frac{144}{300}$ |

In Exercises 13–18, convert each mixed number to an improper fraction.

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| 13. $2\frac{3}{8}$ | 14. $2\frac{7}{9}$ | 15. $-7\frac{3}{5}$ |
| 16. $-6\frac{2}{5}$ | 17. $12\frac{7}{16}$ | 18. $11\frac{5}{16}$ |

In Exercises 19–24, convert each improper fraction to a mixed number.

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| 19. $\frac{23}{5}$ | 20. $\frac{47}{8}$ | 21. $-\frac{76}{9}$ |
| 22. $-\frac{59}{9}$ | 23. $\frac{711}{20}$ | 24. $\frac{788}{25}$ |

In Exercises 25–36, express each rational number as a decimal.

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| 25. $\frac{3}{4}$ | 26. $\frac{3}{5}$ | 27. $\frac{7}{20}$ | 28. $\frac{3}{20}$ |
| 29. $\frac{7}{8}$ | 30. $\frac{5}{16}$ | 31. $\frac{9}{11}$ | 32. $\frac{3}{11}$ |
| 33. $\frac{22}{7}$ | 34. $\frac{20}{3}$ | 35. $\frac{2}{7}$ | 36. $\frac{5}{7}$ |

In Exercises 37–48, express each terminating decimal as a quotient of integers. If possible, reduce to lowest terms.

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| 37. 0.3 | 38. 0.9 | 39. 0.4 | 40. 0.6 |
| 41. 0.39 | 42. 0.59 | 43. 0.82 | 44. 0.64 |
| 45. 0.725 | 46. 0.625 | 47. 0.5399 | 48. 0.7006 |

In Exercises 49–56, express each repeating decimal as a quotient of integers. If possible, reduce to lowest terms.

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| 49. $0.\overline{7}$ | 50. $0.\overline{1}$ | 51. $0.\overline{9}$ | 52. $0.\overline{3}$ |
| 53. $0.\overline{36}$ | 54. $0.\overline{81}$ | 55. $0.\overline{257}$ | 56. $0.\overline{529}$ |

In Exercises 57–92, perform the indicated operations. If possible, reduce the answer to its lowest terms.

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| 57. $\frac{3}{8} \cdot \frac{7}{11}$ | 58. $\frac{5}{8} \cdot \frac{3}{11}$ | 59. $(-\frac{1}{10})(\frac{7}{12})$ |
| 60. $(-\frac{1}{8})(\frac{5}{9})$ | 61. $(-\frac{2}{3})(-\frac{9}{4})$ | 62. $(-\frac{5}{4})(-\frac{6}{7})$ |
| 63. $(3\frac{3}{4})(1\frac{3}{5})$ | 64. $(2\frac{4}{5})(1\frac{1}{4})$ | 65. $\frac{5}{4} \div \frac{3}{8}$ |
| 66. $\frac{5}{8} \div \frac{4}{3}$ | 67. $-\frac{7}{8} \div \frac{15}{16}$ | 68. $-\frac{13}{20} \div \frac{4}{5}$ |
| 69. $6\frac{3}{5} \div 1\frac{1}{10}$ | 70. $1\frac{3}{4} \div 2\frac{5}{8}$ | 71. $\frac{2}{11} + \frac{3}{11}$ |
| 72. $\frac{5}{13} + \frac{2}{13}$ | 73. $\frac{5}{6} - \frac{1}{6}$ | 74. $\frac{7}{12} - \frac{5}{12}$ |
| 75. $\frac{7}{12} - (-\frac{1}{12})$ | 76. $\frac{5}{16} - (-\frac{5}{16})$ | 77. $\frac{1}{2} + \frac{1}{5}$ |
| 78. $\frac{1}{3} + \frac{1}{5}$ | 79. $\frac{3}{4} + \frac{3}{20}$ | 80. $\frac{2}{5} + \frac{2}{15}$ |
| 81. $\frac{5}{24} + \frac{7}{30}$ | 82. $\frac{7}{108} + \frac{55}{144}$ | 83. $\frac{13}{18} - \frac{2}{9}$ |
| 84. $\frac{13}{15} - \frac{2}{45}$ | 85. $\frac{4}{3} - \frac{3}{4}$ | 86. $\frac{3}{2} - \frac{2}{3}$ |
| 87. $\frac{1}{15} - \frac{27}{50}$ | 88. $\frac{4}{15} - \frac{1}{6}$ | 89. $3\frac{3}{4} - 2\frac{1}{3}$ |
| 90. $3\frac{2}{3} - 2\frac{1}{2}$ | 91. $(\frac{1}{2} - \frac{1}{3}) \div \frac{5}{8}$ | 92. $(\frac{1}{2} + \frac{1}{4}) \div (\frac{1}{2} + \frac{1}{3})$ |

In Exercises 93–98, find a rational number halfway between two numbers in each pair.

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| 93. $\frac{1}{4}$ and $\frac{1}{3}$ | 94. $\frac{2}{3}$ and $\frac{5}{6}$ | 95. $\frac{1}{2}$ and $\frac{2}{3}$ |
| 96. $\frac{3}{5}$ and $\frac{2}{3}$ | 97. $-\frac{2}{3}$ and $-\frac{5}{6}$ | 98. -4 and $-\frac{7}{2}$ |

Different operations with the same rational numbers usually result in different answers. Exercises 99–100 illustrate some curious exceptions.

99. Show that $\frac{13}{4} + \frac{13}{9}$ and $\frac{13}{4} \times \frac{13}{9}$ give the same answer.
 100. Show that $\frac{169}{30} + \frac{13}{15}$ and $\frac{169}{30} \div \frac{13}{15}$ give the same answer.

• Practice Plus

In Exercises 101–106, perform the indicated operations. If possible, reduce the answer to its lowest terms.

$$101. -\frac{9}{4}\left(\frac{1}{2}\right) + \frac{3}{4} \div \frac{5}{6}$$

$$102. \left[-\frac{4}{7} - \left(-\frac{2}{5}\right)\right] \left[-\frac{3}{8} + \left(-\frac{1}{9}\right)\right]$$

$$103. \frac{\frac{7}{9} - 3}{\frac{5}{6}} \div \frac{3}{2} + \frac{3}{4}$$

$$104. \frac{\frac{17}{25}}{\frac{3}{5} - 4} \div \frac{1}{5} + \frac{1}{2}$$

$$105. \frac{1}{4} - 6(2 + 8) \div \left(-\frac{1}{3}\right)\left(-\frac{1}{9}\right)$$

$$106. \frac{3}{4} - 4(2 + 7) \div \left(-\frac{1}{2}\right)\left(-\frac{1}{6}\right)$$

In Exercises 107–110, perform the indicated operations. Leave denominators in prime factorization form.

$$107. \frac{5}{2^2 \cdot 3^2} - \frac{1}{2 \cdot 3^2} \qquad 108. \frac{7}{3^2 \cdot 5^2} - \frac{1}{3 \cdot 5^3}$$

$$109. \frac{1}{2^4 \cdot 5^3 \cdot 7} + \frac{1}{2 \cdot 5^4} - \frac{1}{2^3 \cdot 5^2}$$

$$110. \frac{1}{2^3 \cdot 17^8} + \frac{1}{2 \cdot 17^9} - \frac{1}{2^2 \cdot 3 \cdot 17^8}$$

In Exercises 111–114, express each rational number as a decimal. Then insert either $<$ or $>$ in the shaded area between the rational numbers to make the statement true.

$$111. \frac{6}{11} \begin{array}{c} \blacksquare \\ \blacksquare \\ \blacksquare \end{array} \frac{7}{12} \qquad 112. \frac{29}{36} \begin{array}{c} \blacksquare \\ \blacksquare \\ \blacksquare \end{array} \frac{28}{35}$$

$$113. -\frac{5}{6} \begin{array}{c} \blacksquare \\ \blacksquare \\ \blacksquare \end{array} -\frac{8}{9} \qquad 114. -\frac{1}{125} \begin{array}{c} \blacksquare \\ \blacksquare \\ \blacksquare \end{array} -\frac{3}{500}$$