

11. $-15 - 12 = -27$

12. $-15 - (-12) = -15 + 12 = -3$

13. $25 + |-75| = 25 + 75 = 100$

14. $-6(10) = -60$

15. $\frac{-45}{-3} = 15$

16. $\frac{-24}{6} = -4$

17. $513,200 + 136,500 + (-97,750) + (-101,500) = 450,450$

The total profit for the year \$450,450.

18. $(8)(4)(4) = 128$

There are 128 cubic feet in a cord of wood.

19. $90 \div 6 = 15$

Each piece of rope is 15 feet long.

20. The statement is false.

Possible changes:

The sum of two integers is *negative*.

The sum of two *positive* integers is positive.

The *product* of two negative integers is positive.

The *quotient* of two negative integers is positive.

Section 1.3 Operations with Rational Numbers

1. By prime factorization, $20 = 2 \cdot 2 \cdot 5$ and $45 = 3 \cdot 3 \cdot 5$. Thus, the greatest common factor is 5.

3. By prime factorization, $28 = 2 \cdot 2 \cdot 7$ and $52 = 2 \cdot 2 \cdot 13$. Thus, the greatest common factor is $2 \cdot 2$, or 4.

5. By prime factorizing, $18 = 2 \cdot 3 \cdot 3$, $84 = 2 \cdot 2 \cdot 3 \cdot 7$, and $90 = 2 \cdot 3 \cdot 3 \cdot 5$. Thus, the greatest common factor is $2 \cdot 3$, or 6.

7. By prime factorization, $240 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$, $300 = 2 \cdot 2 \cdot 3 \cdot 5 \cdot 5$, and $360 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5$. Thus, the greatest common factor is $2 \cdot 2 \cdot 3 \cdot 5$ or 60.

9. By prime factorizing, $134 = 2 \cdot 67$, $225 = 3 \cdot 3 \cdot 5 \cdot 5$, $315 = 3 \cdot 3 \cdot 5 \cdot 7$, and $945 = 3 \cdot 3 \cdot 3 \cdot 5 \cdot 7$. Because there are no common prime factors, the greatest common factor is 1.

11. $\frac{2}{8} = \frac{(1)(\cancel{2})}{(4)(\cancel{2})} = \frac{1}{4}$

13. $\frac{12}{18} = \frac{2(\cancel{6})}{3(\cancel{6})} = \frac{2}{3}$

15. $\frac{60}{192} = \frac{(5)(\cancel{12})}{(16)(\cancel{12})} = \frac{5}{16}$

Note: This reducing could be done using several steps, such as the following.

$$\frac{60}{192} = \frac{(30)(\cancel{2})}{(96)(\cancel{2})} = \frac{(10)(\cancel{3})}{(32)(\cancel{3})} = \frac{(5)(\cancel{2})}{(16)(\cancel{2})} = \frac{5}{16}$$

17. $\frac{28}{350} = \frac{2(\cancel{14})}{25(\cancel{14})} = \frac{2}{25}$

19. $\frac{1}{5} + \frac{2}{5} = \frac{1+2}{5} = \frac{3}{5}$

21. $\frac{2}{10} + \frac{4}{10} = \frac{2+4}{10} = \frac{6}{10} = \frac{(3)(\cancel{2})}{(5)(\cancel{2})} = \frac{3}{5}$

23. $\frac{7}{15} + \frac{2}{15} = \frac{7+2}{15} = \frac{9}{15} = \frac{(3)(\cancel{3})}{(5)(\cancel{3})} = \frac{3}{5}$

$$25. \frac{9}{11} + \frac{5}{11} = \frac{9+5}{11} = \frac{14}{11}$$

$$27. \frac{9}{16} - \frac{3}{16} = \frac{9}{16} + \frac{-3}{16} \\ = \frac{9+(-3)}{16} = \frac{6}{16} = \frac{(3)(2)}{(8)(2)} = \frac{3}{8}$$

Note: This problem can also be written as follows.

$$\frac{9}{16} - \frac{3}{16} = \frac{9-3}{16} = \frac{6}{16} = \frac{(3)(2)}{(8)(2)} = \frac{3}{8}$$

$$29. \frac{-23}{11} + \frac{12}{11} = \frac{-11}{11} \\ = -1$$

$$31. \frac{3}{4} - \frac{5}{4} = \frac{3}{4} + \frac{-5}{4} = \frac{3+(-5)}{4} = \frac{-2}{4} = -\frac{(1)(2)}{(2)(2)} = -\frac{1}{2}$$

$$33. \frac{13}{15} + \left| -\frac{11}{15} \right| - \frac{4}{15} = \frac{13}{15} + \frac{11}{15} - \frac{4}{15} \\ = \frac{20}{15} = \frac{4(\cancel{5})}{3(\cancel{5})} = \frac{4}{3}$$

$$35. \frac{3}{8} = \frac{3(2)}{8(2)} = \frac{6}{16}$$

37. Write the original fraction in simplest form, and then find an equivalent fraction with the indicated denominator.

$$\frac{6}{15} = \frac{2(\cancel{3})}{5(\cancel{3})} = \frac{2}{5} = \frac{2(5)}{5(5)} = \frac{10}{25}$$

You could do both steps at once by multiplying numerator and denominator by $\frac{5}{3}$.

$$\frac{6}{15} = \frac{6(\frac{5}{3})}{15(\frac{5}{3})} = \frac{10}{25}$$

$$39. \frac{1}{2} + \frac{1}{3} = \frac{1(3)}{2(3)} + \frac{1(2)}{3(2)} \\ = \frac{3}{6} + \frac{2}{6} = \frac{3+2}{6} = \frac{5}{6}$$

$$41. \frac{1}{4} - \frac{1}{3} = \frac{1(3)}{4(3)} - \frac{1(4)}{3(4)} \\ = \frac{3}{12} - \frac{4}{12} = -\frac{1}{12}$$

$$43. \frac{3}{16} + \frac{3}{8} = \frac{3}{16} + \frac{3(2)}{8(2)} \\ = \frac{3}{16} + \frac{6}{16} = \frac{3+6}{16} = \frac{9}{16}$$

$$45. -\frac{1}{8} - \frac{1}{6} = \frac{-1}{8} - \frac{1}{6} \\ = \frac{-1(3)}{8(3)} - \frac{1(4)}{6(4)} \\ = \frac{-3}{24} - \frac{4}{24} \\ = \frac{-3-4}{24} \\ = \frac{-7}{24} = -\frac{7}{24}$$

$$47. 4 - \frac{8}{3} = \frac{4}{1} + \frac{-8}{3} \\ = \frac{4(3)}{1(3)} + \frac{-8}{3} \\ = \frac{12}{3} + \frac{-8}{3} \\ = \frac{12+(-8)}{3} \\ = \frac{4}{3}$$

$$49. -\frac{7}{8} - \frac{5}{6} = -\frac{7(3)}{8(3)} - \frac{5(4)}{6(4)} \\ = -\frac{21}{24} - \frac{20}{24} \\ = -\frac{41}{24}$$

$$51. -\frac{5}{6} - \left(-\frac{3}{4}\right) = -\frac{5}{6} + \frac{3}{4} \\ = -\frac{5(2)}{6(2)} + \frac{3(3)}{4(3)} \\ = -\frac{10}{12} + \frac{9}{12} = -\frac{1}{12}$$

$$53. \frac{5}{12} - \frac{3}{8} + \frac{5}{16} = \frac{5(4)}{12(4)} - \frac{3(6)}{8(6)} + \frac{5(3)}{16(3)} \\ = \frac{20}{48} - \frac{18}{48} + \frac{15}{48} \\ = \frac{17}{48}$$

$$\begin{aligned}
 55. \quad 2 - \frac{25}{6} + \frac{3}{4} &= \frac{2(12)}{1(12)} - \frac{25(2)}{6(2)} + \frac{3(3)}{4(3)} \\
 &= \frac{24}{12} - \frac{50}{12} + \frac{9}{12} \\
 &= \frac{24 - 50 + 9}{12} \\
 &= -\frac{17}{12}
 \end{aligned}$$

$$\begin{aligned}
 57. \quad 1 + \frac{2}{3} - \frac{5}{6} &= \frac{1}{1} + \frac{2}{3} + \frac{-5}{6} \\
 &= \frac{1(6)}{1(6)} + \frac{2(2)}{3(2)} + \frac{-5}{6} \\
 &= \frac{6}{6} + \frac{4}{6} + \frac{-5}{6} \\
 &= \frac{6 + 4 + (-5)}{6} \\
 &= \frac{5}{6}
 \end{aligned}$$

$$59. \quad 4\frac{3}{5} = \frac{4(5) + 3}{5} = \frac{23}{5}$$

$$61. \quad 3\frac{7}{10} = \frac{3(10) + 7}{10} = \frac{37}{10}$$

$$\begin{aligned}
 63. \quad 8\frac{2}{3} &= \frac{8(3) + 2}{3} \\
 &= \frac{26}{3}
 \end{aligned}$$

$$\begin{aligned}
 65. \quad -10\frac{5}{11} &= -\frac{10(11) + 5}{11} \\
 &= -\frac{115}{11}
 \end{aligned}$$

$$\begin{aligned}
 67. \quad 3\frac{1}{2} + 5\frac{2}{3} &= \frac{3(2) + 1}{2} + \frac{5(3) + 2}{3} \\
 &= \frac{7}{2} + \frac{17}{3} \\
 &= \frac{7(3)}{2(3)} + \frac{17(2)}{3(2)} \\
 &= \frac{21}{6} + \frac{34}{6} \\
 &= \frac{21 + 34}{6} \\
 &= \frac{55}{6}
 \end{aligned}$$

$$\begin{aligned}
 69. \quad 1\frac{3}{16} - 2\frac{1}{4} &= \frac{9}{16} - \frac{9}{4} \\
 &= \frac{9}{16} - \frac{9(4)}{4(4)} \\
 &= \frac{9}{16} - \frac{36}{16} \\
 &= \frac{9 - 36}{16} \\
 &= \frac{-17}{16} \\
 &= -\frac{17}{16}
 \end{aligned}$$

$$\begin{aligned}
 71. \quad 15\frac{5}{6} - 20\frac{1}{4} &= \frac{15(6) + 5}{6} - \frac{20(4) + 1}{4} \\
 &= \frac{95}{6} - \frac{81}{4} \\
 &= \frac{95(2)}{6(2)} - \frac{81(3)}{4(3)} \\
 &= \frac{190}{12} - \frac{243}{12} \\
 &= -\frac{53}{12}
 \end{aligned}$$

$$\begin{aligned}
 73. \quad -5\frac{2}{3} - 4\frac{5}{12} &= -\frac{17}{3} - \frac{53}{12} \\
 &= -\frac{17(4)}{3(4)} - \frac{53}{12} \\
 &= -\frac{68}{12} - \frac{53}{12} \\
 &= \frac{-68 - 53}{12} \\
 &= \frac{-121}{12} \\
 &= -\frac{121}{12}
 \end{aligned}$$

$$75. 1 - \frac{3}{10} - \frac{2}{5} = \frac{1}{1} - \frac{3}{10} - \frac{2}{5}$$

$$= \frac{1(10)}{1(10)} - \frac{3}{10} - \frac{2(2)}{5(2)} = \frac{10}{10} - \frac{3}{10} - \frac{4}{10} = \frac{10 - 3 - 4}{10} = \frac{3}{10}$$

Note: This problem could also be worked in two steps. First, add the two known fractions.

$$\frac{3}{10} + \frac{2}{5} = \frac{3}{10} + \frac{2(2)}{5(2)} = \frac{3}{10} + \frac{4}{10} = \frac{3 + 4}{10} = \frac{7}{10}$$

Then subtract the sum from 1.

$$1 - \frac{7}{10} = \frac{1}{1} - \frac{7}{10} = \frac{1(10)}{1(10)} - \frac{7}{10} = \frac{10}{10} - \frac{7}{10} = \frac{10 - 7}{10} = \frac{3}{10}$$

$$77. \frac{1}{2} \times \frac{3}{4} = \frac{1 \cdot 3}{2 \cdot 4} = \frac{3}{8}$$

$$79. \frac{2}{3} \left(-\frac{9}{16} \right) = -\frac{2 \cdot 9}{3 \cdot 16} = -\frac{\cancel{2}(3)\cancel{3}}{\cancel{3}(8)(2)} = -\frac{3}{8}$$

Note: The reducing could also be written this way.

$$\frac{2}{3} \left(-\frac{9}{16} \right) = -\frac{\overset{1}{\cancel{2}} \cdot \overset{3}{\cancel{9}}}{\underset{1}{\cancel{3}} \cdot \underset{8}{\cancel{16}}} = -\frac{3}{8}$$

$$81. \left(-\frac{7}{16} \right) \left(-\frac{12}{5} \right) = \frac{7}{16} \cdot \frac{12}{5}$$

$$= \frac{7 \cdot 12}{16 \cdot 5}$$

$$= \frac{(7)(3)\cancel{4}}{\cancel{4}(4)(5)} = \frac{21}{20}$$

$$83. \left(-\frac{3}{2} \right) \left(-\frac{15}{16} \right) \left(\frac{12}{25} \right) = \frac{3}{2} \cdot \frac{15}{16} \cdot \frac{12}{25} = \frac{3 \cdot 15 \cdot 12}{2 \cdot 16 \cdot 25}$$

$$= \frac{(3)\cancel{5}(3)\cancel{4}(3)}{(2)\cancel{4}(4)\cancel{5}(5)} = \frac{27}{40}$$

Note: The reducing could also be written this way.

$$\left(-\frac{3}{2} \right) \left(-\frac{5}{16} \right) \left(\frac{12}{25} \right) = \frac{3}{2} \cdot \frac{15}{16} \cdot \frac{12}{25} = \frac{\overset{3}{3} \cdot \overset{3}{\cancel{15}} \cdot \overset{3}{\cancel{12}}}{\underset{4}{2} \cdot \underset{4}{\cancel{16}} \cdot \underset{5}{\cancel{25}}} = \frac{27}{40}$$

$$85. \left(\frac{11}{12} \right) \left(-\frac{9}{44} \right) = -\frac{11(9)}{12(44)}$$

$$= -\frac{\cancel{11}(3)(3)}{(4)\cancel{3}(4)\cancel{11}}$$

$$= -\frac{3}{16}$$

$$87. 9 \left(\frac{4}{15} \right) = \frac{9(4)}{1(15)}$$

$$= \frac{\cancel{3}(3)(4)}{\cancel{3}(5)}$$

$$= \frac{12}{5}$$

$$89. \left(-\frac{3}{11} \right) \left(-\frac{11}{3} \right) = \frac{(-3)(-11)}{(11)(3)}$$

$$= \frac{33}{33}$$

$$= 1$$

$$91. 2\frac{3}{4} \times 3\frac{2}{3} = \left(\frac{11}{4} \right) \left(\frac{11}{3} \right) = \frac{121}{12}$$

$$93. 2\frac{4}{5} \times 6\frac{2}{3} = \frac{14}{5} \cdot \frac{20}{3}$$

$$= \frac{14(20)}{5(3)}$$

$$= \frac{14\cancel{5}(4)}{\cancel{5}(3)}$$

$$= \frac{56}{3}$$

95. The reciprocal of 7 is $\frac{1}{7}$.

$$7 \left(\frac{1}{7} \right) = \frac{7}{1} \left(\frac{1}{7} \right) = \frac{7}{7} = 1$$

97. The reciprocal of $\frac{4}{7}$ is $\frac{7}{4}$.

$$\frac{4}{7}\left(\frac{7}{4}\right) = \frac{28}{28} = 1$$

$$\begin{aligned} 99. \quad \frac{3}{8} \div \frac{3}{4} &= \frac{3}{8} \cdot \frac{4}{3} = \frac{3 \cdot 4}{8 \cdot 3} \\ &= \frac{\cancel{3}(1)\cancel{4}}{(2)\cancel{4}\cancel{3}} = \frac{1}{2} \end{aligned}$$

$$\begin{aligned} 101. \quad -\frac{5}{12} \div \frac{45}{32} &= -\frac{5}{12} \cdot \frac{32}{45} \\ &= -\frac{5 \cdot 32}{12 \cdot 45} \\ &= -\frac{\cancel{5}(8)\cancel{4}}{(3)\cancel{4}(9)\cancel{5}} \\ &= -\frac{8}{27} \end{aligned}$$

103. $\frac{3}{5} \div 0$ is undefined.

Division by zero is undefined.

$$\begin{aligned} 105. \quad -10 \div \frac{1}{9} &= -\frac{10}{1} \cdot \frac{9}{1} \\ &= -\frac{90}{1} \\ &= -90 \end{aligned}$$

$$\begin{aligned} 107. \quad \frac{-7/15}{-14/25} &= -\frac{7}{15} \div \left(-\frac{14}{25}\right) \\ &= -\frac{7}{15} \cdot \left(-\frac{25}{14}\right) \\ &= \frac{7(25)}{15(14)} \\ &= \frac{7\cancel{5}(5)}{\cancel{5}(3)\cancel{7}(2)} \\ &= \frac{5}{6} \end{aligned}$$

$$\begin{aligned} 109. \quad \frac{-5}{15/16} &= -\frac{5}{1} \div \frac{15}{16} \\ &= -\frac{5}{1} \cdot \frac{16}{15} \\ &= -\frac{5 \cdot 16}{1 \cdot 15} \\ &= \frac{\cancel{5}(16)}{(1)(3)\cancel{5}} \\ &= -\frac{16}{3} \end{aligned}$$

$$\begin{aligned} 111. \quad 3\frac{3}{4} \div 1\frac{1}{2} &= \frac{15}{4} \div \frac{3}{2} \\ &= \frac{15}{4} \cdot \frac{2}{3} \\ &= \frac{15(2)}{4(3)} \\ &= \frac{5\cancel{3}(2)}{(2)\cancel{2}\cancel{3}} \\ &= \frac{5}{2} \end{aligned}$$

$$\begin{aligned} 113. \quad 3\frac{3}{4} \div 2\frac{5}{8} &= \frac{15}{4} \div \frac{21}{8} \\ &= \frac{15}{4} \cdot \frac{8}{21} \\ &= \frac{5\cancel{3}\cancel{4}(2)}{\cancel{4}\cancel{3}(7)} \\ &= \frac{10}{7} \end{aligned}$$

115. $\frac{3}{4} = 0.75$

$$\begin{array}{r} .75 \\ 4 \overline{)3.0} \\ \underline{28} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

117. $\frac{9}{16} = 0.5625$

$$\begin{array}{r} .5625 \\ 16 \overline{)9.0000} \\ \underline{80} \\ 100 \\ \underline{96} \\ 40 \\ \underline{32} \\ 80 \\ \underline{80} \\ 0 \end{array}$$

119. $\frac{2}{3} = 0.\bar{6}$

$$\begin{array}{r} .666 \dots = 0.\bar{6} \\ 3 \overline{)2.000} \\ \underline{18} \\ 20 \\ \underline{18} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

121. $\frac{7}{12} = 0.58\bar{3}$

$$\begin{array}{r} .58333 \dots = 0.58\bar{3} \\ 12 \overline{) 7.00000} \\ \underline{60} \\ 100 \\ \underline{96} \\ 40 \\ \underline{36} \\ 40 \\ \underline{36} \\ 40 \\ \underline{36} \\ 4 \end{array}$$

123. $\frac{5}{11} = 0.4\bar{5}$

$$\begin{array}{r} .4545 \dots = 0.4\bar{5} \\ 11 \overline{) 5.0000} \\ \underline{44} \\ 60 \\ \underline{55} \\ 50 \\ \underline{44} \\ 60 \\ \underline{55} \\ 4 \end{array}$$

125. $1.21 + 4.06 - 3.00 = 2.27$

127. $-0.0005 - 2.01 + 0.111 = -1.8995 \approx -1.90$

129. $(-6.3)(9.05) \approx -57.02$

131. $(-0.09)(-0.45) = 0.0405$

≈ 0.04

(rounded to two decimal places)

$$\begin{array}{r} 0.45 \\ \times 0.09 \\ \hline .0405 \end{array}$$

133. $4.69 \div 0.12 \approx 39.08$ (rounded to two decimal places)

$$\begin{array}{r} 39.0833 \dots \approx 39.08 \text{ (Rounded)} \\ 0.12 \overline{) 4.69} = 12 \overline{) 469} \\ \underline{36} \\ 109 \\ \underline{108} \\ 100 \\ \underline{96} \\ 40 \\ \underline{36} \\ 40 \\ \underline{36} \\ 4 \end{array}$$

135. The sum is approximately 1.

$$\begin{aligned} 137. \quad 54\frac{1}{4} - 52\frac{5}{8} &= \frac{54(4) + 1}{4} - \frac{52(8) + 5}{8} \\ &= \frac{217}{4} - \frac{421}{8} \\ &= \frac{434}{8} - \frac{421}{8} \\ &= \frac{13}{8} \text{ or } 1\frac{5}{8} \end{aligned}$$

Thus, the increase in the stock price was $\$1\frac{5}{8}$ per share, or \$1.625 per share.

$$\begin{aligned} 139. \quad 8\frac{3}{4} + 7\frac{1}{5} + 9\frac{3}{8} &= \frac{35}{4} + \frac{36}{5} + \frac{75}{8} \\ &= \frac{35(10)}{4(10)} + \frac{36(8)}{5(8)} + \frac{75(5)}{8(5)} \\ &= \frac{350}{40} + \frac{288}{40} + \frac{375}{40} \\ &= \frac{1013}{40} \\ &= 25\frac{13}{40} \end{aligned}$$

Thus, $25\frac{13}{40}$ tons, or 25.325 tons, of feed were purchased during the first quarter of the year.

141. $1 - \frac{3}{8} = \frac{8}{8} - \frac{3}{8} = \frac{5}{8}$

Thus, $\frac{5}{8}$ of the gasoline tank is empty.

143. The cost of the milk is $2(2.23) = \$4.46$, and the cost of the bread is $3(1.23) = \$3.69$. Thus, the total cost is $4.46 + 3.69 = \$8.15$. Your change is the difference: $20 - 8.15 = \$11.85$.

$$\begin{aligned} 145. \quad 60 \div \frac{5}{4} &= \frac{60}{1} \cdot \frac{4}{5} \\ &= \frac{60(4)}{5} \\ &= \frac{12(\cancel{5})(4)}{\cancel{5}} \\ &= 48 \end{aligned}$$

Thus, you can make 48 breadsticks.

147. The number of gallons needed to drive 12,000 miles in a car which gets 22.3 miles per gallon is

$$\frac{12,000}{22.3} \approx 538.117 \text{ gallons.}$$

At \$1.259 per gallon, the annual fuel cost is

$$(538.117)(1.259) \approx \$677.49. \quad (\text{Rounded})$$

(Note: More accurate answers are obtained if you round your answer *only* after all calculations are done.)

149. (a) Two hundred times $23\frac{5}{8}$ is approximately 5000. Three hundred times $86\frac{1}{4}$ is approximately 26,000. Thus, the total cost of the stock is approximately \$31,000.

$$\begin{aligned} \text{(b)} \quad (200)(23\frac{5}{8}) + (300)(86\frac{1}{4}) &= (200)(\frac{189}{8}) + (300)(\frac{345}{4}) \\ &= 30,600 \end{aligned}$$

Thus, the actual total cost of the stocks is \$30,600.

Note: You could also use decimals to find the total cost.

$$200(23.625) + 300(86.25) = 30,600$$

151. (a) Seven times $\frac{2}{3}$ hour is $\frac{14}{3}$ hours; this is approximately equal to 5, or $\frac{15}{3}$, hours. (Note: Estimated answers could vary.)

$$\begin{aligned} \text{(b)} \quad 7(\frac{2}{3}) &= \frac{7(\cancel{2})}{1(\cancel{3})} \\ &= \frac{14}{3} \\ &= 4.666 \dots \\ &\approx 4.7 \quad (\text{rounded to one decimal place}) \end{aligned}$$

Thus, the actual number of hours you practiced during the week was approximately 4.7 hours.

153. (g) December 4th

There was a departure of 20 degrees from the monthly average high temperature on this day.

- (h) December 4th and 5th

There was a difference of 14 degrees in the high temperature between these two successive days.

- (i) December 4th and 5th

There was a difference of 15 degrees in the low temperature between these two successive days.

$$\begin{aligned} \text{(j) Average} &= \frac{2.5 + 1 + (-4) + (-15) + 0 + 5 + 8 + 2 + 7.2 + 3 + 2 + (-4) + (-4.5) + (-4)}{14} \\ &= \frac{-0.8}{14} \\ &\approx -0.06 \end{aligned}$$

Thus, the average high temperature of the 14 days was approximately -0.06° , just below 0 degrees.

$$\begin{aligned} \text{(k) Average} &= \frac{-3 + (-5) + (-12) + (-20) + (-6) + (-4/3) + 0 + 0 + 2 + (-1) + (-2) + (-9) + (-19) + (-8)}{14} \\ &= \frac{-75\frac{1}{3}}{14} \\ &\approx -5.38 \end{aligned}$$

Thus, the average low temperature of 14 days was approximately -5.38° .

- (l) (g), (h), and (i)

155. No, $\frac{2}{3} + \frac{3}{2} \neq \frac{2+3}{3+2}$.

To add two fractions, determine a common denominator and rewrite each denominator with that denominator. Then add the numerators and write the sum over the common denominator.

$$\frac{2}{3} + \frac{3}{2} = \frac{4}{6} + \frac{9}{6} = \frac{13}{6}$$

159. $3 = \frac{3}{1} = \frac{3(4)}{1(4)} = \frac{12}{4}$

Using the diagram, you can count that the number of one-fourths in 3 is 12.

You can also divide 3 by $1/4$ to find this same result.

$$\begin{aligned} \frac{3}{1/4} &= \frac{3}{1} \div \frac{1}{4} \\ &= \frac{3}{1} \cdot \frac{4}{1} \\ &= 12 \end{aligned}$$

163. True

165. True

167. $\frac{4}{5} + \frac{3}{6} = \frac{13}{10}$

Note:

$$\frac{4}{5} + \frac{3}{6} = \frac{4}{5} + \frac{1}{2} = \frac{8}{10} + \frac{5}{10} = \frac{13}{10}$$

Section 1.4 Exponents, Order of Operations, and Properties of Real Numbers

1. $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 2^5$

3. $(-\frac{1}{4})(-\frac{1}{4})(-\frac{1}{4}) = (-\frac{1}{4})^3$

5. $(-3)^6 = (-3)(-3)(-3)(-3)(-3)(-3)$

7. $(9.8)^3 = (9.8)(9.8)(9.8)$

9. $(-\frac{1}{2})^5 = (-\frac{1}{2})(-\frac{1}{2})(-\frac{1}{2})(-\frac{1}{2})(-\frac{1}{2})$

11. $-2^2 = -2 \cdot 2 = -4$

The value is negative.

13. $-5^3 = -5 \cdot 5 \cdot 5 = -125$

15. $3^2 = 3 \cdot 3 = 9$

17. $2^6 = (2)(2)(2)(2)(2)(2) = 64$

The value is negative.

19. $(-5)^3 = (-5)(-5)(-5) = -125$

21. $(\frac{1}{4})^3 = (\frac{1}{4})(\frac{1}{4})(\frac{1}{4}) = \frac{1}{64}$

23. $(-1.2)^3 = (-1.2)(-1.2)(-1.2) = -1.728$

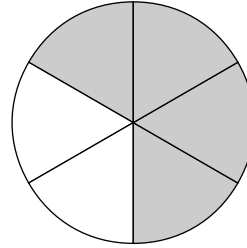
157. (a) $1 - \frac{2}{3} = \frac{1}{3}$

One-third of the pizza was left.

(b) $\frac{1}{2} \cdot \frac{1}{3} = \frac{1}{6}$

You ate one-sixth of the pizza for a midnight snack.

(c)



161. False

The reciprocal of the integer 5 is $1/5$, but $1/5$ is not an integer. In fact, 1 is the only integer with a reciprocal that is also an integer.