College Mathematics for Trades and Technologies 10th edition Cleaves Solutions Manual

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Chapter Two

Review of Fractions

▶CHAPTER 2 REVIEW EXERCISES

2. $\frac{9}{26}$

4. 12 = 12(1); 24 = 12(2); 36 = 12(3); 48 = 12(4); 60 = 12(5)

6. 14 = 14(1); 28 = 14(2); 42 = 14(3); 56 = 14(4); 70 = 14(5); Answers may vary.

8. 11 = 11(1); 22 = 11(2); 33 = 11(3); 44 = 11(4); 55 = 11(5); Answers may vary.

10. 15= 15(1); 30 = 15(2); 45 = 15(3); 60 = 15(4); 75 = 15(5); Answers may vary.

12. No; The last two digits 34 are not divisible by 4.

14. No; The last digit is not 5 or 0.

16. Yes; The last digit is 5.

18. No; The last three digits 428 are not divisible by 8.

20. 1, 50 1, 2, 5, 10, 25, 50
2, 25
5, 10

22. 1, 63 1, 3, 7, 9, 21, 63
3, 21
7, 9

24. Prime; 1 and 17 are the only factors.

26. Composite; 2, 4, 5, 10 are also factors.

28. Prime; 1 and 29 are the only factors.

30. $48 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 = 2^4 \cdot 3$

32. $120 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5 = 2^3 \cdot 3 \cdot 5$

34. $12 = 2^2 \cdot 3$
$18 = 2 \cdot 3^2$
$\text{LCM} = 2^2 \cdot 3^2 = 36$

36. $6 = 2 \cdot 3$
$10 = 2 \cdot 5$
$12 = 2^2 \cdot 3$
$\text{LCM} = 2^2 \cdot 3 \cdot 5 = 60$

38. $12 = 2^2 \cdot 3$
$18 = 2 \cdot 3^2$
$\text{GCF} = 2 \cdot 3 = 6$

40. $4 = 2^2$
$9 = 3^2$
$16 = 2^4$
$\text{GCF} = 1$

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42. $\frac{3}{5}=\frac{2}{2}=\frac{6}{10}$

$\frac{3}{5}\times\frac{3}{3}=\frac{9}{15}$

$\frac{3}{5}\times\frac{4}{4}=\frac{12}{20}$

$\frac{3}{5}\times\frac{5}{5}=\frac{15}{25}$

$\frac{3}{5}\times\frac{6}{6}=\frac{18}{30}$

44. $\frac{4}{5}=\frac{?}{40}$

$\frac{4}{5}\cdot\frac{8}{8}=\frac{32}{40}$

46. $\frac{4}{9}=\frac{?}{18}$

$\frac{4}{9}\cdot\frac{2}{2}=\frac{8}{18}$

48. $\frac{1}{6}=\frac{?}{30}$

$\frac{1}{6}\cdot\frac{5}{5}=\frac{5}{30}$

50. $\frac{7}{8}=\frac{?}{64}$

$\frac{7}{8}\cdot\frac{8}{8}=\frac{56}{64}$

52. $\frac{1}{6}=\frac{?}{15}$ $15\div 6=\frac{15}{6}=2\frac{1}{2}$

$\frac{1}{6}\cdot\frac{2\frac{1}{2}}{2\frac{1}{2}}=\frac{2\frac{1}{2}}{15}$

54. $\frac{8}{12}=\frac{8\div 4}{12\div 4}=\frac{2}{3}$

56. $\frac{26}{64}=\frac{26\div 2}{64\div 2}=\frac{13}{32}$

58. $\frac{8}{32}=\frac{8\div 8}{32\div 8}=\frac{1}{4}$

60. $\frac{16}{64}=\frac{16\div 16}{64\div 16}=\frac{1}{4}$

62. $\frac{45}{90}=\frac{45\div 45}{90\div 45}=\frac{1}{2}$

64. Find the cross products
$8(20) = 160$
$12(16) = 192$
False, the two ratios are not a proportion.

66. $5\frac{1}{8}$ inches

68. $4\frac{3}{16}$ inches

70. $3\frac{11}{16}$ inches

72. 3 inches

74. $2\frac{1}{8}$ inches

76. $1\frac{7}{8}$ in.

78. $2\frac{1}{4}$ in.

80. $\frac{27}{6}=$ $6\overline{)27}$ $\begin{array}{r}4\\ \\ \frac{24}{3}\end{array}$ $=4\frac{3}{6}=4\frac{3\div 3}{6\div 3}=4\frac{1}{2}$

82. $\frac{21}{15}=$ $15\overline{)21}$ $\begin{array}{r}1\\ \\ \frac{15}{6}\end{array}$ $=1\frac{6}{15}=1\frac{6\div 3}{15\div 3}=1\frac{2}{5}$

84. $\frac{22}{7}=$ $7\overline{)22}$ $\begin{array}{r}3\\ \\ \frac{21}{1}\end{array}$ $=3\frac{1}{7}$

86. $\frac{135}{3}=$ $3\overline{)135}$ $\begin{array}{r}45\\ \\ \frac{12}{15}\\ \\ \frac{15}{0}\end{array}$ $=45$

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88. $\frac{35}{7} = 7\overline{)35}\ \begin{array}{r}5\\ \underline{35}\\ 0\end{array} = 5$

90. $10\frac{1}{2} = \frac{(2\times 10)+1}{2} = \frac{21}{2}$

92. $5\frac{7}{12} = \frac{(12\times 5)+7}{12} = \frac{67}{12}$

94. $7\frac{8}{17} = \frac{(17\times 7)+8}{17} = \frac{127}{17}$

96. $9\frac{1}{9} = \frac{(9\times 9)+1}{9} = \frac{82}{9}$

98. $16\frac{2}{3} = \frac{(3\times 16)+2}{3} = \frac{50}{3}$

100. $6\frac{1}{2} = \frac{(2\times 6)+1}{2} = \frac{13}{2}$

102. $6 = \frac{?}{4}$

$6 = \frac{6}{1} = \frac{6\times 4}{1\times 4} = \frac{24}{4}$

104. $7 = \frac{?}{5}$

$7 = \frac{7}{1} = \frac{7\times 5}{1\times 5} = \frac{35}{5}$

106. $0.83 = \frac{83}{100}$

108. $0.25 = \frac{25\div 5}{100\div 5} = \frac{1}{4}$

110. $0.081 = \frac{81}{1,000}$

112. $0.005 = \frac{5\div 5}{1,000\div 5} = \frac{1}{200}$

114. $\frac{1}{10} = 0.1$ $10\overline{)1.0}\ \begin{array}{r}0.1\\ \underline{10}\end{array}$

116. $\frac{3}{7} = 0.429$ $7\overline{)3.0000}\ \begin{array}{r}0.4285 \approx 0.429\\ \underline{28}\\ 20\\ \underline{14}\\ 60\\ \underline{56}\\ 40\\ \underline{35}\\ 5\end{array}$

118. $\frac{7}{8}, \frac{2}{3}$ Factor denominators.

$8 = 2\times 4$ $3 = 3$

$8 = 2\times 2\times 2$

$= 2^3$

$\text{LCD} = 2^3\times 3 = 8\times 3 = 24$

120. $\frac{1}{12}, \frac{3}{4}$ Factor denominators.

$12 = 2\times 6$ $4 = 2\times 2$

$12 = 2\times 2\times 3$ $4 = 2\times 2$

$= 2^2\times 3$ $= 2^2$

$\text{LCD} = 2^2\times 3 = 4\times 3 = 12$

122. $\frac{1}{12}, \frac{3}{8}, \frac{15}{16}$ Factor denominators.

$12 = 2\times 2\times 3$ $8 = 2\times 2\times 2$ $16 = 2\times 2\times 4$

$= 2^2\times 3$ $= 2^3$ $= 2\times 2\times 2\times 2$

$= 2^4$

$\text{LCD} = 2^4\times 3 = 16\times 3 = 48$

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124. $\frac{3}{7}; \frac{2}{7}$ Compare numerators.

Since $2 < 3$, $\frac{2}{7} < \frac{3}{7}$

$\frac{2}{7}$ is smaller.

126. $\frac{5}{9}; \frac{4}{9}$ Compare numerators.

Since $4 < 5$, $\frac{4}{9} < \frac{5}{9}$

$\frac{4}{9}$ is smaller.

128. $\frac{5}{8}; \frac{11}{16}$ Find common denominator.

Since $10 < 11$, $\frac{10}{16} < \frac{11}{16}$

$\frac{5}{8} = \frac{5\times 2}{8\times 2} = \frac{10}{16}$

$\frac{5}{8} < \frac{11}{16}$

$\frac{5}{8}$ is smaller.

130. $\frac{7}{64}; \frac{1}{4}$ Find common denominator.

Since $7 < 16$, $\frac{7}{64} < \frac{16}{64}$ $\frac{1}{4} = \frac{1\times 16}{4\times 16} = \frac{16}{64}$

$\frac{7}{64} < \frac{1}{4}$

$\frac{7}{64}$ is smaller.

132. $\frac{11}{16} \times \frac{2}{2} = \frac{22}{32}$

$\frac{22}{32} > \frac{21}{32}$

$\frac{11}{16}$ is larger.

134. $\frac{2}{3} \stackrel{?}{>} \frac{3}{5}$ $\frac{2}{3} = \frac{2\times 5}{3\times 5} = \frac{10}{15}; \frac{3}{5} = \frac{3\times 3}{5\times 3} = \frac{9}{15}$

Since $10 > 9$, $\frac{10}{15} > \frac{9}{15}$

$\frac{2}{3} > \frac{3}{5}$

The alloy with $\frac{2}{3}$ metal A contains more of metal A.

136. $\frac{9}{16} \stackrel{?}{<} \frac{3}{4}$ $\frac{3}{4} = \frac{3\times 4}{4\times 4} = \frac{12}{16}$

Since $9 < 12$; $\frac{9}{16} < \frac{12}{16}$; Yes

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138. $22\frac{1}{4} \overset{?}{<} 22\frac{5}{16}$

Write fractions with a common denominator.

$22\frac{4}{16} \overset{?}{<} 22\frac{5}{16}$

No, the hole will not need to be cut larger.

140. Change $\frac{1}{8}$ to a decimal.

$1 \div 8 = 0.125$

$0.127 > 0.125$ The digit 7 in the thousandths place of 0.127 is greater than the digit 5 in the thousandths place of 0.125.

$0.127 > 0.125$; 0.127 is larger.

142. Change $\frac{1}{6}$ to a decimal.

$1 \div 6 = 0.1666666667$

$0.1666666667 > 0.08335$ The digit 1 in the tenths place of 0.1666666667 is greater than the digit 0 in the tenths place of 0.08335.

$\frac{1}{6} > 0.8335$; $\frac{1}{6}$ is larger.

144.
$$\begin{array}{r} \frac{1}{8} = \frac{2}{16} \\ +\ \frac{5}{16} = \frac{5}{16} \\ \hline \frac{7}{16} \end{array}$$

146.
$$\begin{array}{r} \frac{3}{14} = \frac{3}{14} \\ +\ \frac{5}{7} = \frac{10}{14} \\ \hline \frac{13}{14} \end{array}$$

148.
$$\begin{array}{r} \frac{5}{16} = \frac{5}{16} \text{ in.} \\ \frac{3}{8} = \frac{6}{16} \text{ in.} \\ +\ \frac{1}{16} = \frac{1}{16} \text{ in.} \\ \hline \frac{12}{16} = \frac{3}{4} \text{ in.; Yes} \end{array}$$

150.
$$\begin{array}{r} \frac{3}{8} = \frac{6}{16} \text{ in.} \\ \frac{3}{16} = \frac{3}{16} \text{ in.} \\ +\ \frac{3}{16} = \frac{3}{16} \text{ in.} \\ \hline \frac{12}{16} = \frac{3}{4} \text{ in.} \end{array}$$

152.
$$\begin{array}{rl} 3\frac{7}{8} &= 3\frac{7}{8} \\ 7 &= 7\frac{0}{8} \\ +\ 5\frac{1}{2} &= 5\frac{4}{8} \\ \hline & 15\frac{11}{8} = 15 + 1\frac{3}{8} = 16\frac{3}{8} \end{array}$$

154.
$$\begin{array}{rl} 9\frac{7}{8} &= 9\frac{7}{8} \\ +\ 5\frac{3}{4} &= 5\frac{6}{8} \\ \hline & 14\frac{13}{8} = 14 + 1\frac{5}{8} = 15\frac{5}{8} \end{array}$$

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156.
$$\begin{array}{rl} 2\frac{1}{4} &= 2\frac{2}{8} \\ +\,3\frac{7}{8} &= 3\frac{7}{8} \\ \hline & 5\frac{9}{8} = 5 + 1\frac{1}{8} = 6\frac{1}{8} \end{array}$$

158.
$$\begin{array}{rl} 3\frac{7}{8} &= 3\frac{14}{16}\text{ in.} \\ 3\frac{7}{8} &= 3\frac{14}{16}\text{ in.} \\ +\,\frac{5}{16} &= \frac{5}{16}\text{ in.} \\ \hline & 6\frac{33}{16} = 6 + 2\frac{1}{16} = 8\frac{1}{16}\text{ in.} \end{array}$$

The total thickness of the wall is $8\frac{1}{16}$ in.

160.
$$\begin{array}{rl} 27\frac{1}{2} &= 27\frac{2}{4}\text{ lb} \\ +\,20\frac{3}{4} &= 20\frac{3}{4}\text{ lb} \\ \hline & 47\frac{5}{4} = 47 + 1\frac{1}{4} = 48\frac{1}{4}\text{ lb} \end{array}$$

The total weight of the two carts is $48\frac{1}{4}$ lb.

162.
$$\begin{array}{rl} 4\frac{3}{16} &= 4\frac{3}{16}\text{ in.} \\ +\,2\frac{3}{8} &= 2\frac{6}{16}\text{ in.} \\ \hline & 6\frac{9}{16}\text{ in.} \end{array}$$

164.
$$\begin{array}{rl} \frac{11}{32} &= \frac{22}{64} \\ -\,\frac{5}{64} &= \frac{5}{64} \\ \hline & \frac{17}{64} \end{array}$$

166.
$$\begin{array}{rl} 7 &= 7\frac{0}{8} = 6\frac{8}{8} + \frac{0}{8} = 6\frac{8}{8} \\ -\,4\frac{3}{8} &= 4\frac{3}{8} = 4\frac{3}{8} \\ \hline & 2\frac{5}{8} \end{array}$$

168.
$$\begin{array}{rl} 7 &= 6\frac{16}{16} \\ -\,2\frac{9}{16} &= 2\frac{9}{16} \\ \hline & 4\frac{7}{16} \end{array}$$

170.
$$\begin{array}{rl} 48\frac{5}{12} &= 47\frac{17}{12} = 47\frac{85}{60} \\ -12\frac{11}{15} &= 12\frac{44}{60} = 12\frac{44}{60} \\ \hline & 35\frac{41}{60} \end{array}$$

172.
$$\begin{array}{rl} 2\frac{3}{8} &= 2\frac{6}{16}\text{ in.} \\ 3\frac{7}{16} &= 3\frac{7}{16}\text{ in.} \\ \frac{1}{16} &= \frac{1}{16}\text{ in.} \\ +\,\frac{1}{16} &= \frac{1}{16}\text{ in.} \\ \hline & 5\frac{15}{16}\text{ in.} \end{array}$$

$$\begin{array}{rl} 12 &= 11\frac{16}{16}\text{ in.} \\ -\,5\frac{15}{16} &= 5\frac{15}{16}\text{ in.} \\ \hline & 6\frac{1}{16}\text{ in.} \end{array}$$

There were $6\frac{1}{16}$ in. of drill rod left.

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174.
$$\begin{array}{r} 6\frac{1}{4} = 6\frac{8}{32} \text{ in.} \\ 9\frac{3}{16} = 9\frac{6}{32} \text{ in.} \\ 7\frac{1}{8} = 7\frac{4}{32} \text{ in.} \\ +\,5\frac{9}{32} = 5\frac{9}{32} \text{ in.} \\ \hline 27\frac{27}{32} \text{ in.} \end{array} \qquad \begin{array}{r} 48 = 47\frac{32}{32} \text{ in.} \\ -27\frac{27}{32} = 27\frac{27}{32} \text{ in.} \\ \hline 20\frac{5}{32} \text{ in.} \end{array}$$

There was $20\frac{5}{32}$ in. cable remaining.

176. $\frac{3}{5}\times\frac{10}{21}=\frac{\cancel{3}^{1}}{\cancel{5}_{1}}\times\frac{\cancel{10}^{2}}{\cancel{21}_{7}}=\frac{1\times 2}{1\times 7}=\frac{2}{7}$

178. $\frac{2}{5}\times\frac{7}{10}=\frac{\cancel{2}^{1}}{5}\times\frac{7}{\cancel{10}_{5}}=\frac{7}{25}$

180. $\frac{2}{3}\times\frac{5}{8}\times\frac{3}{16}=\frac{\cancel{2}^{1}}{\cancel{3}_{1}}\times\frac{5}{\cancel{8}_{4}}\times\frac{\cancel{3}^{1}}{16}=\frac{5}{64}$

182. $5\times\frac{3}{4}=\frac{5}{1}\times\frac{3}{4}=\frac{15}{4}=3\frac{3}{4}$

184. $\frac{3}{16}\times 184=\frac{3}{16}\times\frac{184}{1}=\frac{3}{\cancel{16}_{2}}\times\frac{\cancel{184}^{23}}{1}=\frac{69}{2}=34\frac{1}{2}$

186. $3\frac{1}{3}\times 4\frac{1}{2}=\frac{\cancel{10}^{5}}{\cancel{3}_{1}}\times\frac{\cancel{9}^{3}}{\cancel{2}_{1}}=\frac{5\times 3}{1\times 1}=\frac{15}{1}=15$

188. $\frac{4}{7}\times 135=\frac{4}{7}\times\frac{135}{1}=\frac{540}{7}=77\frac{1}{7}$

For 135 cubic yards of concrete, $77\frac{1}{7}$ yd^3 of sand are needed.

190. $\frac{3}{64}\times 4 = \frac{3}{\cancel{64}_{16}}\times\frac{\cancel{4}^{1}}{1} = \frac{3}{16}$

It will move $\frac{3}{16}$ in. in four turns.

192. $112\frac{1}{2}\times\frac{3}{5} = \frac{\cancel{225}^{45}}{2}\times\frac{3}{\cancel{5}_{1}} = \frac{135}{2} = 67\frac{1}{2}$ lb copper

$112\frac{1}{2}\times\frac{2}{5} = \frac{\cancel{225}^{45}}{\cancel{2}_{1}}\times\frac{\cancel{2}^{1}}{\cancel{5}_{1}} = \frac{45}{1} = 45$ lb zinc

194. $\left(\frac{1}{5}\right)^2=\frac{1}{5}\cdot\frac{1}{5}=\frac{1}{25}$

196. $\left(\frac{5}{6}\right)^2=\frac{5}{6}\cdot\frac{5}{6}=\frac{25}{36}$

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198. $\left(\frac{1}{7}\right)^3 = \frac{1}{7}\cdot\frac{1}{7}\cdot\frac{1}{7} = \frac{1}{343}$

200. $\left(\frac{7}{8}\right)^2 = \frac{7}{8}\cdot\frac{7}{8} = \frac{49}{64}$

202. $\frac{7}{8}$; Reciprocal: $\frac{8}{7}$ or $1\frac{1}{7}$

204. Change $2\frac{3}{5}$ to an improper fraction.

$2\frac{3}{5} = \frac{13}{5}$; Reciprocal: $\frac{5}{13}$

206. $1.8 = 1\frac{8}{10} = 1\frac{4}{5} = \frac{9}{5}$;

Reciprocal $= \frac{5}{9}$

208. $\frac{4}{9} \div \frac{5}{16} = \frac{4}{9} \times \frac{16}{5} = \frac{64}{45} = 1\frac{19}{45}$

210. $8 \div \frac{2}{3} = \frac{8}{1} \div \frac{2}{3} = \frac{8}{1} \times \frac{3}{2} = \frac{\overset{4}{\cancel{8}}}{1} \times \frac{3}{\underset{1}{\cancel{2}}} = \frac{12}{1} = 12$

212. $35 \div \frac{5}{16} = \frac{35}{1} \div \frac{5}{16} = \frac{\overset{7}{\cancel{35}}}{1} \times \frac{16}{\underset{1}{\cancel{5}}} = \frac{112}{1} = 112$

214. $27\frac{2}{3} \div \frac{2}{3} = \frac{83}{3} \div \frac{2}{3} = \frac{83}{3} \times \frac{3}{2} = \frac{83}{\underset{1}{\cancel{3}}} \times \frac{\overset{1}{\cancel{3}}}{2} = \frac{83}{2} = 41\frac{1}{2}$

216. $4\frac{1}{8} \div \frac{1}{4} = \frac{33}{8} \div \frac{1}{4} = \frac{33}{8} \times \frac{4}{1} = \frac{33}{\underset{2}{\cancel{8}}} \times \frac{\overset{1}{\cancel{4}}}{1} = \frac{33}{2} = 16\frac{1}{2}$ ft

$6\frac{1}{2} \div \frac{1}{4} = \frac{13}{2} \div \frac{1}{4} = \frac{13}{2} \times \frac{4}{1} = \frac{13}{\underset{1}{\cancel{2}}} \times \frac{\overset{2}{\cancel{4}}}{1} = \frac{26}{1} = 26$ ft

The porch measures $16\frac{1}{2}$ ft by 26 ft.

218. $21\frac{7}{8} \div \frac{5}{8} = \frac{175}{8} \div \frac{5}{8} = \frac{175}{8} \times \frac{8}{5} = \frac{\overset{35}{\cancel{175}}}{\underset{1}{\cancel{8}}} \times \frac{\overset{1}{\cancel{8}}}{\underset{1}{\cancel{5}}} = \frac{35}{1} = 35$ sheets

There are 35 sheets of plywood in the stack.

220. $7\frac{1}{2} \div 5 = \frac{15}{2} \div \frac{5}{1} = \frac{15}{2} \times \frac{1}{5} = \frac{\overset{3}{\cancel{15}}}{2} \times \frac{1}{\underset{1}{\cancel{5}}} = \frac{3}{2} = 1\frac{1}{2}$ gal per container

The average number of gallons per container is $1\frac{1}{2}$.

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222. $\dfrac{\frac{5}{8}}{2\frac{1}{8}} = \frac{5}{8} \div 2\frac{1}{8} = \frac{5}{8} \div \frac{17}{8} = \frac{5}{\cancel{8}_{1}} \cdot \frac{\cancel{8}^{1}}{17} = \frac{5}{17}$

224. $\dfrac{\frac{4}{5}}{4} = 4 \div \frac{4}{5} = \frac{4}{1} \div \frac{4}{5} = \frac{4}{1} \times \frac{5}{4} = \frac{\cancel{4}^{1}}{1} \times \frac{5}{\cancel{4}_{1}} = \frac{5}{1} = 5$

226. $\dfrac{3\frac{1}{4}}{5} = \frac{13}{4} \div \frac{5}{1} = \frac{13}{4} \times \frac{1}{5} = \frac{13}{20}$

228. $\dfrac{16\frac{2}{3}}{3\frac{1}{3}} = 16\frac{2}{3} \div 3\frac{1}{3} = \frac{50}{3} \div \frac{10}{3} = \frac{50}{3} \times \frac{3}{10} = \frac{\cancel{50}^{5}}{\cancel{3}_{1}} \times \frac{\cancel{3}^{1}}{\cancel{10}_{1}} = \frac{5}{1} = 5$

230. $\dfrac{37\frac{1}{2}}{100} = 37\frac{1}{2} \div 100 = \frac{75}{2} \div \frac{100}{1} = \frac{75}{2} \times \frac{1}{100} = \frac{\cancel{75}^{3}}{2} \times \frac{1}{\cancel{100}_{4}} = \frac{3}{8}$

232. $\dfrac{5\frac{2}{3}}{\frac{5}{6}-\frac{1}{3}} = \frac{\frac{17}{3}}{\frac{5}{6}-\frac{2}{6}} = \frac{\frac{17}{3}}{\frac{3}{6}} = \frac{17}{\cancel{3}_{1}}\left(\frac{\overset{2}{\cancel{6}}}{3}\right) = \frac{34}{3} = 11\frac{1}{3}$

Chapter 2 Concepts Analysis

1. Addition and subtraction of fractions require a common denominator.

2. To find the reciprocal of a fraction: interchange the numerator and denominator.

3. To find the reciprocal of a mixed number:
(1) Write the mixed number as an improper fraction.
(2) Interchange the numerator and denominator.

4. The number 1 can be written as any fraction that has the same numerator and denominator, such as $\frac{2}{2}, \frac{3}{3}, \frac{4}{4}$, etc. $\frac{n}{n} = 1;$ where $n \neq 0$.

5. Division requires the use of the reciprocal of a fraction.

6. sum ——— addition
difference — subtraction
product —— multiplication
quotient —— division

7. Subtraction must be used to solve an applied problem in which the total and one of the two parts are given.

8. The denominator of a fraction indicates the number of parts one unit has been divided into.

9. The numerator of a fraction indicates the number of the parts being considered.

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10. A proper fraction has a value less than one.

11. $\frac{5}{8}+\frac{1}{8}=\frac{6}{16}=\frac{3}{8}$

To add fractions, the denominators need to be the same (which is true in this problem), and only the numerators are added. The common denominator will be the denominator of the sum.

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

12.
$$\begin{array}{r} 12 \\ -\ 5\ \frac{3}{4} \\ \hline 7\ \frac{3}{4} \end{array}$$

To perform the subtraction, one must borrow, because the fractional part of the subtrahend $\left(\frac{3}{4}\right)$ is larger than that of the minuend (0).

$$\begin{array}{r} 12 = 12\frac{0}{4} = 11\frac{4}{4} \\ -\ 5\frac{3}{4} = 5\frac{3}{4} = 5\frac{3}{4} \\ \hline 6\frac{1}{4} \end{array}$$

13. $\frac{3}{5}\times 2\frac{1}{5}=2\frac{3}{25}$

To multiply fractions and mixed numbers, change mixed numbers to improper fractions before multiplying.

$\frac{3}{5}\times 2\frac{1}{5}=\frac{3}{5}\times\frac{11}{5}=\frac{33}{25}=1\frac{8}{25}$

14. $\frac{5}{8}\div 4=\frac{5}{8}\times\frac{4}{1}=\frac{5}{2}=2\frac{1}{2}$

To divide fractions, mixed numbers, and whole numbers, all must be converted to improper fractions. The division is then changed to an equivalent multiplication problem using the reciprocal of the divisor.

$\frac{5}{8}\div 4=\frac{5}{8}\div\frac{4}{1}=\frac{5}{8}\times\frac{1}{4}=\frac{5}{32}$

15. $12\frac{3}{4}=12\frac{6}{8}=11\frac{16}{8}$

$$\begin{array}{r} -\ 4\frac{7}{8} = -4\frac{7}{8} = -4\frac{7}{8} \\ \hline 7\frac{9}{8} = 7+1\frac{1}{8} = 8\frac{1}{8} \end{array}$$

Borrow $\frac{8}{8}$, not $\frac{10}{8}$.

$$\begin{array}{r} 12\frac{3}{4} = 12\frac{6}{8} = 11\frac{14}{8} \\ -\ 4\frac{7}{8} = -4\frac{7}{8} = -4\frac{7}{8} \\ \hline 7\frac{7}{8} \end{array}$$

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Chapter 2 Practice Test

2. $7 \div 9$; $\frac{7}{9}$

4. $\frac{14}{9} = 9\overline{)14}\ \begin{array}{r}1\\ 9\\ \hline 5\end{array} = 1\frac{5}{9}$

To convert an improper fraction to a mixed number, perform the division indicated, and express the remainder as a fraction with the same denominator.

6. $3\frac{1}{10} = \frac{(3\times 10)+1}{10} = \frac{31}{10}$

To convert a mixed number to an improper fraction, multiply the denominator of the fraction part by the whole number and add the numerator of the fractional part to form the new numerator, while the denominator remains the same.

8. $132 = 2 \times 66$
$= 2 \times 2 \times 33$
$= 2 \times 2 \times 3 \times 11$
$= 2^2 \times 3 \times 11$

10. Write each number in factored form.
$48 = 2^4(3)$
$64 = 2^6$
$LCD = 2^6(3) = 192$ List each unique factor with the greatest exponent found in any of the factors that have like bases.

12. Write each number in factored form.
$15 = 3(5)$
$35 = 5(7)$
$GCF = 5$ List only the factors that are found in both numbers.

14. $\frac{18 \div 6}{24 \div 6} = \frac{3}{4}$

16. $20\overline{)7.00}\ \begin{array}{r}0.35\\ 6\,0\\ \hline 1\,00\\ 1\,00\\ \hline\end{array}$ $\frac{7}{20} = 0.35$

18. $5\frac{3}{8} = \frac{(5\times 8)+3}{8} = \frac{43}{8}$

20. $\frac{7}{12} + \frac{5}{6} = \frac{7}{12} + \frac{10}{12} = \frac{17}{12} = 1\frac{5}{12}$

22. $\frac{\cancel{5}^{1}}{\cancel{6}_{2}} \times \frac{\cancel{2}^{1}}{\cancel{10}_{2}} = \frac{1}{4}$

24. $\frac{7}{8} - \frac{1}{4} = \frac{7}{8} - \frac{2}{8} = \frac{5}{8}$

26. $\frac{5}{12} \div \frac{5}{6} = \frac{5}{12} \cdot \frac{6}{5} = \frac{\cancel{5}^{1}}{\cancel{12}_{2}} \cdot \frac{\cancel{6}^{1}}{\cancel{5}_{1}} = \frac{1}{2}$

28. $5\frac{2}{3} \div 1\frac{1}{9} = \frac{17}{3} \div \frac{10}{9} = \frac{17}{3} \cdot \frac{9}{10} = \frac{\cancel{17}}{\cancel{3}_{1}} \cdot \frac{9}{10} = \frac{51}{10} = 5\frac{1}{10}$

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30. $1\frac{1}{2} = 1\frac{2}{4}$ lb $\left(\frac{1}{2} = \frac{1\cdot 2}{2\cdot 2} = \frac{2}{4}\right)$

$$\begin{array}{rl} & \frac{3}{4} = \frac{3}{4} \text{ lb} \\ + & \frac{1}{2} = \frac{2}{4} \text{ lb} \\ \hline & \end{array}$$

$1\frac{7}{4} = 1 + 1\frac{3}{4} = 2\frac{3}{4}$ lb $\left(\begin{array}{l} 4\overline{)7} = \frac{3}{4} \\ \frac{4}{3} \end{array}\right)$

The total weight of the mixed candy is $2\frac{3}{4}$ pounds.

32. $68\frac{3}{4} \div 6\frac{1}{4} = \frac{(68\times 4)+3}{4} \div \frac{(6\times 4)+1}{4} = \frac{275}{4} \div \frac{25}{4}$

$$= \frac{275}{4} \cdot \frac{4}{25} = \frac{\overset{11}{\cancel{275}}}{\cancel{4}_{1}} \cdot \frac{1}{\cancel{25}_{1}} = 11 \text{ extension cords}$$

There can be 11 extension cords made from the wire.

34. Is $\frac{5}{8} > \frac{1}{2}$?

$\frac{5}{8} \overset{?}{>} \frac{4}{8}$ $\left(\frac{1}{2} = \frac{1}{2}\cdot\frac{4}{4} = \frac{4}{8}\right)$

$\frac{5}{8} > \frac{1}{2}$ The drill bit will make a hole wide enough.

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