2.1 Fractions

1. $3\dfrac{5}{8} = \dfrac{(8\times3)+5}{8} = \dfrac{29}{8}$

2. $2\dfrac{4}{5} = \dfrac{(5\times2)+4}{5} = \dfrac{14}{5}$

3. $4\dfrac{1}{4} = \dfrac{(4\times4)+1}{4} = \dfrac{17}{4}$

4. $3\dfrac{2}{3} = \dfrac{(3\times3)+2}{3} = \dfrac{11}{3}$

5. $12\dfrac{2}{3} = \dfrac{(3\times12)+2}{3} = \dfrac{38}{3}$

6. $2\dfrac{8}{11} = \dfrac{(11\times2)+8}{11} = \dfrac{30}{11}$

7. $22\dfrac{7}{8} = \dfrac{(8\times22)+7}{8} = \dfrac{183}{8}$

8. $17\dfrac{5}{8} = \dfrac{(8\times17)+5}{8} = \dfrac{141}{8}$

9. $7\dfrac{6}{7} = \dfrac{(7\times7)+6}{7} = \dfrac{55}{7}$

10. $21\dfrac{14}{15} = \dfrac{(15\times21)+14}{15} = \dfrac{329}{15}$

11. $15\dfrac{19}{23} = \dfrac{(23\times15)+19}{23} = \dfrac{364}{23}$

12. $7\dfrac{9}{16} = \dfrac{(16\times7)+9}{16} = \dfrac{121}{16}$

13. $4\overline{)13}$ gives quotient 3, remainder 1 ($\dfrac{12}{1}$) $\qquad \dfrac{13}{4} = 3\dfrac{1}{4}$

14. $5\overline{)9}$ gives quotient 1, remainder 4 ($\dfrac{5}{4}$) $\qquad \dfrac{9}{5} = 1\dfrac{4}{5}$

15. $3\overline{)8}$ gives quotient 2, remainder 2 ($\dfrac{6}{2}$) $\qquad \dfrac{8}{3} = 2\dfrac{2}{3}$

16. $10\overline{)23}$ gives quotient 2, remainder 3 ($\dfrac{20}{3}$) $\qquad \dfrac{23}{10} = 2\dfrac{3}{10}$

17. $10\overline{)38}$ gives quotient 3, remainder 8 ($\dfrac{30}{8}$) $\qquad \dfrac{38}{10} = 3\dfrac{8}{10} = 3\dfrac{4}{5}$

18. $8\overline{)56}$ gives quotient 7, remainder 0 ($\dfrac{56}{0}$) $\qquad \dfrac{56}{8} = 7$

19. $11\overline{)40}$ gives quotient 3, remainder 7 ($\dfrac{33}{7}$) $\qquad \dfrac{40}{11} = 3\dfrac{7}{11}$

20. $12\overline{)78}$ gives quotient 6, remainder 6 ($\dfrac{72}{6}$) $\qquad \dfrac{78}{12} = 6\dfrac{6}{12} = 6\dfrac{1}{2}$

21. $63\overline{)125}$ gives quotient 1, remainder 62 ($\dfrac{63}{62}$) $\qquad \dfrac{125}{63} = 1\dfrac{62}{63}$

22. $45\overline{)195}$ gives quotient 4, remainder 15 ($\dfrac{180}{15}$) $\qquad \dfrac{195}{45} = 4\dfrac{15}{45} = 4\dfrac{1}{3}$

23. $25\overline{)183}$ $\dfrac{183}{25} = 7\dfrac{8}{25}$
$\phantom{25\overline{)}}\dfrac{175}{8}$
(quotient 7)

24. $149\overline{)720}$ $\dfrac{720}{149} = 4\dfrac{124}{149}$
$\phantom{149\overline{)}}\dfrac{596}{124}$
(quotient 4)

25. Answers will vary.

26. Answers will vary.

27. $\dfrac{8}{16} = \dfrac{8 \div 8}{16 \div 2} = \dfrac{1}{2}$

28. $\dfrac{15}{20} = \dfrac{15 \div 5}{20 \div 5} = \dfrac{3}{4}$

29. $\dfrac{25}{40} = \dfrac{25 \div 5}{40 \div 5} = \dfrac{5}{8}$

30. $\dfrac{36}{42} = \dfrac{36 \div 6}{42 \div 6} = \dfrac{6}{7}$

31. $\dfrac{27}{45} = \dfrac{27 \div 9}{45 \div 9} = \dfrac{3}{5}$

32. $\dfrac{112}{128} = \dfrac{112 \div 16}{128 \div 16} = \dfrac{7}{8}$

33. $\dfrac{165}{180} = \dfrac{165 \div 15}{180 \div 15} = \dfrac{11}{12}$

34. $\dfrac{12}{600} = \dfrac{12 \div 12}{600 \div 12} = \dfrac{1}{50}$

35. $\dfrac{24}{24} = \dfrac{24 \div 24}{24 \div 24} = 1$
24 Kt. gold is pure gold.

36. $\dfrac{18}{24} = \dfrac{18 \div 6}{24 \div 6} = \dfrac{3}{4}$
18 Kt. gold is $\dfrac{3}{4}$ gold.

37. $\dfrac{14}{24} = \dfrac{14 \div 2}{24 \div 2} = \dfrac{7}{12}$
14 Kt. gold is $\dfrac{7}{12}$ gold.

38. $\dfrac{10}{24} = \dfrac{10 \div 2}{24 \div 2} = \dfrac{5}{12}$
10 Kt. gold is $\dfrac{5}{12}$ gold.

39. Answers will vary.

40. Answers will vary.

41. 32 is divisible by 2 since the last digit is an even number.
32 is not divisible by 3 since $3 + 2 = 5$ is not divisible by 3.
32 is divisible by 4 since $32 \div 4 = 8$.
32 is not divisible by 5 since the last digit is not 0 or 5.
32 is not divisible by 6 since $3 + 2 = 5$ is not divisible by 3.
32 is divisible by 8 since $32 \div 8 = 4$.
32 is not divisible by 9 since $3 + 2 = 5$ is not divisible by 9.
32 is not divisible by 10 since the last digit is not 0.

42. 45 is not divisible by 2 since the last digit is not an even number.
45 is divisible by 3 since $4 + 5 = 9$ is divisible by 3.
45 is not divisible by 4 since $45 \div 4 \neq$ integer.
45 is divisible by 5 since the last digit is 5.
45 is not divisible by 6 since it is not an even number.
45 is not divisible by 8 since $45 \div 8 \neq$ integer.
45 is divisible by 9 since $4 + 5 = 9$ is divisible by 9.
45 is not divisible by 10 since the last digit is not 0.

43. 60 is divisible by 2 since the last digit is an even number.
60 is divisible by 3 since $6+0=6$ is divisible by 3.
60 is divisible by 4 since $60 \div 4 = 15$.
60 is divisible by 5 since the last digit is 0.
60 is divisible by 6 since 60 is even and since $6+0=6$ is divisible by 3.
60 is not divisible by 8 since $60 \div 8 \neq$ integer.
60 is not divisible by 9 since $6+0=6$ is not divisible by 9.
60 is divisible by 10 since the last digit is 0.

44. 72 is divisible by 2 since the last digit is an even number.
72 is divisible by 3 since $7+2=9$ is divisible by 3.
72 is divisible by 4 since $72 \div 4 = 18$.
72 is not divisible by 5 since the last digit is not 0 or 5.
72 is divisible by 6 since 72 is even and $7+2=9$ is divisible by 3.
72 is divisible by 8 since $72 \div 8 = 9$.
72 is divisible by 9 since $7+2=9$ is divisible by 9.
72 is not divisible by 10 since the last digit is not 0.

45. 90 is divisible by 2 since the last digit is an even number.
90 is divisible by 3 since $9+0=9$ is divisible by 3.
90 is not divisible by 4 since $90 \div 4 \neq$ integer.
90 is divisible by 5 since the last digit is 0.
90 is divisible by 6 since 90 is even and since $9+0=9$ is divisible by 3.
90 is not divisible by 8 since $90 \div 8 \neq$ integer.
90 is divisible by 9 since $9+0=9$ is divisible by 9.
90 is divisible by 10 since the last digit is 0.

46. 105 is not divisible by 2 since the last digit is not an even number.
105 is divisible by 3 since $1+0+5=6$ is divisible by 3.
105 is not divisible by 4 since 5 is not divisible by 4.
105 is divisible by 5 since the last digit is 5.
105 is not divisible by 6 since it is not an even number.
105 is not divisible by 8 since $105 \div 8 \neq$ integer.
105 is not divisible by 9 since $1+0+5=6$ is not divisible by 9.
105 is not divisible by 10 since the last digit is not 0.

47. 4172 is divisible by 2 since the last digit is an even number.
4172 is not divisible by 3 since $4+1+7+2=14$ is not divisible by 3.
4172 is divisible by 4 since 72 is divisible by 4.
4172 is not divisible by 5 since the last digit is not 0 or 5.
4172 is not divisible by 6 since $4+1+7+2=14$ is not divisible by 3.
4172 is not divisible by 8 since $172 \div 8 \neq$ integer.
4172 is not divisible by 9 since $4+1+7+2=14$ is not divisible by 9.
4172 is not divisible by 10 since the last digit is not 0.

48. 5688 is divisible by 2 since the last digit is an even number.
5688 is divisible by 3 since $5+6+8+8=27$ is divisible by 3.
5688 is divisible by 4 since $88 \div 4 = 22$.
5688 is not divisible by 5 since the last digit is not 0 or 5.
5688 is divisible by 6 since 5688 is even and $5+6+8+8=27$ is divisible by 3.
5688 is divisible by 8 since $688 \div 8 = 86$.
5688 is divisible by 9 since $5+6+8+8=27$ is divisible by 9.
5688 is not divisible by 10 since the last digit is not 0.

2.2 Addition and Subtraction of Fractions

1. $\dfrac{4}{5} = \dfrac{}{20}$

$20 \div 5 = 4$

$4 \times 4 = 16$

$\dfrac{4}{5} = \dfrac{16}{20}$

2. $\dfrac{3}{4} = \dfrac{}{16}$

$16 \div 4 = 4$

$4 \times 3 = 12$

$\dfrac{3}{4} = \dfrac{12}{16}$

3. $\dfrac{9}{10} = \dfrac{}{40}$

$40 \div 10 = 4$

$4 \times 9 = 36$

$\dfrac{9}{10} = \dfrac{36}{40}$

4. $\dfrac{7}{8} = \dfrac{}{56}$

$56 \div 8 = 7$

$7 \times 7 = 49$

$\dfrac{7}{8} = \dfrac{49}{56}$

5. $\dfrac{6}{5} = \dfrac{}{40}$

$40 \div 5 = 8$

$8 \times 6 = 48$

$\dfrac{6}{5} = \dfrac{48}{40}$

6. $\dfrac{7}{8} = \dfrac{}{64}$

$64 \div 8 = 8$

$8 \times 7 = 56$

$\dfrac{7}{8} = \dfrac{56}{64}$

7. $\dfrac{6}{7} = \dfrac{}{49}$

$49 \div 7 = 7$

$7 \times 6 = 42$

$\dfrac{6}{7} = \dfrac{42}{49}$

8. $\dfrac{11}{15} = \dfrac{}{120}$

$120 \div 15 = 8$

$8 \times 11 = 88$

$\dfrac{11}{15} = \dfrac{88}{120}$

9. 3, 8, ___

$$
\begin{array}{r}
1\quad 1 \\
3\overline{)3\quad 1} \\
2\overline{)3\quad 2} \\
2\overline{)3\quad 4} \\
2\overline{)3\quad 8}
\end{array}
$$

$2 \times 2 \times 2 \times 3 = 24$

10. 18, 24, ___

$$
\begin{array}{r}
1\quad\ 1 \\
3\overline{)\ \ 3\quad\ 1} \\
3\overline{)\ \ 9\quad\ 3} \\
2\overline{)\ \ 9\quad\ 6} \\
2\overline{)\ \ 9\quad 12} \\
2\overline{)18\quad 24}
\end{array}
$$

$2 \times 2 \times 2 \times 3 \times 3 = 72$

11. 12, 18, 20, ___

$$
\begin{array}{r}
1\quad 1\quad\ 1 \\
5\overline{)\ 1\quad 1\quad\ 5} \\
3\overline{)\ 1\quad 3\quad\ 5} \\
3\overline{)\ 3\quad 9\quad\ 5} \\
2\overline{)\ 6\quad 9\quad 10} \\
2\overline{)12\ \ 18\ \ 20}
\end{array}
$$

$2 \times 2 \times 3 \times 3 \times 5 = 180$

12. 18, 20, 24, ___

$$
\begin{array}{r}
\;1\quad1\quad1 \\
5)\overline{\;1\quad5\quad1\;} \\
3)\overline{\;3\quad5\quad1\;} \\
3)\overline{\;9\quad5\quad3\;} \\
2)\overline{\;9\quad5\quad6\;} \\
2)\overline{\;9\quad10\quad12\;} \\
2)\overline{18\quad20\quad24\;}
\end{array}
$$

$2 \times 2 \times 2 \times 3 \times 3 \times 5 = 360$

13. 15, 24, 32, ___

$$
\begin{array}{r}
\;1\quad1\quad1 \\
5)\overline{\;5\quad1\quad1\;} \\
3)\overline{15\quad3\quad1\;} \\
2)\overline{15\quad3\quad2\;} \\
2)\overline{15\quad3\quad4\;} \\
2)\overline{15\quad6\quad8\;} \\
2)\overline{15\quad12\quad16\;} \\
2)\overline{15\quad24\quad32\;}
\end{array}
$$

$2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 5 = 480$

14. 6, 8, 10, 12, ___

$$
\begin{array}{r}
\;1\quad1\quad1\quad1 \\
5)\overline{\;1\quad1\quad5\quad1\;} \\
3)\overline{\;3\quad1\quad5\quad3\;} \\
2)\overline{\;3\quad2\quad5\quad3\;} \\
2)\overline{\;3\quad4\quad5\quad6\;} \\
2)\overline{\;6\quad8\quad10\quad12\;}
\end{array}
$$

$2 \times 2 \times 2 \times 3 \times 5 = 120$

15. 10, 35, 50, 60, ___

$$
\begin{array}{r}
\;1\quad1\quad1\quad1 \\
7)\overline{\;1\quad7\quad1\quad1\;} \\
5)\overline{\;1\quad7\quad5\quad1\;} \\
5)\overline{\;5\quad35\quad25\quad5\;} \\
3)\overline{\;5\quad35\quad25\quad15\;} \\
2)\overline{\;5\quad35\quad25\quad30\;} \\
2)\overline{10\quad35\quad50\quad60\;}
\end{array}
$$

$2 \times 2 \times 3 \times 5 \times 5 \times 7 = 2100$

16. 5, 18, 25, 30, 36, ___

$$
\begin{array}{r}
\;1\quad1\quad1\quad1\quad1 \\
5)\overline{\;1\quad1\quad5\quad1\quad1\;} \\
5)\overline{\;5\quad1\quad25\quad5\quad1\;} \\
3)\overline{\;5\quad3\quad25\quad5\quad3\;} \\
3)\overline{\;5\quad9\quad25\quad15\quad9\;} \\
2)\overline{\;5\quad9\quad25\quad15\quad18\;} \\
2)\overline{\;5\quad18\quad25\quad30\quad36\;}
\end{array}
$$

$2 \times 2 \times 3 \times 3 \times 5 \times 5 = 900$

17. Answers will vary.

18. Answers will vary.

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

20. $\dfrac{2}{9} + \dfrac{4}{9} = \dfrac{2+4}{9} = \dfrac{6}{9} = \dfrac{2}{3}$

21. $\dfrac{3}{10} + \dfrac{5}{10} = \dfrac{3+5}{10} = \dfrac{8}{10} = \dfrac{4}{5}$

22. $\dfrac{5}{8} + \dfrac{7}{8} = \dfrac{5+7}{8} = \dfrac{12}{8} = 1\dfrac{4}{8} = 1\dfrac{1}{2}$

23. $\dfrac{11}{12} - \dfrac{5}{12} = \dfrac{11-5}{12} = \dfrac{6}{12} = \dfrac{1}{2}$

24. $\dfrac{5}{7} - \dfrac{1}{7} = \dfrac{5-1}{7} = \dfrac{4}{7}$

25. $\dfrac{5}{12} - \dfrac{1}{16} = \dfrac{20}{48} - \dfrac{3}{48} = \dfrac{20-3}{48} = \dfrac{17}{48}$

26. $\dfrac{2}{3} - \dfrac{3}{8} = \dfrac{16}{24} - \dfrac{9}{24} = \dfrac{16-9}{24} = \dfrac{7}{24}$

27. $\dfrac{3}{4} + \dfrac{5}{9} + \dfrac{1}{3} = \dfrac{27}{36} + \dfrac{20}{36} + \dfrac{12}{36}$

$= \dfrac{27+20+12}{36} = \dfrac{59}{36} = 1\dfrac{23}{36}$

28. $\dfrac{1}{4} + \dfrac{1}{8} + \dfrac{1}{12} = \dfrac{6}{24} + \dfrac{3}{24} + \dfrac{2}{24}$

$= \dfrac{6+3+2}{24} = \dfrac{11}{24}$

29. $\dfrac{3}{7}+\dfrac{2}{5}+\dfrac{1}{10}=\dfrac{30}{70}+\dfrac{28}{70}+\dfrac{7}{70}$

$=\dfrac{30+28+7}{70}=\dfrac{65}{70}=\dfrac{13}{14}$

30. $\dfrac{5}{6}+\dfrac{3}{4}+\dfrac{5}{8}=\dfrac{20}{24}+\dfrac{18}{24}+\dfrac{15}{24}$

$=\dfrac{20+18+15}{24}=\dfrac{53}{24}=2\dfrac{5}{24}$

31. $\dfrac{7}{10}+\dfrac{8}{15}+\dfrac{5}{6}=\dfrac{21}{30}+\dfrac{16}{30}+\dfrac{25}{30}$

$=\dfrac{21+16+25}{30}=\dfrac{62}{30}=2\dfrac{2}{30}=2\dfrac{1}{15}$

32. $\dfrac{3}{10}+\dfrac{2}{5}+\dfrac{3}{20}=\dfrac{6}{20}+\dfrac{8}{20}+\dfrac{3}{20}$

$=\dfrac{6+8+3}{20}=\dfrac{17}{20}$

33.
$$\dfrac{3}{4}=\dfrac{27}{36}$$
$$\dfrac{2}{3}=\dfrac{24}{36}$$
$$+\dfrac{8}{9}=\dfrac{32}{36}$$
$$\dfrac{83}{36}=2\dfrac{11}{36}$$

34.
$$\dfrac{7}{12}=\dfrac{14}{24}$$
$$\dfrac{5}{8}=\dfrac{15}{24}$$
$$+\dfrac{7}{6}=\dfrac{28}{24}$$
$$\dfrac{57}{24}=2\dfrac{9}{24}=2\dfrac{3}{8}$$

35.
$$\dfrac{8}{15}=\dfrac{16}{30}$$
$$\dfrac{3}{10}=\dfrac{9}{30}$$
$$+\dfrac{3}{5}=\dfrac{18}{30}$$
$$\dfrac{43}{30}=1\dfrac{13}{30}$$

36.
$$\dfrac{1}{6}=\dfrac{3}{18}$$
$$\dfrac{5}{9}=\dfrac{10}{18}$$
$$+\dfrac{13}{18}=\dfrac{13}{18}$$
$$\dfrac{26}{18}=1\dfrac{8}{18}=1\dfrac{4}{9}$$

37.
$$\dfrac{7}{10}=\dfrac{14}{20}$$
$$-\dfrac{1}{4}=\dfrac{5}{20}$$
$$\dfrac{9}{20}$$

38.
$$\dfrac{4}{5}=\dfrac{12}{15}$$
$$-\dfrac{2}{3}=\dfrac{10}{15}$$
$$\dfrac{2}{15}$$

39.
$$\dfrac{5}{8}=\dfrac{15}{24}$$
$$-\dfrac{1}{3}=\dfrac{8}{24}$$
$$\dfrac{7}{24}$$

40.
$$\dfrac{19}{24}=\dfrac{38}{48}$$
$$-\dfrac{5}{16}=\dfrac{15}{48}$$
$$\dfrac{23}{48}$$

41. Answers will vary.

42. Answers will vary.

43. $\dfrac{1}{4}+\dfrac{3}{8}+\dfrac{1}{3}=\dfrac{6}{24}+\dfrac{9}{24}+\dfrac{8}{24}=\dfrac{23}{24}$

Zalia ordered $\dfrac{23}{24}$ cubic yards.

44. $\dfrac{1}{4}+\dfrac{1}{6}+\dfrac{1}{10}+\dfrac{1}{12}=\dfrac{15}{50}+\dfrac{10}{60}+\dfrac{6}{60}+\dfrac{5}{60}$

$=\dfrac{36}{60}=\dfrac{3}{5}$

Chuck has spent $\dfrac{3}{5}$ of his total savings.

45. $\dfrac{1}{5}+\dfrac{1}{3}+\dfrac{1}{4}=\dfrac{12}{60}+\dfrac{20}{60}+\dfrac{15}{60}=\dfrac{47}{60}$

The total length of the bolt is $\dfrac{47}{60}$ inch.

46. $\dfrac{1}{8}+\dfrac{1}{4}+\dfrac{2}{5}=\dfrac{5}{40}+\dfrac{10}{40}+\dfrac{16}{40}=\dfrac{31}{40}$

The total length of the screw is $\dfrac{31}{40}$ inch.

47. $\dfrac{7}{8}-\dfrac{1}{4}-\dfrac{1}{3}=\dfrac{21}{24}-\dfrac{6}{24}-\dfrac{8}{24}=\dfrac{7}{24}$

$\dfrac{7}{24}$ of the contents remain.

48. $\dfrac{7}{8}-\dfrac{1}{6}-\dfrac{1}{3}=\dfrac{21}{24}-\dfrac{4}{24}-\dfrac{8}{24}=\dfrac{9}{24}=\dfrac{3}{8}$

There is $\dfrac{3}{8}$ gallon of fluid remaining.

49. $\dfrac{1}{4}+\dfrac{1}{4}+\dfrac{1}{4}=\dfrac{1+1+1}{4}=\dfrac{3}{4}$

$\dfrac{3}{4}$ cup of butter is needed.

50. $\dfrac{2}{5}+\dfrac{1}{8}+\dfrac{1}{6}=\dfrac{48}{120}+\dfrac{15}{120}+\dfrac{20}{120}=\dfrac{83}{120}$

Joan has saved $\dfrac{83}{120}$ of the start-up costs.

51. $\dfrac{15}{16}-\dfrac{3}{8}-\dfrac{3}{8}=\dfrac{15}{16}-\dfrac{6}{16}-\dfrac{6}{16}=\dfrac{3}{16}$

The diameter of the hole is $\dfrac{3}{16}$ inch.

52. $\dfrac{1}{8}+\dfrac{1}{4}+\dfrac{1}{4}=\dfrac{1}{8}+\dfrac{2}{8}+\dfrac{2}{8}=\dfrac{5}{8}$

Martin has run $\dfrac{5}{8}$ mile.

$\dfrac{3}{4}-\dfrac{5}{8}=\dfrac{6}{8}-\dfrac{5}{8}=\dfrac{1}{8}$

Martin must run an additional $\dfrac{1}{8}$ mile.

53. $\dfrac{1}{6}+\dfrac{1}{8}=\dfrac{4}{24}+\dfrac{3}{24}=\dfrac{7}{24}$

$\dfrac{7}{24}$ of the day was spent in class and study.

54. $\dfrac{1}{3}+\dfrac{1}{12}=\dfrac{4}{12}+\dfrac{1}{12}=\dfrac{5}{12}$

$\dfrac{5}{12}$ of the day was spent in work and travel, and other.

55. The greatest amount of time (the largest segment of the graph) was spent in work and travel.

$\dfrac{1}{3}+\dfrac{1}{6}=\dfrac{2}{6}+\dfrac{1}{6}=\dfrac{3}{6}=\dfrac{1}{2}$

$\dfrac{1}{2}$ of the day was spent in work and travel, and class time.

56. The least amount of time (the smallest segment of the graph) was spent in other.

$\dfrac{1}{12}+\dfrac{1}{8}=\dfrac{2}{24}+\dfrac{3}{24}=\dfrac{5}{24}$

$\dfrac{5}{24}$ of the day was spent in other and study.

57. $\dfrac{3}{4}-\dfrac{1}{4}=\dfrac{2}{4}=\dfrac{1}{2}$

The difference in the width is $\dfrac{1}{2}$ inch.

58. $\dfrac{1}{2}-\dfrac{1}{4}=\dfrac{2}{4}-\dfrac{1}{4}=\dfrac{1}{4}$

The difference in the width is $\dfrac{1}{4}$ inch.

59. $\dfrac{7}{8}-\dfrac{1}{4}-\dfrac{1}{6}-\dfrac{3}{8}=\dfrac{21}{24}-\dfrac{6}{24}-\dfrac{4}{24}-\dfrac{9}{24}$

$=\dfrac{2}{24}=\dfrac{1}{12}$

The length of the fourth side is $\dfrac{1}{12}$ mile.

60. $\dfrac{7}{8}-\dfrac{3}{16}-\dfrac{3}{16}=\dfrac{14}{16}-\dfrac{3}{16}-\dfrac{3}{16}=\dfrac{8}{16}=\dfrac{1}{2}$

The diameter of the hole is $\dfrac{1}{2}$ inch.

2.3   Addition and Subtraction of Mixed Numbers

1. $82\dfrac{3}{5}$

$+15\dfrac{1}{5}$

$97\dfrac{4}{5}$

2. $5\dfrac{1}{3} = 5\dfrac{4}{12}$

$+2\dfrac{1}{4} = 2\dfrac{3}{12}$

$7\dfrac{7}{12}$

3. $41\dfrac{1}{2} = 41\dfrac{2}{4}$

$+39\dfrac{1}{4} = 39\dfrac{1}{4}$

$80\dfrac{3}{4}$

4. $28\dfrac{1}{4} = 28\dfrac{5}{20}$

$+23\dfrac{3}{5} = 23\dfrac{12}{20}$

$51\dfrac{17}{20}$

5. $46\dfrac{3}{4} = 46\dfrac{30}{40}$

$12\dfrac{5}{8} = 12\dfrac{25}{40}$

$+37\dfrac{4}{5} = 37\dfrac{32}{40}$

$95\dfrac{87}{40} = 95 + 2\dfrac{7}{40} = 97\dfrac{7}{40}$

6. $26\dfrac{5}{8} = 26\dfrac{35}{56}$

$17\dfrac{3}{14} = 17\dfrac{12}{56}$

$+32\dfrac{2}{7} = 32\dfrac{16}{56}$

$75\dfrac{63}{56} = 75 + 1\dfrac{7}{56} = 76\dfrac{1}{8}$

7. $32\dfrac{3}{4} = 32\dfrac{18}{24}$

$6\dfrac{1}{3} = 6\dfrac{8}{24}$

$+14\dfrac{5}{8} = 14\dfrac{15}{24}$

$52\dfrac{41}{24} = 52 + 1\dfrac{17}{24} = 53\dfrac{17}{24}$

8. $16\dfrac{7}{10} = 16\dfrac{28}{40}$

$26\dfrac{1}{5} = 26\dfrac{8}{40}$

$+8\dfrac{3}{8} = 8\dfrac{15}{40}$

$50\dfrac{51}{40} = 50 + 1\dfrac{11}{40} = 51\dfrac{11}{40}$

9. $16\dfrac{3}{4} = 16\dfrac{6}{8}$

$-12\dfrac{3}{8} = 12\dfrac{3}{8}$

$4\dfrac{3}{8}$

10. $25\dfrac{13}{24} = 25\dfrac{13}{24}$

$-18\dfrac{5}{12} = 18\dfrac{10}{24}$

$7\dfrac{3}{24} = 7\dfrac{1}{8}$

11. $9\dfrac{7}{8} = 9\dfrac{21}{24}$

$-6\dfrac{5}{12} = 6\dfrac{10}{24}$

$3\dfrac{11}{24}$

12. $374 = 373\dfrac{6}{6}$

$-211\dfrac{5}{6} = 211\dfrac{5}{6}$

$162\dfrac{1}{6}$

13.
$$19 = 18\frac{4}{4}$$
$$\underline{-12\frac{3}{4}} = 12\frac{3}{4}$$
$$6\frac{1}{4}$$

14.
$$71\frac{3}{8} = 71\frac{9}{24}$$
$$\underline{-62\frac{1}{3}} = 62\frac{8}{24}$$
$$9\frac{1}{24}$$

15.
$$6\frac{1}{3} = 6\frac{4}{12} = 5\frac{16}{12}$$
$$\underline{-2\frac{5}{12}} = 2\frac{5}{12} = 2\frac{5}{12}$$
$$3\frac{11}{12}$$

16.
$$72\frac{3}{10} = 72\frac{9}{30} = 71\frac{39}{30}$$
$$\underline{-25\frac{8}{15}} = 25\frac{16}{30} = 25\frac{16}{30}$$
$$46\frac{23}{30}$$

17. Answers will vary.

18. Answers will vary.

19. $3\frac{3}{8}+5\frac{1}{2}+4\frac{3}{4}+3\frac{1}{4}+6$
$$= 3\frac{3}{8}+5\frac{4}{8}+4\frac{6}{8}+3\frac{2}{8}+6$$
$$= 21\frac{15}{8} = 22\frac{7}{8}$$

Loren worked $22\frac{7}{8}$ hours altogether.

20. $2\frac{5}{8}+6\frac{1}{2}+1\frac{5}{6}+3\frac{1}{4}+7\frac{3}{8}$
$$= 2\frac{15}{24}+6\frac{12}{24}+1\frac{20}{24}+3\frac{6}{24}+7\frac{9}{24}$$
$$= 19\frac{62}{24} = 21\frac{14}{24} = 21\frac{7}{12}$$

The total weight is $21\frac{7}{12}$ tons.

21. $34\frac{1}{2}+23\frac{3}{4}+34\frac{1}{2}+23\frac{3}{4}$
$$= 34\frac{2}{4}+23\frac{3}{4}+34\frac{2}{4}+23\frac{3}{4}$$
$$= 114\frac{10}{4} = 116\frac{2}{4} = 116\frac{1}{2}$$

$116\frac{1}{2}$ inches of lead stripping are needed.

22. $9\frac{7}{8}+5\frac{1}{8}+9\frac{7}{8}+5\frac{1}{8} = 28\frac{16}{8} = 30$

30 inches of brass trim are needed.

23. $107\frac{2}{3}+150\frac{3}{4}+138\frac{5}{8}$
$$= 107\frac{16}{24}+150\frac{18}{24}+138\frac{15}{24} = 395\frac{49}{24} = 397\frac{1}{24}$$

Lengths of the three sides total $397\frac{1}{24}$ feet.

$527\frac{1}{24} - 397\frac{1}{24} = 130$

The length of the fourth side is 130 feet.

24. $108\frac{1}{4}+162\frac{3}{8}+143\frac{1}{2}$
$$= 108\frac{2}{8}+162\frac{3}{8}+143\frac{4}{8} = 413\frac{9}{8} = 414\frac{1}{8}$$

Lengths of the three sides total $414\frac{1}{8}$ feet.

$518\frac{3}{4} - 414\frac{1}{8} = 518\frac{6}{8} - 414\frac{1}{8} = 104\frac{5}{8}$

The length of the fourth side is $104\frac{5}{8}$ feet.

25. $2\frac{1}{2}+3+1\frac{3}{4} = 2\frac{2}{4}+3+1\frac{3}{4} = 6\frac{5}{4} = 7\frac{1}{4}$

$7\frac{1}{4}$ cubic yards have been unloaded.

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

$1\frac{5}{8}$ cubic yards of concrete remain.

26. $3\frac{3}{4}+4\frac{1}{8}+3\frac{7}{8} = 3\frac{6}{8}+4\frac{1}{8}+3\frac{7}{8} = 10\frac{14}{8} = 11\frac{3}{4}$

$11\frac{3}{4}$ yards of material have been used.

$15 - 11\frac{3}{4} = 14\frac{4}{4} - 11\frac{3}{4} = 3\frac{1}{4}$

$3\frac{1}{4}$ yards of material remain.

2.4 Multiplication and Division of Fractions

1. $\dfrac{3}{\cancel{4}_{2}}\times\dfrac{\cancel{2}^{1}}{5}=\dfrac{3\times1}{2\times5}=\dfrac{3}{10}$

2. $\dfrac{\cancel{2}^{1}}{3}\times\dfrac{5}{\cancel{8}_{4}}=\dfrac{1\times5}{3\times4}=\dfrac{5}{12}$

3. $\dfrac{9}{10}\times\dfrac{11}{16}=\dfrac{9\times11}{10\times16}=\dfrac{99}{160}$

4. $\dfrac{\cancel{2}^{1}}{\cancel{3}_{1}}\times\dfrac{\cancel{3}^{1}}{\cancel{8}_{4}}=\dfrac{1\times1}{1\times4}=\dfrac{1}{4}$

5. $\dfrac{9}{\cancel{22}_{2}}\times\dfrac{\cancel{11}^{1}}{16}=\dfrac{9\times1}{2\times16}=\dfrac{9}{32}$

6. $\dfrac{\cancel{5}^{1}}{12}\times\dfrac{7}{\cancel{10}_{2}}=\dfrac{1\times7}{12\times2}=\dfrac{7}{24}$

7. $1\dfrac{1}{4}\times3\dfrac{1}{2}=\dfrac{5}{4}\times\dfrac{7}{2}$

$=\dfrac{5\times7}{4\times2}=\dfrac{35}{8}=4\dfrac{3}{8}$

8. $1\dfrac{2}{3}\times2\dfrac{7}{10}=\dfrac{\cancel{5}^{1}}{\cancel{3}_{1}}\times\dfrac{\cancel{27}^{9}}{\cancel{10}_{2}}$

$=\dfrac{1\times9}{1\times2}=\dfrac{9}{2}=4\dfrac{1}{2}$

9. $3\dfrac{1}{9}\times3=\dfrac{28}{\cancel{9}_{3}}\times\dfrac{\cancel{3}^{1}}{1}$

$=\dfrac{28\times1}{3\times1}=\dfrac{28}{3}=9\dfrac{1}{3}$

10. $\dfrac{3}{4}\times\dfrac{8}{9}\times2\dfrac{1}{2}=\dfrac{\cancel{3}^{1}}{\cancel{4}_{1}}\times\dfrac{\cancel{8}^{2}}{\cancel{9}_{3}}\times\dfrac{5}{2}$

$=\dfrac{1\times2\times5}{1\times3\times2}=\dfrac{10}{6}=1\dfrac{4}{6}=1\dfrac{2}{3}$

11. $\dfrac{1}{4}\times6\dfrac{2}{3}\times\dfrac{1}{5}=\dfrac{1}{\cancel{4}_{1}}\times\dfrac{\cancel{20}^{\cancel{5}^{1}}}{3}\times\dfrac{1}{\cancel{5}}$

$=\dfrac{1\times1\times1}{1\times3\times1}=\dfrac{1}{3}$

12. $\dfrac{2}{3}\times\dfrac{9}{8}\times3\dfrac{1}{4}=\dfrac{\cancel{2}^{1}}{\cancel{3}_{1}}\times\dfrac{\cancel{9}^{3}}{\cancel{8}_{4}}\times\dfrac{13}{4}$

$=\dfrac{1\times3\times13}{1\times4\times4}=\dfrac{39}{16}=2\dfrac{7}{16}$

13. $\dfrac{5}{9}\times2\dfrac{1}{4}\times3\dfrac{2}{3}=\dfrac{5}{\cancel{9}_{1}}\times\dfrac{\cancel{9}^{1}}{4}\times\dfrac{11}{3}$

$=\dfrac{5\times1\times11}{1\times4\times3}=\dfrac{55}{12}=4\dfrac{7}{12}$

14. $3\times1\dfrac{1}{2}\times2\dfrac{2}{3}=\dfrac{3}{1}\times\dfrac{\cancel{3}^{1}}{\cancel{2}_{1}}\times\dfrac{\cancel{8}^{4}}{\cancel{3}_{1}}$

$=\dfrac{3\times1\times4}{1\times1\times1}=\dfrac{12}{1}=12$

15. $5\dfrac{3}{5}\times1\dfrac{5}{9}\times\dfrac{10}{49}=\dfrac{\cancel{28}^{4}}{\cancel{5}_{1}}\times\dfrac{\cancel{14}^{2}}{9}\times\dfrac{\cancel{10}^{2}}{\cancel{49}_{\cancel{7}_{1}}}$

$=\dfrac{4\times2\times2}{1\times9\times1}=\dfrac{16}{9}=1\dfrac{7}{9}$

16. $\dfrac{1}{4}\div\dfrac{3}{4}=\dfrac{1}{\cancel{4}_{1}}\times\dfrac{\cancel{4}^{1}}{3}$

$=\dfrac{1\times1}{1\times3}=\dfrac{1}{3}$

17. $\dfrac{3}{8}\div\dfrac{5}{8}=\dfrac{3}{\cancel{8}_{1}}\times\dfrac{\cancel{8}^{1}}{5}$

$=\dfrac{3\times1}{1\times5}=\dfrac{3}{5}$

18. $\dfrac{13}{20}\div\dfrac{26}{30}=\dfrac{\cancel{13}^{1}}{\cancel{20}_{2}}\times\dfrac{\cancel{30}^{3}}{\cancel{26}_{2}}$

$=\dfrac{1\times3}{2\times2}=\dfrac{3}{4}$

19. $\dfrac{9}{10} \div \dfrac{3}{5} = \dfrac{\overset{3}{\cancel{9}}}{\underset{2}{\cancel{10}}} \times \dfrac{\overset{1}{\cancel{5}}}{\underset{1}{\cancel{3}}}$

$= \dfrac{3 \times 1}{2 \times 1} = \dfrac{3}{2} = 1\dfrac{1}{2}$

20. $\dfrac{7}{8} \div \dfrac{3}{4} = \dfrac{7}{\underset{2}{\cancel{8}}} \times \dfrac{\overset{1}{\cancel{4}}}{3}$

$= \dfrac{7 \times 1}{2 \times 3} = \dfrac{7}{6} = 1\dfrac{1}{6}$

21. $2\dfrac{1}{2} \div 3\dfrac{3}{4} = \dfrac{5}{2} \div \dfrac{15}{4}$

$= \dfrac{\overset{1}{\cancel{5}}}{\underset{1}{\cancel{2}}} \times \dfrac{\overset{2}{\cancel{4}}}{\underset{3}{\cancel{15}}} = \dfrac{1 \times 2}{1 \times 3} = \dfrac{2}{3}$

22. $1\dfrac{1}{4} \div 4\dfrac{1}{6} = \dfrac{5}{4} \div \dfrac{25}{6}$

$= \dfrac{\overset{1}{\cancel{5}}}{\underset{2}{\cancel{4}}} \times \dfrac{\overset{3}{\cancel{6}}}{\underset{5}{\cancel{25}}} = \dfrac{1 \times 3}{2 \times 5} = \dfrac{3}{10}$

23. $5 \div 1\dfrac{7}{8} = 5 \div \dfrac{15}{8}$

$= \dfrac{\overset{1}{\cancel{5}}}{1} \times \dfrac{8}{\underset{3}{\cancel{15}}} = \dfrac{1 \times 8}{1 \times 3} = \dfrac{8}{3} = 2\dfrac{2}{3}$

24. $3 \div 1\dfrac{1}{4} = 3 \div \dfrac{5}{4}$

$= \dfrac{3}{1} \times \dfrac{4}{5} = \dfrac{3 \times 4}{5} = \dfrac{12}{5} = 2\dfrac{2}{5}$

25. $\dfrac{3}{8} \div 2\dfrac{1}{2} = \dfrac{3}{8} \div \dfrac{5}{2}$

$= \dfrac{3}{\underset{4}{\cancel{8}}} \times \dfrac{\overset{1}{\cancel{2}}}{5} = \dfrac{3 \times 1}{4 \times 5} = \dfrac{3}{20}$

26. $1\dfrac{7}{8} \div 6\dfrac{1}{4} = \dfrac{15}{8} \div \dfrac{25}{4}$

$= \dfrac{\overset{3}{\cancel{15}}}{\underset{2}{\cancel{8}}} \times \dfrac{\overset{1}{\cancel{4}}}{\underset{5}{\cancel{25}}} = \dfrac{3 \times 1}{2 \times 5} = \dfrac{3}{10}$

27. $2\dfrac{5}{8} \div \dfrac{5}{16} = \dfrac{21}{8} \div \dfrac{5}{16}$

$= \dfrac{21}{\underset{1}{\cancel{8}}} \times \dfrac{\overset{2}{\cancel{16}}}{5} = \dfrac{21 \times 2}{1 \times 5} = \dfrac{42}{5} = 8\dfrac{2}{5}$

28. $5\dfrac{2}{3} \div 6 = \dfrac{17}{3} \div \dfrac{6}{1}$

$= \dfrac{17}{3} \times \dfrac{1}{6} = \dfrac{17 \times 1}{3 \times 6} = \dfrac{17}{18}$

29. Answers will vary.

30. Answers will vary.

31. $\$8 \times 1\dfrac{1}{2} = \dfrac{\$\overset{4}{\cancel{8}}}{1} \times \dfrac{3}{\underset{1}{\cancel{2}}}$

$= \dfrac{\$4 \times 3}{1 \times 1} = \$12$

32. $\$17 \times 1\dfrac{1}{2} = \dfrac{\$17}{1} \times \dfrac{3}{2}$

$= \dfrac{\$17 \times 3}{1 \times 2} = \dfrac{\$51}{2} = \$25\dfrac{1}{2} = \$25.50$

33. $\$12.50 \times 1\dfrac{1}{2} = \dfrac{\$25}{2} \times \dfrac{3}{2}$

$= \dfrac{\$25 \times 3}{2 \times 2} = \dfrac{\$75}{4} = \$18\dfrac{3}{4} = \$18.75$

34. $\$9.50 \times 1\dfrac{1}{2} = \dfrac{\$19}{2} \times \dfrac{3}{2}$

$= \dfrac{\$19 \times 3}{2 \times 2} = \dfrac{\$57}{4} = \$14\dfrac{1}{4} = \$14.25$

35. Answers will vary.

36. Answers will vary.

37. $30 \times \dfrac{3}{10} = \dfrac{\overset{3}{\cancel{30}}}{1} \times \dfrac{3}{\underset{1}{\cancel{10}}} = \dfrac{3 \times 3}{1 \times 1} = 9$

The cost of operating the hair dryer for 30 minutes is 9 cents.

38. $90 \times \dfrac{2}{5} = \dfrac{\overset{18}{\cancel{90}}}{1} \times \dfrac{2}{\underset{1}{\cancel{5}}} = \dfrac{18 \times 2}{1 \times 1} = 36$

The cost of brewing coffee for 90 minutes is 36 cents.

39. $16 \times 2\frac{1}{4} = \frac{\overset{4}{\cancel{16}}}{1} \times \frac{9}{\cancel{4}} = \frac{4 \times 9}{1 \times 1} = 36$

Matthew needs 36 yards of ribbon.

40. $10 \times 38\frac{1}{4} = \frac{\overset{5}{\cancel{10}}}{1} \times \frac{153}{\underset{2}{\cancel{4}}} = \frac{5 \times 153}{1 \times 2} = 382\frac{1}{2}$

Jack made \$382.50.

41. $1314 \div 109\frac{1}{2} = \frac{1314}{1} \div \frac{219}{2}$

$= \frac{\overset{6}{\cancel{1314}}}{1} \times \frac{2}{\underset{1}{\cancel{219}}} = \frac{6 \times 2}{1 \times 1} = 12$

12 homes can be fitted with cabinet trim.

42. $1200 \div 7\frac{1}{2} = \frac{1200}{1} \div \frac{15}{2}$

$= \frac{\overset{80}{\cancel{1200}}}{1} \times \frac{2}{\underset{1}{\cancel{15}}} = \frac{80 \times 2}{1 \times 1} = 160$

160 acres can be fertilized.

43. $135 \times 19\frac{1}{2} = \frac{135}{1} \times \frac{39}{2}$

$= \frac{135 \times 39}{1 \times 2} = \frac{5265}{2} = 2632\frac{1}{2}$

$2632\frac{1}{2}$ inches of steel tubing are needed.

44. $182 \times 61\frac{1}{2} = \frac{\overset{91}{\cancel{182}}}{1} \times \frac{123}{\underset{1}{\cancel{2}}}$

$= \frac{91 \times 123}{1 \times 1} = \frac{11{,}193}{1} = 11{,}193$

11,193 inches of wood are needed.

45. $40 \div 1\frac{1}{4} = 40 \div \frac{5}{4}$

$= \frac{\overset{8}{\cancel{40}}}{1} \times \frac{4}{\underset{1}{\cancel{5}}} = \frac{8 \times 4}{1 \times 1} = 32$

32 strawberry cheesecakes can be made.

46. $6750 \div 62\frac{1}{2} = 6750 \div \frac{125}{2}$

$= \frac{\overset{54}{\cancel{6750}}}{1} \times \frac{2}{\underset{1}{\cancel{125}}} = \frac{54 \times 2}{1 \times 1} = 108$

108 units can be carpeted.

47. $28 \times 12\frac{3}{4} = \frac{\overset{7}{\cancel{28}}}{1} \times \frac{51}{\underset{1}{\cancel{4}}} = \frac{7 \times 51}{1 \times 1} = 357$

$16 \times 7\frac{1}{8} = \frac{\overset{2}{\cancel{16}}}{1} \times \frac{57}{\underset{1}{\cancel{8}}} = \frac{2 \times 57}{1 \times 1} = 114$

$357 + 114 = 471$

471 gallons of fuel are used.

48. $36 \times 6\frac{1}{2} = \frac{\overset{18}{\cancel{36}}}{1} \times \frac{13}{\underset{1}{\cancel{2}}} = \frac{18 \times 13}{1 \times 1} = 234$

$22 \times 3\frac{1}{8} = \frac{\overset{11}{\cancel{22}}}{1} \times \frac{25}{\underset{4}{\cancel{8}}} = \frac{11 \times 25}{1 \times 4} = \frac{275}{4} = 68\frac{3}{4}$

$234 + 68\frac{3}{4} = 302\frac{3}{4}$

It takes a total of $302\frac{3}{4}$ minutes.

49. $11 \div \frac{1}{8} = \frac{11}{1} \times \frac{8}{1} = \frac{11 \times 8}{1 \times 1} = 88$

88 dispensers can be filled.

50. $10 \div \frac{5}{16} = \frac{\overset{2}{\cancel{10}}}{1} \times \frac{16}{\underset{1}{\cancel{5}}} = \frac{2 \times 16}{1 \times 1} = 32$

32 footings can be constructed.

51. $40 \div 8\frac{1}{2} = 40 \div \frac{17}{2}$

$= \frac{40}{1} \times \frac{2}{17} = \frac{40 \times 2}{1 \times 17} = \frac{80}{17} = 4\frac{12}{17} \approx 5$

Approximately 5 round trips are required.

52. $200 \div \frac{5}{8} = \frac{\overset{40}{\cancel{200}}}{1} \times \frac{8}{\underset{1}{\cancel{5}}} = \frac{40 \times 8}{1 \times 1} = 320$

320 pieces of weather stripping may be cut from the roll.

2.5 Converting Decimals to Fractions and Fractions to Decimals

1. $.75 = \dfrac{75}{100} = \dfrac{3}{4}$

2. $.55 = \dfrac{55}{100} = \dfrac{11}{20}$

3. $.24 = \dfrac{24}{100} = \dfrac{6}{25}$

4. $.64 = \dfrac{64}{100} = \dfrac{16}{25}$

5. $.73 = \dfrac{73}{100}$

6. $.33 = \dfrac{33}{100}$

7. $.85 = \dfrac{85}{100} = \dfrac{17}{20}$

8. $.68 = \dfrac{68}{100} = \dfrac{17}{25}$

9. $.34 = \dfrac{34}{100} = \dfrac{17}{50}$

10. $.288 = \dfrac{288}{1000} = \dfrac{36}{125}$

11. $.444 = \dfrac{444}{1000} = \dfrac{111}{250}$

12. $.125 = \dfrac{125}{1000} = \dfrac{1}{8}$

13. $.625 = \dfrac{625}{1000} = \dfrac{5}{8}$

14. $.875 = \dfrac{875}{1000} = \dfrac{7}{8}$

15. $.805 = \dfrac{805}{1000} = \dfrac{161}{200}$

16. $.791 = \dfrac{791}{1000}$

17. $.096 = \dfrac{96}{1000} = \dfrac{12}{125}$

18. $.012 = \dfrac{12}{1000} = \dfrac{3}{250}$

19. $.0375 = \dfrac{375}{10,000} = \dfrac{3}{80}$

20. $.0875 = \dfrac{875}{10,000} = \dfrac{7}{80}$

21. $.1875 = \dfrac{1875}{10,000} = \dfrac{3}{16}$

22. $.9845 = \dfrac{9845}{10,000} = \dfrac{1969}{2000}$

23. $.0016 = \dfrac{16}{10,000} = \dfrac{1}{625}$

24. $.0085 = \dfrac{85}{10,000} = \dfrac{17}{2000}$

25. Answers will vary.

26. Answers will vary.

27. $\dfrac{1}{4} = .25$

$$\begin{array}{r} .25 \\ 4\overline{)1.00} \\ \underline{8} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

28. $\dfrac{7}{8} = .875$

$$\begin{array}{r} .875 \\ 8\overline{)7.000} \\ \underline{64} \\ 60 \\ \underline{56} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

29. $\dfrac{3}{8} = .375$

$$\begin{array}{r} .375 \\ 8\overline{)3.000} \\ \underline{24} \\ 60 \\ \underline{56} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

30. $\dfrac{5}{8} = .625$

$$
\begin{array}{r}
.625 \\
8\overline{)5.000} \\
\underline{48} \\
20 \\
\underline{16} \\
40 \\
\underline{40} \\
0
\end{array}
$$

31. $\dfrac{2}{3} = .667$ (rounded)

$$
\begin{array}{r}
.6666 \\
3\overline{)2.0000} \\
\underline{18} \\
20 \\
\underline{18} \\
20 \\
\underline{18} \\
20 \\
\underline{18} \\
2
\end{array}
$$

32. $\dfrac{5}{6} = .833$ (rounded)

$$
\begin{array}{r}
.8333 \\
6\overline{)5.0000} \\
\underline{48} \\
20 \\
\underline{18} \\
20 \\
\underline{18} \\
20 \\
\underline{18} \\
2
\end{array}
$$

33. $\dfrac{7}{9} = .778$ (rounded)

$$
\begin{array}{r}
.7777 \\
9\overline{)7.0000} \\
\underline{63} \\
70 \\
\underline{63} \\
70 \\
\underline{63} \\
70 \\
\underline{63} \\
7
\end{array}
$$

34. $\dfrac{1}{9} = .111$ (rounded)

$$
\begin{array}{r}
.1111 \\
9\overline{)1.0000} \\
\underline{9} \\
10 \\
\underline{9} \\
10 \\
\underline{9} \\
10 \\
\underline{9} \\
1
\end{array}
$$

35. $\dfrac{7}{11} = .636$ (rounded)

$$
\begin{array}{r}
.6363 \\
11\overline{)7.0000} \\
\underline{66} \\
40 \\
\underline{33} \\
70 \\
\underline{66} \\
40 \\
\underline{33} \\
7
\end{array}
$$

36. $\dfrac{8}{25} = .32$

$$
\begin{array}{r}
.32 \\
25\overline{)8.00} \\
\underline{7\,50} \\
50 \\
\underline{50} \\
0
\end{array}
$$

37. $\dfrac{22}{25} = .88$

$$
\begin{array}{r}
.88 \\
25\overline{)22.00} \\
\underline{200} \\
2\,00 \\
\underline{2\,00} \\
0
\end{array}
$$

38. $\dfrac{14}{25} = .56$

$$
\begin{array}{r}
.56 \\
25\overline{)14.00} \\
\underline{12\,5} \\
150 \\
\underline{150} \\
0
\end{array}
$$

39. $\dfrac{181}{205} = .883$ (rounded)

$$
\begin{array}{r}
.8829 \\
205\overline{)181.0000} \\
\underline{1640} \\
1700 \\
\underline{1640} \\
600 \\
\underline{410} \\
1900 \\
\underline{1845} \\
55
\end{array}
$$

40. $\dfrac{1}{99} = .010$ (rounded)

$$
\begin{array}{r}
.0101 \\
99\overline{)1.0000} \\
\underline{99} \\
10 \\
\underline{0} \\
100 \\
\underline{99} \\
1
\end{array}
$$

41. (a) 1 out of 8, or $\frac{1}{8}$ quit taking their

medicine.

(b) $\frac{1}{8} = .125$

$$
\begin{array}{r}
.125 \\
8\overline{)1.000} \\
\underline{8} \\
20 \\
\underline{16} \\
40 \\
\underline{40} \\
0
\end{array}
$$

(c) $\frac{1}{8} \times 1521 = \frac{1}{8} \times \frac{1521}{1} = \frac{1 \times 1521}{8 \times 1}$

$= \frac{1521}{8} = 190\frac{1}{8} \approx 190$

190 patients in the study quit taking their medicine.

42. (a) $\frac{1}{16} = .0625$

$$
\begin{array}{r}
.0625 \\
16\overline{)1.0000} \\
\underline{0} \\
1\,00 \\
\underline{96} \\
40 \\
\underline{32} \\
80 \\
\underline{80} \\
0
\end{array}
$$

(b) $\frac{1}{16} \times 8000 = \frac{1}{\cancel{16}_{1}} \times \frac{\overset{500}{\cancel{8000}}}{1}$

$= \frac{1 \times 500}{1 \times 1} = 500$

500 smokers are expected to develop lung cancer.

Case Study

1. Multiply each monthly amount by 12.
Salaries: $\$10,000 \times 12 = \$120,000$
Rent: $\$6000 \times 12 = \$72,000$
Utilities: $\$2000 \times 12 = \$24,000$
Insurance: $\$1500 \times 12 = \$18,000$
Advertising: $\$1500 \times 12 = \$18,000$
Miscellaneous: $\$3000 \times 12 = \$36,000$

$\$120,000 + \$72,000 + \$24,000$
$+\$18,000 + \$18,000 + \$36,000 = \$288,000$
The total annual operating expenses are
$\$288,000$.

2. Divide each annual amount by the total annual operating expenses.

Salaries: $\frac{\$120,000}{\$288,000} = \frac{5}{12}$

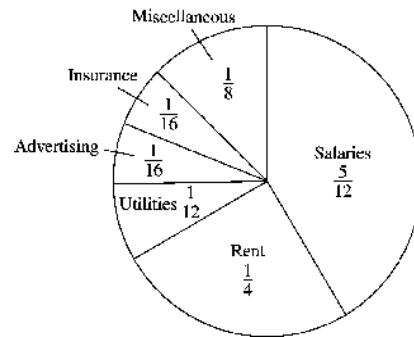Rent: $\frac{\$72,000}{\$288,000} = \frac{1}{4}$

Utilities: $\frac{\$24,000}{\$288,000} = \frac{1}{12}$

Insurance: $\frac{\$18,000}{\$288,000} = \frac{1}{16}$

Advertising: $\frac{\$18,000}{\$288,000} = \frac{1}{16}$

Miscellaneous: $\frac{\$36,000}{\$288,000} = \frac{1}{8}$

3.

4. Multiply each fraction by $360°$.

Salaries: $\frac{5}{12} \times 360° = 150°$

Rent: $\frac{1}{4} \times 360° = 90°$

Utilities: $\frac{1}{12} \times 360° = 30°$

Insurance: $\frac{1}{16} \times 360° = 22.5°$

Advertising: $\frac{1}{16} \times 360° = 22.5°$

Miscellaneous: $\frac{1}{8} \times 360° = 45°$

Case in Point Summary Exercise

1. $6 \times 32\frac{1}{4} = \frac{\overset{3}{\cancel{6}}}{1} \times \frac{129}{\cancel{4}}$

$= \frac{3 \times 129}{1 \times 2} = \frac{387}{2} = 193\frac{1}{2}$

$193\frac{1}{2}$ inches of cherry wood are needed.

2. $32\frac{1}{4} \times 14\frac{1}{2} = \frac{129}{4} \times \frac{29}{2}$

$= \frac{129 \times 29}{4 \times 2} = \frac{3741}{8} = 467\frac{5}{8}$

The area of each panel is $467\frac{5}{8}$ square inches.

3. $467\frac{5}{8} \times 6 = \frac{3741}{\cancel{8}} \times \frac{\overset{3}{\cancel{6}}}{1}$

$= \frac{3741 \times 3}{4 \times 1} = \frac{11,223}{4} = 2805\frac{3}{4}$

A total area of $2805\frac{3}{4}$ square inches of cherry wood is needed.

4. $2250 \div 467\frac{5}{8} = \frac{2250}{1} \div \frac{3741}{8}$

$= \frac{\overset{750}{\cancel{2250}}}{1} \times \frac{8}{\underset{1247}{\cancel{3741}}} = \frac{750 \times 8}{1 \times 1247} = \frac{6000}{1247}$

$= 4\frac{1012}{1247}$, which must be rounded down to 4.

4 side panels can be made.

Chapter 2   Test

1. $\frac{25}{30} = \frac{25 \div 5}{30 \div 5} = \frac{5}{6}$

2. $\frac{875}{1000} = \frac{875 \div 125}{1000 \div 125} = \frac{7}{8}$

3. $\frac{84}{132} = \frac{84 \div 12}{132 \div 12} = \frac{7}{11}$

4. $8\overline{)65}$ $\quad \frac{65}{8} = 8\frac{1}{8}$
$\underline{64}$
1

5. $12\overline{)56}$ $\quad \frac{56}{12} = 4\frac{8}{12} = 4\frac{2}{3}$
$\underline{48}$
8

6. $45\overline{)120}$ $\quad \frac{120}{45} = 2\frac{30}{45} = 2\frac{2}{3}$
$\underline{90}$
30

7. $7\frac{3}{4} = \frac{(4 \times 7) + 3}{4} = \frac{31}{4}$

8. $18\frac{4}{5} = \frac{(5 \times 18) + 4}{5} = \frac{94}{5}$

9. $18\frac{3}{8} = \frac{(8 \times 18) + 3}{8} = \frac{147}{8}$

10. 2, 6, 5, ____
$\quad\;\; 1 \quad 1 \quad 1$
$\;\, 5\overline{)1 \quad 1 \quad 5}$
$\;\, 3\overline{)1 \quad 3 \quad 5}$
$\;\, 2\overline{)2 \quad 6 \quad 5}$
$\;\; 2 \times 3 \times 5 = 30$

11. 6, 8, 15, ___

$$
\begin{array}{r}
1 \quad 1 \quad 1 \\
5\overline{)1 \quad 1 \quad 5} \\
3\overline{)3 \quad 1 \quad 15} \\
2\overline{)3 \quad 2 \quad 15} \\
2\overline{)3 \quad 4 \quad 15} \\
2\overline{)6 \quad 8 \quad 15}
\end{array}
$$

$$2 \times 2 \times 2 \times 3 \times 5 = 120$$

12. 6, 9, 12, 24, ___

$$
\begin{array}{r}
1 \quad 1 \quad 1 \quad 1 \\
3\overline{)1 \quad 3 \quad 1 \quad 1} \\
3\overline{)3 \quad 9 \quad 3 \quad 3} \\
2\overline{)3 \quad 9 \quad 3 \quad 6} \\
2\overline{)3 \quad 9 \quad 6 \quad 12} \\
2\overline{)6 \quad 9 \quad 12 \quad 24}
\end{array}
$$

$$2 \times 2 \times 2 \times 3 \times 3 = 72$$

13.
$$\frac{1}{5} = \frac{8}{40}$$
$$\frac{3}{10} = \frac{12}{40}$$
$$+ \frac{3}{8} = \frac{15}{40}$$
$$\frac{35}{40} = \frac{7}{8}$$

14.
$$32\frac{5}{16} = 32\frac{5}{16}$$
$$-17\frac{1}{4} = 17\frac{4}{16}$$
$$\overline{\qquad\quad 15\frac{1}{16}}$$

15. $126\frac{3}{16} = 126\frac{3}{16} = 125\frac{19}{16}$

$$-89\frac{7}{8} = 89\frac{14}{16} = 89\frac{14}{16}$$
$$\overline{\qquad\qquad\qquad\quad 36\frac{5}{16}}$$

16. $67\frac{1}{2} \times \frac{8}{15} = \frac{\overset{9}{\cancel{135}}}{\underset{1}{\cancel{2}}} \times \frac{\overset{4}{\cancel{8}}}{\underset{1}{\cancel{15}}} = \frac{9 \times 4}{1 \times 1} = 36$

17. $33\frac{1}{3} \div \frac{200}{9} = \frac{100}{3} \div \frac{20}{9}$

$$= \frac{\overset{1}{\cancel{100}}}{\cancel{3}} \times \frac{\overset{3}{\cancel{9}}}{\underset{2}{\cancel{200}}} = \frac{1 \times 3}{1 \times 2} = \frac{3}{2} = 1\frac{1}{2}$$

18. $23\frac{1}{2} + 34\frac{3}{4} + 17\frac{5}{8} = 23\frac{4}{8} + 34\frac{6}{8} + 17\frac{5}{8}$

$$= 74\frac{15}{8} = 75\frac{7}{8}$$

Becky used $75\frac{7}{8}$ pounds of sugar.

$$(2 \times 50) - 75\frac{7}{8} = 100 - 75\frac{7}{8}$$

$$= 99\frac{8}{8} - 75\frac{7}{8} = 24\frac{1}{8}$$

$24\frac{1}{8}$ pounds of sugar remain.

19. $\$1275 \times \frac{1}{3} = \$425$ rent

$\$1275 - \$425 = \$850$

$\$850 \times \frac{3}{5} = \$510$

Rhonda paid \$510 for food, utilities, and transportation.

$\$1275 - \$425 - \$510 = \$340$
Rhonda has \$340 left.

20. $68\frac{1}{2} + 37\frac{3}{8} + 5\frac{3}{4} = 68\frac{4}{8} + 37\frac{3}{8} + 5\frac{6}{8}$

$$= 110\frac{13}{8} = 111\frac{5}{8}$$

$111\frac{5}{8}$ gallons of paint were used.

$$147\frac{1}{2} = 147\frac{4}{8} = 146\frac{12}{8}$$
$$-111\frac{5}{8} = 111\frac{5}{8} = 111\frac{5}{8}$$
$$\overline{\qquad\qquad\qquad\qquad\quad 35\frac{7}{8}}$$

There are $35\frac{7}{8}$ gallons of paint remaining.

21. $1000 \div 8\dfrac{1}{2} = \dfrac{1000}{1} \div \dfrac{17}{2}$

$= \dfrac{1000}{1} \times \dfrac{2}{17} = \dfrac{1000 \times 2}{1 \times 17} = \dfrac{2000}{17} = 117\dfrac{11}{17}$

117 pizzas can be made.

$117 \times 8\dfrac{1}{2} = \dfrac{117}{1} \times \dfrac{17}{2}$

$= \dfrac{117 \times 17}{1 \times 2} = \dfrac{1989}{2} = 994\dfrac{1}{2}$

$994\dfrac{1}{2}$ ounces of mozzarella will be used.

$1000 - 994\dfrac{1}{2} = 5\dfrac{1}{2}$

$5\dfrac{1}{2}$ ounces of mozzarella will remain.

22. $.625 = \dfrac{625}{100} = \dfrac{5}{8}$

23. $.82 = \dfrac{82}{100} = \dfrac{41}{50}$

24.
$$
\begin{array}{r}
.25 \\
4\overline{)1.00} \\
\underline{8} \\
20 \\
\underline{20} \\
0
\end{array}
$$
.25 inch

25.
$$
\begin{array}{r}
.875 \\
8\overline{)7.000} \\
\underline{64} \\
60 \\
\underline{56} \\
40 \\
\underline{40} \\
0
\end{array}
$$
.875 inch