Smith Power and Utility 10e Solution Manual

Problem Set 1.1

2. Read the "Math Anxiety Bill of Rights" on page 6 and then make up your own list.

4. When you see this caution sign, make a special note of the material next to the caution sign, because it will be used throughout the rest of the book.

6. The bump sign means that some unexpected or difficult material follows, and you will need to slow down to understand the discussion.

8-36. We will generally not give answers to those questions marked **IN YOUR OWN WORDS**. These problems do not have "right" or "wrong" answers, but rather are included to help you advance your success in this course. Do your best to answer the question.

38. This sign means that there is a construction ahead.

40. This sign is used to mean an unprotected river.

42. This sign is used to mean a road narrows.

44. This sign is used to designate a place of assistance for handicapped passengers.

46. This sign is used to designate a place of assistance for things that are lost and found.

48. This sign is used to designate a gift shop.

50. Choice F, transportation medium

52. Choice D, merchandise

54. Choice C, rentals

56-60. We will generally not give answers to those questions marked **IN YOUR OWN WORDS**. These problems do not have "right" or "wrong" answers, but rather are included to help you advance your success in this course. Do your best to answer the question.

Problem Set 1.2

2.

We estimate

$$4 \times 2{,}650 \approx 4 \times 2{,}500$$
$$\approx 10{,}000$$

We estimate the deduction to be \$10,000. The exact answer is \$10,600.

4. Distributive Property: $a(b+c) = ab+ac$

SURVIVAL HINT: *Take a look at the essential ideas of this section. There are two:*
1. State the order of operations.
2. Explain the distributive property in your own words.
Because these items are essential to your understanding of the material, we give the answer to all of the essential ideas in this Survival Manual. Your instructor may or may not assign these problems, but it would be a good idea to designate a section of your notebook ESSENTIAL IDEAS *and then put into this section* ***all*** *of the essential ideas.*

6. $2+8\times10 = 2+80$
$= 82$

True

8. False; first multiply and divide (left to right), then add and subtract (left to right)

10. True

12a. $20-4\times2 = 20-8$ *Multiplication*
$= 12$ *Subtraction*

Since the last operation was subtraction, we call this a *difference*.

b. $10-5\times 2=10-10$ *Multiplication*
$=0$ *Subtraction*

Since the last operation was subtraction, we call this a *difference*.

14a. $12+6\div 3=12+2$ *Division*
$=14$ *Addition*

Since the last operation was addition, we call this a *sum.*

b. $100\div(10\times 2)=100\div 20$ *Parentheses*
$=5$ *Division*

Since the last operation was addition, we call this a *sum.*

16a. $(15+6)\div 3=21\div 3$ *Parentheses*
$=7$ *Division*

Since the last operation was division, we call this a *quotient*.

b. $(15-6)\div 3=9\div 3$ *Parentheses*
$=3$ *Division*

Since the last operation was division, we call this a *quotient*.

18a. $4\times(3+5)=4\times 8$ *Parentheses*

$=32$ *Multiplication*

Since the last operation was multiplication, we call this a *product*.

b. $8\times(2+5)=8\times 7$ *Parentheses*

$=56$ *Multiplication*

Since the last operation was multiplication, we call this a *product*.

20a. $2+15\times 3\div 5=2+45\div 5$ *Multiplication* (*left to right*)

$=2+9$ *Division*

$=11$ *Addition*

Since the last operation was addition, we call this a *sum.*

b. $5+12\times 3\div 2=5+36\div 2$ *Multiplication* (*left to right*)

$=5+18$ *Division*

$=23$ *Addition*

Since the last operation was addition, we call this a *sum.*

22a. $2+3\times 4-12\div 2=2+12-12\div 2$ *Multiplication* (*left to right*)

$=2+12-6$ *Division*

$=14-6$ *Addition* (*left to right*)

$=8$ *Subtraction*

Since the last operation was subtraction, we call this a *difference*.

b. $15 \div 5 \times 2 + 6 \div 3 = 3 \times 2 + 6 \div 3$ *Division* (*left to right*)
$= 6 + 6 \div 3$ *Multiplication*
$= 6 + 2$ *Division*
$= 8$ *Addition*

Since the last operation was addition, we call this a *sum.*

24a. $4 \times (12 - 8) \div 2 = 4 \times 4 \div 2$ *Parentheses*
$= 16 \div 2$ *Multiplication*
$= 8$ *Division*

Since the last operation was division, we call this a *quotient*.

b. $4 \times 12 - 8 \div 2 = 48 - 8 \div 2$ *Multiplication* (*left to right*)
$= 48 - 4$ *Division*
$= 44$ *Subtraction*

Since the last operation was subtraction, we call this a *difference*.

26a. $8(50 + 5) = 8 \times 50 + 8 \times 5$

b. $6(90 + 7) = 6 \times 90 + 6 \times 7$

28a. $5(800 + 60 + 4) = 5 \times 800 + 5 \times 60 + 5 \times 4$

b. $4(700+10+5) = 4\times 700 + 4\times 10 + 4\times 5$

30. "The product" means "$\times$" and "sum" means "$+$": $3(2+4)$

The parentheses are used to indicate the order of operation and they are also used to indicate multiplication.

32. "Times", "$\cdot$", and "product" means "$\times$": $10(5\cdot 6)$

The parentheses and center dot are used to indicate the order of operation and they are also used to indicate multiplication.

34. "Times" means "$\times$" and difference means "$-$": $8(7-5)$

The parentheses are used to indicate the order of operation and they are also used to indicate multiplication.

36. "The product" means "$\times$" and "sum" means "$+$": $(3+4)(5+6)$

The parentheses are used to indicate the order of operation and they are also used to indicate multiplication.

38. Press: [143] [+] [12] [×] [14] [=] *Display*: 311

Since the last operation was addition, we call this a *sum.*

40. Press: [15] [×] [27] [+] [15] [×] [73] [=] *Display*: 1,500

Since the last operation was addition, we call this a *sum.*

42. Press: [19] [×] [250] [+] [19] [×] [750] [=] *Display*: 19,000

Since the last operation was addition, we call this a *sum.*

44. Press: [(] [34] [–] [4] [)] [(] [16] [+] [4] [)] [=]

Don't forget the times sign for the indicated multiplication.

Display: 600

Since the last operation was multiplication, we call this a *product*.

46. Press: [12] [+] [6] [×] [9] [–] [5] [×] [2] [+] [5] [×] [14] [=] *Display*: 126
Since the last operation was addition, we call this a *sum.*

48. Press: [23] [×] [237] [+] [23] [×] [763] [=] *Display*: 23,000
Since the last operation was addition, we call this a *sum.*

50. Press: [862] [+] [328] [×] [142] [–] [168] [=] *Display*: 47,270
Since the last operation was subtraction, we call this a *difference*.

52. Press: [12] [×] [(] [125] [–] [72] [)] [–] [3] [×] [(] [18] [–] [3] [×] [5] [)] [=]

Don't forget the times sign for the indicated multiplication.

Display: 627

Since the last operation was subtraction, we call this a *difference*.

Estimates for Problems 53-60 may vary.

54. Each manuscript has 487 pages and $1{,}850$ copies are required so we estimate

$$\begin{aligned} 1{,}850 \times 487 &\approx 1{,}800 \times 500 \\ &\approx 900{,}000 \end{aligned}$$

We estimate the required pages to be $900{,}000$. The exact answer is $900{,}950$ pages.

56.

We estimate

$$\begin{aligned} 12 \times 1{,}543 &\approx 10 \times 1{,}600 \\ &\approx 16{,}000 \end{aligned}$$

We estimate the salary to be $16{,}000$. The exact answer is $18{,}516$.

58. We estimate the hourly salary by assuming a 40 hour work week for 50 weeks a year:

$$\begin{aligned} \frac{31{,}200}{(40 \times 50)} &\approx \frac{26{,}000}{(40 \times 50)} \\ &\approx 13 \end{aligned}$$

We estimate the required hourly salary to be $\$13.00$. The exact answer is $\$15.00$ per hour.

60. We estimate

$$\begin{aligned} \frac{492}{12} &\approx \frac{480}{12} \\ &\approx 40 \end{aligned}$$

We estimate 40 number of miles per gallons. The exact number of miles per gallon is 41.

Problem Set 1.3

2. A common fraction is a fraction written as a numerator divided by a denominator whereas a decimal fraction is a fraction written as a number with a decimal point followed by one or more digits.

4. The answers get larger. Answer vary; it looks like the closer the divisor is to 0 the larger the answer.

6. True; don't confuse this problem (where you are dividing by 2) with one in which you are dividing by 0.

8. True; we can affix any number of trailing zeros.

10. False; $\frac{1}{3} = 0.\overline{3}$

12. True; verify by division or calculator that the answer is a terminating decimal.

14a. improper; 3 ÷ 2 =

b. whole number; 15 ÷ 5 =

16a. 14 + 3 ÷ 4 =

b. $\boxed{3}\boxed{+}\boxed{2}\boxed{\div}\boxed{7}\boxed{=}$

18a. $\frac{3}{2}=1\frac{1}{2}$ *Divide 2 into 3 to obtain 1, with a remainder of 1.*

b. $\frac{4}{3}=1\frac{1}{3}$ *Divide* 3 *into* 4 *to obtain 1, with a remainder of* 1.

c. $\frac{5}{4}=1\frac{1}{4}$ *Divide* 4 *into* 5 *to obtain 1, with a remainder of* 1.

d. $\frac{19}{2}=9\frac{1}{2}$ *Divide* 2 *into* 19 *to obtain 9, with a remainder of* 1.

20a. $\frac{1,681}{10}=168\frac{1}{10}$ *Divide* 10 *into* 1,681 *to obtain* 168, *with a remainder of* 1.

b. $\frac{1,493}{10}=149\frac{3}{10}$ *Divide* 10 *into* 1,493 *to obtain* 149, *with a remainder of* 3.

c. $\frac{833}{100}=8\frac{33}{100}$ *Divide* 100 *into* 833 *to obtain* 8, *with a remainder of* 33.

d. $\frac{1,457}{100} = 14\frac{57}{100}$ *Divide* 100 *into* 1,457 *to obtain* 14, *with a remainder of* 57.

22a. $\frac{41}{12} = 3\frac{5}{12}$ *Divide* 12 *into* 41 *to obtain* 3, *with a remainder of* 5.

b. $\frac{61}{5} = 12\frac{1}{5}$ *Divide* 5 *into* 61 *to obtain* 12, *with a remainder of* 1.

c. $\frac{118}{15} = 7\frac{13}{15}$ *Divide* 15 *into* 118 *to obtain* 7, *with a remainder of* 13.

d. $\frac{89}{21} = 4\frac{5}{21}$ *Divide 21 into* 89 *to obtain* 4, *with a remainder of* 5.

24a. $2\frac{1}{2} = \frac{5}{2}$

$2 \times 2 + 1 = 5$

b. $1\frac{2}{3} = \frac{5}{3}$

$3 \times 1 + 2 = 5$

26a. $4\frac{3}{8}=\frac{35}{8}$

$8\times 4+3=35$

b. $5\frac{1}{4}=\frac{21}{4}$

$4\times 5+1=21$

28a. $6\frac{1}{2}=\frac{13}{2}$

$2\times 6+1=13$

b. $3\frac{2}{5}=\frac{17}{5}$

$5\times 3+2=17$

30a. $2\frac{2}{5}=\frac{12}{5}$

$5\times 2+2=12$

b. $3\frac{7}{10}=\frac{37}{10}$

$10\times 3+7=37$

32a. $11\frac{3}{8} = \frac{91}{8}$

$8 \times 11 + 3 = 91$

b. $2\frac{9}{10} = \frac{29}{10}$

$10 \times 2 + 9 = 29$

34a. $19\frac{3}{5} = \frac{98}{5}$

$5 \times 19 + 3 = 98$

b. $17\frac{1}{8} = \frac{137}{8}$

$8 \times 17 + 1 = 137$

SURVIVAL HINT: *In Problems* 36-46, *do not round the decimal representations. For example,*

$$\frac{1}{3} = 0.\overline{3}$$

Note the bar over the three; this shows that the three repeats. It is NOT correct to write

$$\frac{1}{3} = 0.33333 \text{ or } \frac{1}{3} = 0.33$$

or any other such representation. The three repeats and does not terminate. That is, in doing the long division, there is never a remainder of zero.

36a. $\frac{1}{8} = 0.125$ *Long division*; $1 \div 8$; *by calculator:* 1 ÷ 8 =

Continue with the division until the remainder is zero.

b. $\frac{3}{8} = 0.375$ *Long division;* $3 \div 8$; *by calculator:* $\boxed{3}\boxed{\div}\boxed{8}\boxed{=}$

Continue with the division until the remainder is zero.

38a. $\frac{3}{5} = 0.6$ *Long division;* $3 \div 5$; *by calculator:* $\boxed{3}\boxed{\div}\boxed{5}\boxed{=}$

Continue with the division until the remainder is zero.

b. $\frac{7}{8} = 0.875$ *Long division;* $7 \div 8$; *by calculator:* $\boxed{7}\boxed{\div}\boxed{8}\boxed{=}$

Continue with the division until the remainder is zero.

40a. $\frac{3}{7} = 0.\overline{428571}$ *Long division;* $3 \div 7$; *by calculator:* $\boxed{3}\boxed{\div}\boxed{7}\boxed{=}$

Continue with the division until you see the digits repeat. There are six repeating digits.

b. $3\frac{1}{6} = 3.1\overline{6}$ *Long division;* $1 \div 6$; *by calculator:* $\boxed{1}\boxed{\div}\boxed{6}\boxed{=}$

Continue with the division until you see the digits repeat. There is one repeating digit.

42a. $\frac{5}{9} = 0.\overline{5}$ *Long division;* $5 \div 9$; *by calculator:* $\boxed{5}\boxed{\div}\boxed{9}\boxed{=}$

Continue with the division until you see the digits repeat. There is one repeating digit.

b. $\frac{7}{9} = 0.\overline{7}$ *Long division*; $7 \div 9$; *by calculator:* $\boxed{7}\boxed{\div}\boxed{9}\boxed{=}$

Continue with the division until you see the digits repeat. There is one repeating digit.

44a. $3\frac{1}{30} = 3.0\overline{3}$ *Long division*; $1 \div 30$; *by calculator:* $\boxed{1}\boxed{\div}\boxed{30}\boxed{=}$

Continue with the division until you see the digits repeat. There is one repeating digit.

b. $\frac{2}{7} = 0.\overline{285714}$ *Long division*; $2 \div 7$; *by calculator:* $\boxed{2}\boxed{\div}\boxed{7}\boxed{=}$

Continue with the division until you see the digits repeat. There are six repeating digits.

46a. $\frac{7}{15} = 0.4\overline{6}$ *Long division*; $7 \div 15$; *by calculator:* $\boxed{7}\boxed{\div}\boxed{15}\boxed{=}$

Continue with the division until you see the digits repeat. There is one repeating digit.

b. $\frac{8}{9} = 0.\overline{8}$ *Long division*; $8 \div 9$; *by calculator:* $\boxed{8}\boxed{\div}\boxed{9}\boxed{=}$

Continue with the division until you see the digits repeat. There is one repeating digit.

48a. The circle is divided into 4 parts and 1 part is shaded; $\frac{1}{4}$.

b. The square is divided into 2 parts and 1 part is shaded; $\frac{1}{2}$.

SURVIVAL HINT: *Your answers to Problem 50 may vary. Estimating is not an easy skill to learn, so relax and do the best you can.*

50a. The square is divided into one hundred small parts, and there is a triangle with base as 10 units and height as 10 units is shaded. Thus, the shaded portion is the area of the triangle, and so 0.50 of the square is shaded.

b. The square is divided into one hundred small parts, and there is a circle with radius as 5 units is shaded. Thus, the shaded portion is approximately the area of the circle, and so 0.80 of the square is shaded.

SURVIVAL HINT: *Do not round the answers to Problem 52, but use the overbar to indicate the repeating decimals. If your calculator does not show a pattern, you must approximate the answer.*

52a. Press: 1 ÷ 11 = *Display:* 0.0909090909 Answer: $0.\overline{09}$

b. Press: 1 ÷ 12 = *Display:* 0.083333333 Answer: $0.08\overline{3}$

54a. Press: 5 ÷ 19 = *Display:* 0.2631578947368 Answer: $0.2631578947\,(\text{approx.})$

b. Press: 3 ÷ 17 = *Display:* 0.1764705882352 Answer: $0.1764705882\,(\text{approx.})$

56. First, note that $\frac{3}{4} = 0.75$:

$$100 \times \$18\frac{3}{4} = 100 \times \$18.75$$
$$= \$1{,}875$$

To multiply by 100, move the decimal point two places to the right.

58. First, note that $\frac{1}{2} = 0.5$:

$$300 \times \$126\frac{1}{2} = 300 \times \$126.5$$
$$= \$37{,}950$$

To multiply by 300, move the decimal point two places to the right.

60. First, note that $\frac{5}{8} = 0.625$:

$$100 \times \$60\frac{5}{8} = 100 \times \$60.625$$
$$= \$6{,}062.50$$

To multiply by 100, move the decimal point two places to the right.

Problem Set 1.4

2. Anytime card

4. Estimation is making a reasonably accurate guess. It is important in everyday life in many situations in which an exact answers is not needed. For example, when making a purchase, deciding on which route to take, how long a task may take to complete, or tipping at restaurant.

6. $625.9\boxed{7}555$ is rounded to the nearest hundredth is 625.98, so the statement is false.
The error is that the number was rounded to the nearest hundred, rather than the nearest hundredth.

8. $12,456.\boxed{9}099$ is rounded to the nearest tenth is $12,456.9$, so the statement is false.
The error is that the number was rounded to the nearest tenth and instead of deleting the "099" trailing zeros were added.

10. True, $\frac{1,000}{144} \approx \frac{1,000}{125} \approx 8$; estimate is correct.

12.

$14.\boxed{8}36$	Rounding place digit is marked.
14.8	Digit to the right is a 3, so delete the "36".

14.

$342.3\boxed{5}5$	Rounding place digit is marked.
342.36	Digit to the right is a 5, so add one to the rounding place digit and delete the "5".

16.

$5.2\boxed{9}1$	Rounding place digit is marked.
5.29	Digit to the right is a 1, so delete the "1".

18.

$\boxed{6},287.4513$	Rounding place digit is marked.
$6,000$	Digit to the right is a 2, so change the numerals to the right of the rounding place digit to zero; then delete those to the right of the decimal point.

20.

$813.0\boxed{5}5$	Rounding place digit is marked.
813.06	Digit to the right is a 5, so add one to the rounding place digit and delete the "5"

22. $\boxed{1}.396$ Rounding place digit is marked.
1 Digit to the right is a 3, so delete the "0.396".

24. $4\boxed{8}$ .5003 Rounding place digit is marked.
49 Digit to the right is a 5, add one to the rounding place digit and delete the "0.5003".

26. \$6.4$\boxed{3}$12 Rounding place digit is marked.
\$6.43 Digit to the right is a 1, so delete the "12".

28. \$6.9$\boxed{7}$41 Rounding place digit is marked.
\$6.97 Digit to the right is a 4, so delete the "41"

30. \$$\boxed{8}$61.43 Rounding place digit is marked.
\$900 Digit to the right is a 6, so add one to the rounding place digit and change the digits to the right to zeros. Drop the zeros to the right of the decimal point.

32. \$12$\boxed{5}$,500 Rounding place digit is marked.
\$126,000 Digit to the right is a 5, so change the numerals to the right of the rounding place digit to zeros.

34. From the calculator display, we see $\frac{1}{3}$ is represented as $0.333\boxed{3}333333$. The digit to the right is a 3, so do not change the rounding place digit but drop the digits to the right to obtain: 0.3333.

36. From the calculator display, we see $\frac{5}{11}$ is represented as $0.454\boxed{5}454545$. The digit to the right is a 4, so do not change the rounding place digit but drop the digits to the right to obtain: 0.4545.

38. From the calculator display, we see $\frac{19}{53}$ is represented as $0.358\boxed{4}90566$. The digit to the right is a 9, so add 1 to the rounding place digit and drop the digits to the right to obtain: 0.3585.

40. $\frac{7}{20} = 0.35$; rounded answer: 0.350; by calculator: $\boxed{7}\ \boxed{\div}\ \boxed{20}\ \boxed{=}$

42. $\frac{98}{306} \approx 0.32\boxed{0}26$; rounded answer: 0.320; by calculator: $\boxed{98}\ \boxed{\div}\ \boxed{306}\ \boxed{=}$

44. $\frac{168}{530} \approx 0.31\boxed{6}981$; rounded answer: 0.317; by calculator: $\boxed{168}\ \boxed{\div}\ \boxed{530}\ \boxed{=}$

46. A; *Think*: $279 \text{ ft} \approx 300 \text{ ft}$, so it is about 6 times the length; $300 \times 6 = 1{,}800$.

48. A; *Think*: $\$19,087.50 \approx \$20,000$ and $\$20,000 \div 500 = \$40$.

50. A; *Think*: $\$22,000 \approx \$21,000$ and $\$21,000 \div 3 = \$7,000$.

52. $\frac{\$512}{12} \approx 42.66667$; Rounded answer: $\$42.67$. By calculator: $\boxed{512}\ \boxed{\div}\ \boxed{12}\ \boxed{=}$

54. $\frac{\$378,459}{3} = \$126{,}153$; Rounded answer: $\$126{,}153$. By calculator: $\boxed{378459}\ \boxed{\div}\ \boxed{3}\ \boxed{=}$

56. $\frac{\$1,000}{12} \approx \$83.33333$; Rounded answer: $\$83.33$. By calculator: $\boxed{1000}\ \boxed{\div}\ \boxed{12}\ \boxed{=}$

58. $\frac{\$890}{7} \approx \$127.1428$; Rounded answer: $\$127.14$. By calculator: $\boxed{890}\ \boxed{\div}\ \boxed{7}\ \boxed{=}$

60. $10^9 = 1$ billion
In terms of lakhs, $10{,}000$ lakhs is one billion.

Problem Set 1.5

SURVIVAL HINT: *There are many ideas in this section which you will use daily in your future math work.*
Be sure you understand the concept of an exponent, and that of a prime factorization.

2a. In scientific notation, the decimal point goes after the first nonzero digit:

$14,200,000,000,000 = 1.4200000000000 \times 10^{?}$ *Move decimal point 13 places to the right.*

Decide on the exponent by counting the number of decimal places necessary to write this number, 1.42, as the given number.

$$14,200,000,000,000 = 1.42 \times 10^{13}$$

b. In scientific notation, the decimal point goes after the first nonzero digit:

$308,000,000 = 3.08000000 \times 10^{?}$ *Move decimal point 8 places to the right.*

Decide on the exponent by counting the number of decimal places necessary to write this number, 3.08, as the given number.

$$308,000,000 = 3.08 \times 10^{8}$$

c. You must divide the debt by the number of people. Use scientific notation:

$14,200,000,000,000 = 1.42 \times 10^{13}$ and $308,000,000 = 3.08 \times 10^{8}$

The desired calculation is $\dfrac{1.42 \times 10^{13}}{3.08 \times 10^{8}}$.

The answer is \$46,104 per person.

4. A number is in scientific notation when that number is written as a power of 10 or as a decimal number between 1 and 10 times a power of 10.

6. The y^x is an exponent key and EE is used for scientific notation.

8a. one thousand

8b. 10

8c. 3

8d. $10 \times 10 \times 10$

10a. one-hundredth

10b. 10

10c. -2

10d. 0.01

12. False; 2^3 means $2 \times 2 \times 2$.

14. False; it can also be a power of ten; moreover, it should be in decimal form.

16a. $0.004 = 4 \times 10^{-3}$

Move the decimal point 3 places to the left.

b. $0.02 = 2 \times 10^{-2}$

Move the decimal point 2 places to the left.

c. $0.0035 = 3.5 \times 10^{-3}$

Move the decimal point 3 places to the left.

d. $0.00000045 = 4.5 \times 10^{-7}$

Move the decimal point 7 places to the left.

18a. $0.0000861 = 8.61 \times 10^{-5}$

Move the decimal point 5 places to the left.

b. $249,000,000 = 2.49 \times 10^{8}$

Move the decimal point 8 places to the right.

c. $100 = 10^{2}$

d. $11\frac{1}{2} = 11.5 = 1.15 \times 10$

Move the decimal point 1 place to the right.

20a. $"-03"$ means $"\times 10^{-3}"$, so $2.029283-03=2.029283\times 10^{-3}$.

b. $"E-05"$ means $"\times 10^{-5}"$, so $5.209E-05=5.209\times 10^{-5}$.

c. $"-10"$ means $"\times 10^{-10}"$, so $3.56-10=3.56\times 10^{-10}$.

d. $"E-14"$ means $"\times 10^{-14}"$, so $3.8928E-14=3.8928\times 10^{-14}$.

22a. $3.1\times 10^{2}=310$

Move the decimal point 2 places to the right.

b. $6.8\times 10^{8}=680,000,000$

Move the decimal point 8 places to the right.

24a. $2.05\times 10^{-1}=0.205$

Move the decimal point 1 place to the left.

b. $3.013\times 10^{-2}=0.03013$

Move the decimal point 2 places to the left.

26a. $5.06 \times 10^3 = 5,060$

Move the decimal point 3 places to the right.

b. $6.81 \times 10^0 = 6.81$

Don't move the decimal point

28a. $4^5 = 4 \times 4 \times 4 \times 4$

$= 1,024$

b. $9^3 = 9 \times 9 \times 9$

$= 729$

30a. $0.00029214\,\text{E}12 = 0.00029214 \times 10^{12}$

$= 292,140,000$

b. $4.29436732478\ \text{E}19 = 4.29436732478 \times 10^{19}$

$= 42,943,673,247,800,000,000$

32. $3(8-5)+3^2 = 3(3)+3^2$

$= 9+9$

$= 18$

34. $3^3-(1+4)^2 = 3^3-(5)^2$

$= 27-25$

$= 2$

36. $7+(3\cdot 2)^2 = 7+(6)^2$

$= 7+36$

$= 43$

38a. $120 = 24\times 5$

$= 8\times 3\times 5$

$= (2\times 2\times 2)\times 3\times 5$

$= 2^3\times 3\times 5$

b. $24 = 8\times 3$

$= (2\times 2\times 2)\times 3$

$= 2^3\times 3$

40a. $150 = 6 \times 25$

$= 6 \times (5 \times 5)$

$= 2 \times 3 \times 5^2$

b. $105 = 15 \times 7$

$= 3 \times 5 \times 7$

42a. $10,000 = 2 \times 5,000$

$= 2 \times 2 \times 2,500$

$= 2 \times 2 \times 2 \times 1,250$

$= 2 \times 2 \times 2 \times 2 \times 625$

$= 2 \times 2 \times 2 \times 2 \times 5 \times 125$

$= 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 25$

$= 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5$

$= 2^4 \times 5^4$

b. $720 = 2 \times 360$

$= 2 \times 2 \times 180$

$= 2 \times 2 \times 2 \times 90$

$= 2 \times 2 \times 2 \times 2 \times 45$

$= 2 \times 2 \times 2 \times 2 \times 3 \times 15$

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

$= 2^4 \times 3^2 \times 5$

44a. $2,098,987 = 11 \times 190,817$

$= 11 \times 11 \times 17,347$

$= 11 \times 11 \times 11 \times 1,577$

$= 11 \times 11 \times 11 \times 19 \times 83$

$= 11^3 \times 19 \times 83$

b. $803,257 = 7 \times 114,751$

$= 7 \times 7 \times 16,393$

$= 7 \times 7 \times 13 \times 1,261$

$= 7 \times 7 \times 13 \times 13 \times 97$

$= 7^2 \times 13^2 \times 97$

46. Choice A is small compared to choice B, and Choice C is too large, so the best choice must be B.

48. Choice A is a penny, choice B is a dime, and choice C is a dollar; the best choice is C.

50. Choice A is a very small number (and not even a possibility), and choice C is too large, so the best choice must be B.

52. 10^{100}

54. $5\times10^{9}=5,000,000,000$

56a. $59,000,000=5.9\times10^{7}$

b. Let the Library of Congress be x times larger than the local library.

$$x=\frac{59,000,000}{54,000}\approx1,093$$

The library of Congress is approximately 1,093 times larger.

58.

a. $5,869,713,600=5.8697136\times10^{9}$

b. $\dfrac{5.8697136\times10^{9}}{8.23\times10^{4}}\approx71,321$ By calculator: 5.8697136 | EE | 9 | ÷ | 8.23 | EE | 4 | = *Display*: 71320.9428919

It would take about 71,321 hours.

c. We need to change the number of hours in part **b** into years. There are 24 hours in one day, and 365 days in one year, so $\dfrac{71,321}{24\times365}\approx8$

By calculator we begin with the display from part **b** and continue:

÷ | (| 24 | × | 365 |) | = *Display*: 8141660.14747

It would take about 8 years.

60.

NOTE: no calculator; this is an estimation problem.

$\$76.80+\$17.89+\$24.28+\$14.16+\$6.48+\$12.84\approx\ \$80+\$20+\$20+\$10+\$10+\$10=\$150$

Problem Set 1.6

2. If you multiply or divide both the numerator and denominator of a fraction by the same nonzero number, the resulting fraction will be the same.

4. A fraction is reduced when there is no number (except 1) that divides into both the numerator and denominator.

6. To divide fractions, invert and multiply.

8. **(1)** Multiply the given number without its decimal point by the decimal name of the last digit

(2) By the decimal name of the last digit, we mean: one place is tenth, or $\frac{1}{10}$; two places is hundredeth, or $\frac{1}{100}$; three places is thousandth, or $\frac{1}{1,000}$/; … .

10. F; the word "of" is translated to mean multiply so the correct calculation is 16 times ½.

12. F; the formula works for all numbers except zero. Remember, we can't divide by 0.

14. This is a true and correct statement.

16a.

$$\frac{14}{7} = \frac{2 \times 7}{7}$$
$$= 2$$

b.

$$\frac{38}{19} = \frac{2 \times 19}{19}$$
$$= 2$$

c.

$$\frac{92}{2} = \frac{46 \times 2}{2}$$
$$= 46$$

d.

$$\frac{160}{8} = \frac{20 \times 8}{8}$$
$$= 20$$

18a.

$$\frac{18}{30} = \frac{2 \times 3 \times 3}{2 \times 3 \times 5}$$
$$= \frac{3}{5}$$

b.

$$\frac{70}{105} = \frac{2 \times 35}{3 \times 35}$$
$$= \frac{2}{3}$$

c.

$$\frac{50}{400} = \frac{1 \times 50}{8 \times 50}$$
$$= \frac{1}{8}$$

d.

$$\frac{35}{21} = \frac{5 \times 7}{3 \times 7}$$
$$= \frac{5}{3}$$

20a.

$$\frac{12}{432} = \frac{1 \times 12}{36 \times 12}$$
$$= \frac{1}{36}$$

b.

$$\frac{150}{1,000} = \frac{3 \times 50}{20 \times 50}$$
$$= \frac{3}{20}$$

c.

$$\frac{2,500}{10,000} = \frac{1 \times 2,500}{4 \times 2,500}$$
$$= \frac{1}{4}$$

d.

$$\frac{105}{120} = \frac{7 \times 15}{8 \times 15}$$
$$= \frac{7}{8}$$

22. Shade three of the five rows and five of the six columns. There are 15 of the 30 squares that are double shaded. This can also be stated as half of the large square.

24. Shade three of the five rows and three of the four columns. There are 9 of the 20 squares that are double shaded.

26. Shade three of the five rows and one of the two columns. There are 3 of the 10 squares that are double shaded.

28. In this problem, you are verifying for yourself that division gives the same result as "invert and multiply."

a. The divisor is 3, and the answer is 0. Also, $0 \times \frac{1}{3} = 0$.

b. The divisor is 2, and the answer is 7. Also, $14 \times \frac{1}{2} = 7$.

30. In this problem, you are verifying for yourself that division gives the same result as "invert and multiply."

a. The divisor is 0.2, and the answer is 25. Also, $5 \times \frac{1}{0.2} = 25$.

b. The divisor is 0.6, and the answer is 4. Also, $2.4 \times \frac{1}{0.6} = 4$.

32a.

$$\frac{4}{5}\times\frac{13}{16}=\frac{2\times2\times13}{5\times2\times2\times2\times2}$$
$$=\frac{13}{20}$$

b.

$$\frac{18}{25}\times\frac{5}{36}=\frac{2\times3\times3\times5}{5\times5\times2\times2\times3\times3}$$
$$=\frac{1}{10}$$

c.

$$\frac{4}{5}\times\frac{3}{8}=\frac{2\times2\times3}{5\times2\times2\times2}$$
$$=\frac{3}{10}$$

d.

$$\frac{4}{7}\times\frac{14}{9}=\frac{2\times2\times2\times7}{7\times3\times3}$$
$$=\frac{8}{9}$$

e.

$$\frac{5}{12}\times\frac{4}{15}=\frac{5\times2\times2}{2\times2\times3\times3\times5}$$
$$=\frac{1}{9}$$

f.

$$\frac{9}{16}\times\frac{4}{27}=\frac{3\times3\times2\times2}{2\times2\times2\times2\times3\times3\times3}$$
$$=\frac{1}{12}$$

34a.

$$\frac{3}{5}\times\frac{20}{27}=\frac{3\times2\times2\times5}{5\times3\times3\times3}$$
$$=\frac{4}{9}$$

b.

$$\frac{3}{8}\div\frac{15}{16}=\frac{3}{8}\times\frac{16}{15}$$
$$=\frac{2\times3\times8}{3\times5\times8}$$
$$=\frac{2}{5}$$

c.

$$\frac{2}{3}\div\frac{5}{6}=\frac{2}{3}\times\frac{6}{5}$$
$$=\frac{2}{3}\times\frac{2\times3}{5}$$
$$=\frac{4}{5}$$

d.

$$\frac{4}{5}\div\frac{3}{10}=\frac{4}{5}\times\frac{10}{3}$$
$$=\frac{2\times2}{5}\times\frac{2\times5}{3}$$
$$=\frac{8}{3}$$

e.

$$\frac{4}{7}\div\frac{4}{5}=\frac{4}{7}\times\frac{5}{4}$$
$$=\frac{5}{7}$$

f.

$$\frac{5}{6}\div\frac{1}{3}=\frac{5}{6}\times\frac{3}{1}$$
$$=\frac{5\times3}{2\times3}$$
$$=\frac{5}{2}$$

36a.

$$\frac{4}{9}\div\frac{3}{4}=\frac{4}{9}\times\frac{4}{3}$$
$$=\frac{16}{27}$$

b.

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

c.

$$\frac{5}{6}\times 18=\frac{5}{6}\times\frac{18}{1}$$
$$=\frac{5\times 3\times 6}{6}$$
$$=15$$

d.

$$\frac{3}{8}\times 24=\frac{3}{8}\times\frac{24}{1}$$
$$=\frac{3\times 3\times 8}{8}$$
$$=9$$

e. $$\frac{5}{8}\times 8=\frac{5}{8}\times\frac{8}{1}$$
$$=5$$

f. $\frac{6}{7}\times 7=\frac{6}{7}\times\frac{7}{1}$

$=6$

38a. $3\frac{4}{5}\div 0$ is impossible.

b.

$7\times\frac{9}{14}=\frac{7}{1}\times\frac{9}{14}$

$=\frac{7}{1}\times\frac{9}{2\times 7}$

$=\frac{9}{2}$

c.

$5\div 1\frac{1}{2}=5\div\frac{3}{2}$

$=\frac{5}{1}\times\frac{2}{3}$

$=\frac{10}{3}$

d.

$$4 \div 2\frac{2}{3} = 4 \div \frac{8}{3}$$
$$= \frac{4}{1} \times \frac{3}{8}$$
$$= \frac{4}{1} \times \frac{3}{2 \times 4}$$
$$= \frac{3}{2}$$

e.

$$6 \div 1\frac{5}{6} = 6 \div \frac{11}{6}$$
$$= \frac{6}{1} \times \frac{6}{11}$$
$$= \frac{36}{11}$$

f.

$$52 \times \frac{5}{13} = \frac{52}{1} \times \frac{5}{13}$$
$$= \frac{4 \times 13}{1} \times \frac{5}{13}$$
$$= 20$$

40a.

$$2\frac{2}{5} \div 1\frac{2}{3} = \frac{12}{5} \div \frac{5}{3}$$
$$= \frac{12}{5} \times \frac{3}{5}$$
$$= \frac{36}{25}$$

b.

$$5\frac{1}{2} \div 1\frac{4}{5} = \frac{11}{2} \div \frac{9}{5}$$
$$= \frac{11}{2} \times \frac{5}{9}$$
$$= \frac{55}{18}$$

c.

$$2\frac{2}{3} \div 1\frac{1}{3} = \frac{8}{3} \div \frac{4}{3}$$
$$= \frac{8}{3} \times \frac{3}{4}$$
$$= \frac{2 \times 4}{3} \times \frac{3}{4}$$
$$= 2$$

d.

$$5 \times \frac{3}{5} = \frac{5}{1} \times \frac{3}{5}$$
$$= 3$$

e.

$$2\frac{1}{2} \times \frac{3}{4} = \frac{5}{2} \times \frac{3}{4}$$
$$= \frac{15}{8}$$

f.

$$4\frac{1}{2} \div 9\frac{1}{2} = \frac{9}{2} \div \frac{19}{2}$$
$$= \frac{9}{2} \times \frac{2}{19}$$
$$= \frac{9}{19}$$

42a. $0.7 = \frac{70}{100} = \frac{7}{10}$

b. $0.9 = \frac{90}{100} = \frac{9}{10}$

c. $0.8 = \frac{80}{100} = \frac{4}{5}$

44a. $0.18 = \frac{18}{100} = \frac{9}{50}$

b. $0.48 = \frac{48}{100} = \frac{12}{25}$

c. $0.54 = \frac{54}{100} = \frac{27}{50}$

46a. $0.505 = \frac{505}{1000} = \frac{101}{200}$

b. $0.015 = \frac{15}{1000} = \frac{3}{200}$

c. $0.005 = \frac{5}{1000} = \frac{1}{200}$

48a.

$$\begin{aligned} 0.37\frac{1}{2} &= 37\frac{1}{2} \times \frac{1}{100} \\ &= \frac{75}{2} \times \frac{1}{100} \\ &= \frac{3 \times 25}{2 \times 4 \times 25} \\ &= \frac{3}{8} \end{aligned}$$

b.

$$\begin{aligned} 0.8\frac{8}{9} &= 8\frac{8}{9} \times \frac{1}{10} \\ &= \frac{80}{9} \times \frac{1}{10} \\ &= \frac{8}{9} \end{aligned}$$

c.

$$0.000\frac{1}{3} = \frac{1}{3} \times \frac{1}{1{,}000}$$
$$= \frac{1}{3{,}000}$$

50.

$$\frac{1}{10} \times \text{AGE} \times \text{SALARY} = \frac{1}{10} \times 20 \times \$24{,}000$$
$$= 2 \times \$24{,}000$$
$$= \$48{,}000$$

52.

$$\frac{1}{10} \times \text{AGE} \times \text{SALARY} = \frac{1}{10} \times 25 \times \$25{,}000$$
$$= 25 \times \$2{,}500$$
$$= \$62{,}500$$

SURVIVAL HINT: *Translate the word "of" to mean multiply.*

54. $\frac{2}{3} \times 180 = 120$ pounds

By calculator: [2] [÷] [3] [×] [180] [=]

56. $100 \times \$56.63 = \$5{,}663.00$

By calculator: [100] [×] [56.63] [=]

58. $2\left(\frac{5}{8}\right)=\frac{10}{8}=\frac{5}{4}=1\frac{1}{4}$ cups of sugar

$2(1)=2$ eggs

$2\left(\frac{7}{8}\right)=\frac{14}{8}=\frac{7}{4}=1\frac{3}{4}$ cups of flour

60. If you are 20 years old, then according to advertisement, $20\div\frac{1}{2}=40$, that is you will get 40% off.

If your age is 50, then $50\div\frac{1}{2}=100$, and you will get 100% off.

If your age is 60, then $60\div\frac{1}{2}=120$, and you will get 120% off.

This concludes that if the $\text{age}\geq 50$ then it's free.

Problem Set 1.7

2.

Step 1 Find the LCD.
Step 2 Change the forms of the fractions to obtain forms with common denominators.
Step 3 Subtract the numerators of the fractions with common denominators.

4. $\text{Outside diameter}=\frac{15}{16}\text{in.}$; $\text{Thickness}=\frac{3}{16}\text{in.}$

$$\begin{aligned}\text{Inside diameter} &= \text{outside diameter} - \text{thickness}\\ &=\frac{15}{16}-\frac{6}{16}\\ &=\frac{9}{16}\text{in.}\end{aligned}$$

The inside diameter is $\frac{9}{16}$ inches.

6.

Step 1 Factor all given denominators into prime factors; write this factorization using exponents.
Step 2 List each different prime factor you found in the prime factorization of the denominators.
Step 3 On each prime in the list from Step 2, place the largest exponent that appears on that prime factor anywhere in the factorization of the denominators.

8. False; write $3\frac{5}{8}-2\frac{7}{8}=2\frac{13}{8}-2\frac{7}{8}=\frac{6}{8}=\frac{3}{4}$.

10. False; Invert the divisor; the correct answer is $\frac{3}{8}\div\frac{5}{8}=\frac{3}{8}\times\frac{8}{5}=\frac{3}{5}$.

12. False; multiplication first : $\frac{3}{5}+\frac{1}{5}=\frac{4}{5}$

14. $\frac{3}{10}\approx\frac{3}{9}=\frac{1}{3}$

The correct response is B.

16.

$$\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}+\frac{1}{32}=\frac{16}{32}+\frac{8}{32}+\frac{4}{32}+\frac{2}{32}+\frac{1}{32}$$
$$=\frac{31}{32}$$
$$\approx\frac{32}{32}$$
$$=1$$

The correct response is B.

18. If I multiply a number by a number larger than 1, the result is larger, but if I multiply a number by a number smaller than 1, the result is smaller. The correct response is A.

20. If I divide a number by a number larger than 1 the result is smaller, but if I divide a number by a number smaller than 1, then the result is larger. The correct response is B.

22.a. $\frac{9}{13}-\frac{5}{13}=\frac{4}{13}$

b. $\frac{6}{23}-\frac{5}{23}=\frac{1}{23}$

SURVIVAL HINT: *A number is **reduced** if there is no number other than 1 that divides into both the numerator and denominator.*

c. $\frac{9}{7}-\frac{2}{7}=\frac{7}{7}=1$

d. $\frac{13}{15}+\frac{2}{15}=\frac{15}{15}=1$

e. $\frac{7}{12}-\frac{1}{12}=\frac{6}{12}=\frac{1}{2}$

f. $\frac{5}{8}-\frac{3}{8}=\frac{2}{8}=\frac{1}{4}$

24a.

$4=2^2$

$8=2^3$

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

b.

$2=2$

$6=2\times3$

$\text{LCD}=2\times3=6$

c.

$2=2$

$5=5$

$\text{LCD}=2\times5=10$

d.

$5=5$

$12=2^2\times3$

$\text{LCD}=2^2\times3\times5=60$

26a.

$6=2\times3$

$8=2^3$

$10=2\times5$

$\text{LCD}=2^3\times3\times5=120$

b.

$9=3^2$

$12=2^2\times3$

$14=2\times7$

$\text{LCD}=2^2\times3^2\times7=252$

c.

$60 = 2^2 \times 3 \times 5$

$18 = 2 \times 3^2$

$\text{LCD} = 2^2 \times 3^2 \times 5 = 180$

d.

$450 = 2 \times 3^2 \times 5^2$

$15 = 3 \times 5$

$\text{LCD} = 2 \times 3^2 \times 5^2 = 450$

28a. LCD is 6;

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

b. LCD is 8;

$$\frac{1}{2} + \frac{3}{8} = \frac{4}{8} + \frac{3}{8}$$
$$= \frac{7}{8}$$

c. LCD is 6;

$$\frac{1}{2} - \frac{1}{6} = \frac{3}{6} - \frac{1}{6}$$
$$= \frac{2}{6}$$
$$= \frac{1}{3}$$

d. LCD is 10;

$$\frac{1}{2} + \frac{2}{5} = \frac{5}{10} + \frac{4}{10}$$
$$= \frac{9}{10}$$

e. LCD is 10;

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

f. LCD is 6;

$$\frac{5}{6}+\frac{2}{3}=\frac{5}{6}+\frac{4}{6}$$
$$=\frac{9}{6}$$
$$=\frac{3}{2}$$

30a. LCD is 90;

$$\frac{2}{45}+\frac{1}{6}=\frac{4}{90}+\frac{15}{90}$$
$$=\frac{19}{90}$$

b. LCD is 90;

$$\frac{41}{45}-\frac{5}{6}=\frac{82}{90}-\frac{75}{90}$$
$$=\frac{7}{90}$$

c. LCD is 36;

$$\frac{4}{9}-\frac{5}{12}=\frac{16}{36}-\frac{15}{36}$$
$$=\frac{1}{36}$$

d. LCD is 60;

$$\frac{3}{5}+\frac{1}{12}=\frac{36}{60}+\frac{5}{60}$$
$$=\frac{41}{60}$$

e. LCD is 120;

$$\frac{5}{24}-\frac{2}{15}=\frac{25}{120}-\frac{16}{120}$$
$$=\frac{9}{120}$$
$$=\frac{3}{40}$$

f. LCD is 2,430;

$$\frac{5}{27}+\frac{1}{90}=\frac{50}{270}+\frac{3}{270}$$
$$=\frac{53}{270}$$

32a.

$$5\frac{1}{8}= \quad 5\frac{1}{8}= \quad 4\frac{9}{8}$$
$$-3\frac{3}{4}=-3\frac{6}{8}=-3\frac{6}{8}$$
$$1\frac{3}{8}$$

b.

$$17\frac{1}{2}= \quad 17\frac{3}{6}=16\frac{9}{6}$$
$$-6\frac{2}{3}=-6\frac{4}{6}=-6\frac{4}{6}$$
$$10\frac{5}{6}$$

c.

$$12\frac{1}{3}=12\frac{2}{6}=11\frac{8}{6}$$
$$-4\frac{1}{2}=-4\frac{3}{6}=-4\frac{3}{6}$$
$$7\frac{5}{6}$$

34a.

$$8=2^3$$
$$5=5$$
$$4=2^2$$
$$\text{LCD}=2^3\times 5=40$$

$$6\frac{1}{8}=6\frac{1\times5}{8\times5}=6\frac{5}{40}$$
$$3\frac{2}{5}=3\frac{2\times8}{5\times8}=3\frac{16}{40}$$
$$1\frac{1}{4}=1\frac{1\times10}{4\times10}=1\frac{10}{40}$$
$$10\frac{31}{40}$$

b.

$2=2$

$4=2^2$

$8=2^3$

LCD=$2^3=8$

$$5\frac{1}{2}=5\frac{1\times4}{2\times4}=5\frac{4}{8}$$
$$6\frac{3}{4}=6\frac{3\times2}{4\times2}=6\frac{6}{8}$$
$$4\frac{1}{8}=4\frac{1}{8}\quad=4\frac{1}{8}$$
$$15\frac{11}{8}=16\frac{3}{8}$$

36a.

$$\frac{1}{2}+\frac{2}{3}\times\frac{1}{5}=\frac{1}{2}+\frac{2}{15}$$ *Multiplication before addition*
$$=\frac{15}{30}+\frac{4}{30}$$
$$=\frac{19}{30}$$

b.

$$\frac{1}{2}\div\left(\frac{1}{3}\div\frac{1}{4}\right)=\frac{1}{2}\div\left(\frac{1}{3}\times\frac{4}{1}\right)$$
$$=\frac{1}{2}\div\frac{4}{3}$$
$$=\frac{1}{2}\times\frac{3}{4}$$
$$=\frac{3}{8}$$

Division, parenthesis first

38a.

$$\frac{3}{4}\left(\frac{9}{13}+\frac{4}{13}\right)=\frac{3}{4}\left(\frac{9}{13}+\frac{4}{13}\right)$$
$$=\frac{3}{4}\left(\frac{13}{13}\right)$$
$$=\frac{3}{4}$$

Parenthesis first, multiplication

b.

$$\frac{4}{5}\left(\frac{5}{16}+\frac{11}{16}\right)=\frac{4}{5}\left(\frac{5}{16}+\frac{11}{16}\right)$$
$$=\frac{4}{5}\left(\frac{16}{16}\right)$$
$$=\frac{4}{5}$$

Addition in parenthesis first, multiplication

40. Multiplication before addition:

$$\frac{3}{4}\times\frac{119}{200}+\frac{3}{4}\times\frac{81}{200}=\frac{357}{800}+\frac{243}{800}$$
$$=\frac{600}{800}$$
$$=\frac{3}{4}$$

By calculator : [(] [3] [÷] [4] [)] [×] [(] [119] [÷] [200] [)] [+] [(] [3] [÷] [4] [)] [×] [(] [81] [÷] [200] [)] [=]
Display : 0.75
Answer is 0.75 or $\frac{3}{4}$

42. Multiplication before addition:

$$\frac{7}{8}\times\frac{107}{147}+\frac{7}{8}\times\frac{40}{147}=\frac{749}{1{,}176}+\frac{280}{1{,}176}$$
$$=\frac{1{,}029}{1{,}176}$$

By calculator:
$\boxed{(}\boxed{7}\boxed{\div}\boxed{8}\boxed{)}\boxed{\times}\boxed{(}\boxed{107}\boxed{\div}\boxed{147}\boxed{)}\boxed{+}\boxed{(}\boxed{7}\boxed{\div}\boxed{8}\boxed{)}\boxed{\times}\boxed{(}\boxed{40}\boxed{\div}\boxed{147}\boxed{)}\boxed{=}$ Display : 0.875

Answer is 0.875 or $\frac{1029}{1176}$

44. By calculator: $\boxed{19}\boxed{\div}\boxed{300}\boxed{+}\boxed{55}\boxed{\div}\boxed{144}\boxed{+}\boxed{25}\boxed{\div}\boxed{108}\boxed{=}$
Display: 0.6767592593 (This is an approximate answer.)

46. First find the regions labeled "A" and add up their areas: The first one at the left is $\frac{1}{2}$ of $\frac{1}{4}$; The second one is at the right and is $\frac{1}{3}$ of $\frac{1}{2}$:

$$\frac{1}{2}.\frac{1}{4}+\frac{1}{3}.\frac{1}{2}=\frac{1}{8}+\frac{1}{6}$$ *Multiplication before addition.*
$$=\frac{1\times3}{8\times3}+\frac{1\times4}{6\times4}$$
$$=\frac{3}{24}+\frac{4}{24}$$
$$=\frac{7}{24}$$

48. First find the regions labeled "C" and add up their areas: The first one at the left is $\frac{1}{4}$; The second one is at the right and is $\frac{1}{3}$ of $\frac{1}{2}$:

$$\frac{1}{4}+\frac{1}{3}.\frac{1}{2}=\frac{1}{4}+\frac{1}{6}$$ *Multiplication before addition.*
$$=\frac{1\times3}{4\times3}+\frac{1\times2}{6\times2}$$
$$=\frac{3}{12}+\frac{2}{12}$$
$$=\frac{5}{12}$$

50. This is the portion that is not A. From Problem 46, the portion that is A is $\frac{7}{24}$. Thus, we find

$$1-\frac{7}{24}=\frac{17}{24}$$

52. We see the square is divided into three columns of equal size. We are looking for the parts labeled R: in the first column R is $\frac{1}{3}$ of $\frac{1}{2}$ of that column; in the second column it is $\frac{1}{3}$ of that column; in the third column R is $\frac{1}{2}$ of that column. Thus,

$$\begin{aligned}\frac{1}{6}\times\frac{1}{3}+\frac{1}{3}\times\frac{1}{3}+\frac{1}{2}\times\frac{1}{3}&=\frac{1}{18}+\frac{1}{9}+\frac{1}{6}\\&=\frac{1}{18}+\frac{2}{18}+\frac{3}{18}\\&=\frac{6}{18}\\&=\frac{1}{3}\end{aligned}$$

54. We see the square is divided into three columns of equal size. We are looking for the parts labeled G: in the first column G is $\frac{1}{3}$ of $\frac{1}{2}$ of that column; in the second column there is no G; in the third column G is $\frac{1}{2}$ of that column. Thus,

$$\begin{aligned}\frac{1}{6}\times\frac{1}{3}+0\times\frac{1}{3}+\frac{1}{2}\times\frac{1}{3}&=\frac{1}{18}+\frac{1}{6}\\&=\frac{1}{18}+\frac{3}{18}\\&=\frac{4}{18}\\&=\frac{2}{9}\end{aligned}$$

56. We see the square is divided into three columns of equal size. We are looking for the parts labeled Y: in the first column Y is $\frac{1}{2}$ of that column; in the second column Y is $\frac{1}{3}$ of that column; in the third column there is no Y. Thus,

$$\begin{aligned}\frac{1}{2}\times\frac{1}{3}+\frac{1}{3}\times\frac{1}{3}+0\times\frac{1}{3}&=\frac{1}{6}+\frac{1}{9}\\&=\frac{3}{18}+\frac{2}{18}\\&=\frac{5}{18}\end{aligned}$$

R or K or G is everything that is not Y:

$$1-\frac{5}{18}=\frac{13}{18}$$

58. To find the total amount of liquid add $\frac{2}{3}$ cup milk and $\frac{1}{2}$ cup of water.

$$\begin{aligned}\frac{2}{3}+\frac{1}{2}&=\frac{4}{6}+\frac{3}{6}\\&=\frac{7}{6}\\&=1\frac{1}{6}\end{aligned}$$

The total amount of liquid is $1\frac{1}{6}$ cup.

60. To find the total weight, add all three boxes.

$$\begin{aligned}1\frac{1}{2}+\frac{3}{4}+2\frac{15}{16}&=\frac{24}{16}+\frac{12}{16}+\frac{47}{16}\\&=\frac{83}{16}\\&=5\frac{3}{16}\end{aligned}$$

The total weight is $5\frac{3}{16}$ pounds.

Problem Set 1.8

2. A Hindu-Arabic numeral is one of the symbols: 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9.

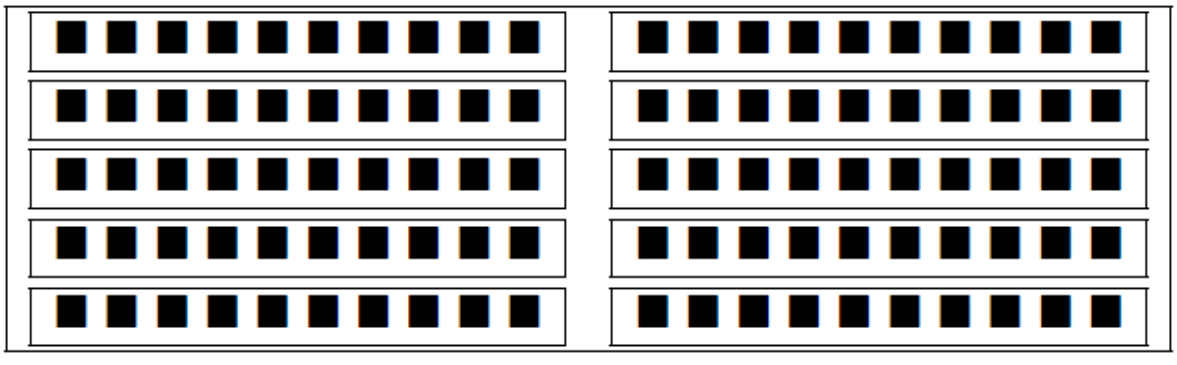
4. We will generally not give answers to those questions marked **IN YOUR OWN WORDS**. This problem do not have "right" or "wrong" answer, but rather is included to help you advance your success in this course. Do your best to answer the question.

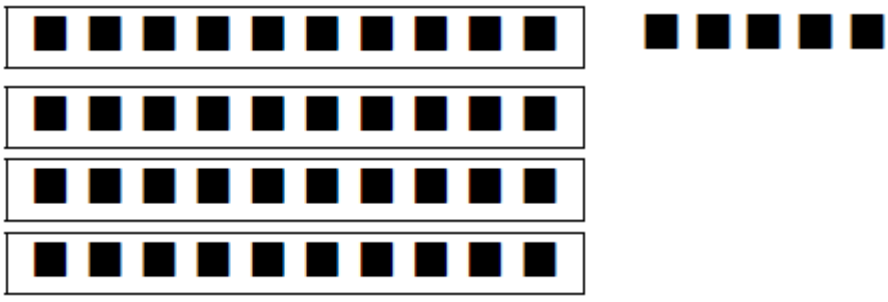
6. Expanded notation is writing a number by showing the meaning of each digit in that number.

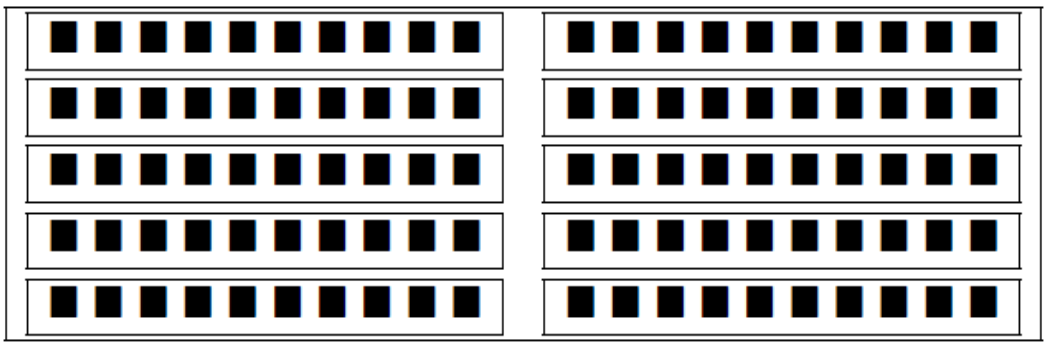
8a. 2

b. 64

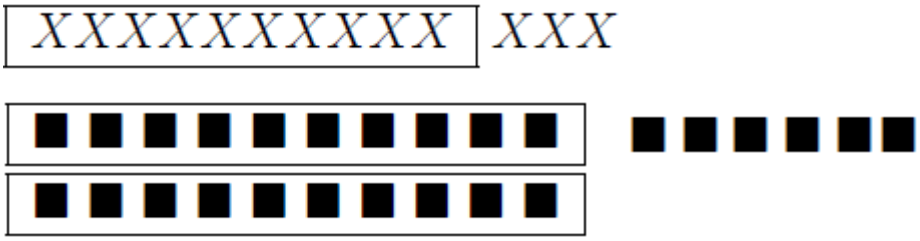
10.





12. Let $X =$ 

Then, 1,326 can be represented as



14. 5 hundreds

16. 5 hundred-thousandths

18. 5 ten millions

20a. $10^{-2} = 0.01$

b. $10^{-6} = 0.000001$

22a. $8 \times 10^{-4} = 0.0008$

b. $7 \times 10^{-3} = 0.007$

24a. $5 \times 10^{-6} = 0.000005$

b. $2 \times 10^{-9} = 0.000000002$

26a. $5 \times 10^{5} + 2 \times 10^{4} + 1 \times 10^{3} + 6 \times 10^{2} + 5 \times 10^{1} + 8 \times 10^{0} = 521,658$

b. $6 \times 10^{7} + 4 \times 10^{3} + 1 \times 10^{0} = 60,004,001$

28. $5 \times 10^{5} + 4 \times 10^{2} + 5 \times 10^{1} + 7 \times 10^{0} + 3 \times 10^{-1} + 4 \times 10^{-2} = 500,457.34$

30. $2 \times 10^{4} + 6 \times 10^{2} + 4 \times 10^{-1} + 7 \times 10^{-3} + 6 \times 10^{-4} + 9 \times 10^{-5} = 20,600.40769$

32a. $0.096421 = 9\times10^{-2} + 6\times10^{-3} + 4\times10^{-4} + 2\times10^{-5} + 1\times10^{-6}$

b. $27.572 = 2\times10^{1} + 7\times10^{0} + 5\times10^{-1} + 7\times10^{-2} + 2\times10^{-3}$

34a. $6,245 = 6\times10^{3} + 2\times10^{2} + 4\times10^{1} + 5\times10^{0}$

b. $2,305,681 = 2\times10^{6} + 3\times10^{5} + 5\times10^{3} + 6\times10^{2} + 8\times10^{1} + 1\times10^{0}$

36a. $0.00000527 = 5\times10^{-6} + 2\times10^{-7} + 7\times10^{-8}$

b. $100,000.001 = 1\times10^{5} + 1\times10^{-3}$

38a. $678,000.01 = 6\times10^{5} + 7\times10^{4} + 8\times10^{3} + 1\times10^{-2}$

b.

$57,285.9361$

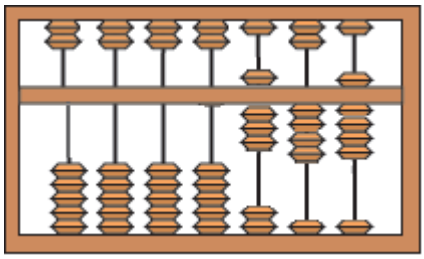
$= 5\times10^{4} + 7\times10^{3} + 2\times10^{2} + 8\times10^{1} + 5\times10^{0} + 9\times10^{-1} + 3\times10^{-2} + 6\times10^{-3} + 1\times10^{-4}$

40. $3,201$

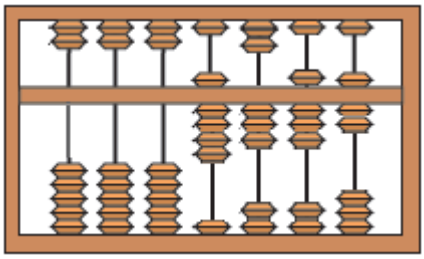
42. $5,001,005$

44. $8,009,026$

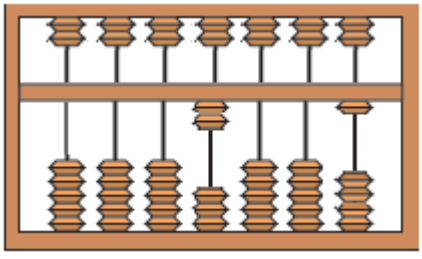
46.



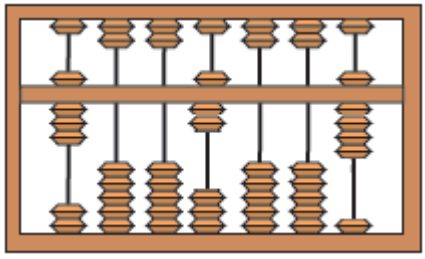
48.



50.



52.



54. 3 yr, 10 mo + 2 yr, 5 mo = 5 yr, 15 mo or 6 yr, 3 mo

(There are 12 months in one year.)

56. 6 ft, 8 in. + 9 ft, 5 in. = 15 ft, 13 in.

(There are 12 in. in one ft.)

58.

	1 gross	+	9 dozen	+	7 units
+	2 gross	+	8 dozen	+	8 units
	3 gross	+	17 dozen	+	15 units

Since 14 units = 1 dozen and, 12 dozen = 1 gross,
we have

3 gross + 17 dozen + 15 units = 4 gross, 6 dozen, 1 unit

60.

	3 year	+	4 months	+	21 days
+	1 year	+	6 months	+	15 days
	4 year	+	10 months	+	36 days

Since 36 days = 1 month, 6 days, we have the length of time to be:

4 year, 11 months, 6 days

Problem Set 1.9

2. We will generally not give answers to those questions marked **IN YOUR OWN WORDS**. This problem do not have "right" or "wrong" answers, but rather are included to help you advance your success in this course. Do your best to answer the question.

4. We will generally not give answers to those questions marked **IN YOUR OWN WORDS**. This problem do not have "right" or "wrong" answers, but rather are included to help you advance your success in this course. Do your best to answer the question.

6. To change from base sixteen to base ten write the base sixteen number in expanded notation, and then simplify.

8. To change from base ten to base sixteen, we need to invent symbols for 12, 13, 14, and 15 objects. Then use repeated division by sixteen and save the remainders. Read the remainders down for base sixteen representation.

10a. In base 10, we count 13 people in line.

b. In base 5, we have 2 groups of 5 with 3 left over; that is, 23_{five}.

c. In base 13, there is one big group of 13 with 0 left over; that is, $10_{thirteen}$.

d. In base 8, there is 1 group with 5 left over; that is, 15_{eight}.

e. In base 2, there is one group of a group of groups, and one left over; that is, 1101_{two}.

f. In base 12, there is 1 group with 1 left over; that is, 11_{twelve}.

12. $5387.9_{twelve} = 5\times12^3 + 3\times12^2 + 8\times12^1 + 7\times12^0 + 9\times12^{-1}$

14. $5411.1023_{six} = 5\times6^3 + 4\times6^2 + 1\times6^1 + 1\times6^0 + 1\times6^{-1} + 0\times6^{-2} + 2\times6^{-3} + 3\times6^{-4}$

16. $1021.221_{three} = 1\times3^3 + 0\times3^2 + 2\times3^1 + 1\times3^0 + 2\times3^{-1} + 2\times3^{-2} + 1\times3^{-3}$

18. $234000_{five} = 2\times5^5 + 3\times5^4 + 4\times5^3 + 0\times5^2 + 0\times5^1 + 0\times5^0$

20. $2033.1_{four} = 2\times4^3 + 0\times4^2 + 3\times4^1 + 3\times4^0 + 1\times4^{-1}$

22. $527_{twelve} = 5\times12^2 + 2\times12^1 + 7\times12^0 = 751$

24. $1101.11_{two} = 1\times2^3 + 1\times2^2 + 0\times2^1 + 1\times2^0 + 1\times2^{-1} + 1\times2^{-2} = 13.75$

26. $65_{eight} = 6\times8^1 + 5\times8^0 = 53$

28.

11101000110_{two}

$= 1\times2^{10} + 1\times2^9 + 1\times2^8 + 0\times2^7 + 1\times2^6 + 0\times2^5 + 0\times2^4 + 0\times2^3 + 1\times2^2 + 1\times2^1 + 0\times2^0$

$= 1,862$

30. $4312_{\textit{five}} = 4\times5^4 + 3\times5^3 + 1\times5^2 + 2\times5^1 = 582$

32. $3731_{\textit{eight}} = 3\times8^3 + 7\times8^2 + 3\times8^1 + 1\times8^0 = 2{,}009$

34. Use repeated division by four.

$$\begin{array}{rl} 0 & \text{remainder: } 2 \\ 4\overline{)2} & \text{remainder: } 1 \\ 4\overline{)9} & \text{remainder: } 3 \\ 4\overline{)39} & \text{remainder: } 1 \\ 4\overline{)157} & \text{remainder: } 0 \\ 4\overline{)628} & \end{array}$$

Read down the correct number; $21310_{\textit{four}}$

36. Use repeated division by twelve.

$$\begin{array}{rl} 0 & \text{remainder: } 2 \\ 12\overline{)2} & \text{remainder: } 11 \\ 12\overline{)35} & \text{remainder: } 7 \\ 12\overline{)427} & \end{array}$$

Read down the correct number (don't forget to represent the remainder of 11 as E); $2E7_{\textit{twelve}}$

38. Use repeated division by eight.

0 remainder: 1
$8\overline{)1}$ remainder: 1
$8\overline{)9}$ remainder: 4
$8\overline{)76}$ remainder: 7
$8\overline{)615}$

Read down the correct number; 1147_{eight}

40. Use repeated division by two.

0 remainder: 1
$2\overline{)1}$ remainder: 0
$2\overline{)2}$ remainder: 0
$2\overline{)4}$ remainder: 1
$2\overline{)9}$ remainder: 1
$2\overline{)19}$ remainder: 0
$2\overline{)38}$ remainder: 0
$2\overline{)76}$ remainder: 1
$2\overline{)153}$ remainder: 1
$2\overline{)307}$ remainder: 1
$2\overline{)615}$

Read down the correct number; 1001100111_{two}

42. Use repeated division by seven.

0 remainder: 2
$7\overline{)2}$ remainder: 2
$7\overline{)16}$ remainder: 1
$7\overline{)113}$ remainder: 4
$7\overline{)795}$

Read down the correct number; 2214_{seven}

44. Use repeated division by twelve.

$$\begin{array}{rl} 0 & \text{remainder: } 2 \\ 12\overline{)2} & \text{remainder: } 8 \\ 12\overline{)32} & \text{remainder: } 10 \\ 12\overline{)394} & \text{remainder: } 3 \\ 12\overline{)4731} & \end{array}$$

Read down the correct number don't forget to represent the remainder of 10 as T); $28T3_{twelve}$

46. Use repeated division by four.

$$\begin{array}{rl} 0 & \text{remainder: } 1 \\ 4\overline{)1} & \text{remainder: } 0 \\ 4\overline{)4} & \text{remainder: } 3 \\ 4\overline{)19} & \text{remainder: } 0 \\ 4\overline{)76} & \end{array}$$

Read down the correct number; 1030_{four}

48. Convert 52 to base seven.

$$\begin{array}{rl} 0 & \text{remainder: } 7 \\ 7\overline{)7} & \text{remainder: } 3 \\ 7\overline{)52} & \end{array}$$

Read down the correct number: 7 weeks and 3 days

50. Convert 55 to base twelve.

$$\begin{array}{rl} 0 & \text{remainder: } 4 \\ 12\overline{)4} & \text{remainder: } 7 \\ 12\overline{)55} & \end{array}$$

Read down the correct number: 4 ft and 7 in

52. Convert 500 to base twelve.

$$\begin{array}{rl} 0 & \text{remainder: } 3 \\ 12\overline{)3} & \text{remainder: } 5 \\ 12\overline{)41} & \text{remainder: } 8 \\ 12\overline{)500} & \end{array}$$

In base twelve, $500 = 358_{twelve}$. This means that we have $3\times12^2 + 5\times12^1 + 8\times12^0$. There are 3 gross, 5 dozens, and 8 units.

54. We do repeated division by 5.

$$\begin{array}{rl} 0 & \text{remainder: } 3 \\ 5\overline{)3} & \text{remainder: } 1 \\ 5\overline{)16} & \text{remainder: } 4 \\ 5\overline{)84} & \end{array}$$

We see that we would have 3 quarters, 1 nickel, and 4 pennies.

So, minimum numbers of coins needed to make $\$0.84$ is 8.

56. We must find maximum number of gross, then find the number of dozens and then purchase the remainder individually. We will expand the number 954_{twelve} to base ten.

$$954_{twelve} = 9\times12^2 + 5\times12^1 + 4\times12^0 = 1,360 \text{ pencils.}$$

58. $44 = 6 \times 7 + 2,\ \text{so}\ 54 = 62_{\textit{seven}}$

This is 6 weeks and 2 days.

60. $29 = 1 \times 24 + 5,\ \text{so}\ 54 = 15_{\textit{twenty-four}}$

This is 1 day and 5 hours.

Problem Set 1.Rev

2a. A box of oranges contains approximately 96 oranges and U.S. annual production is 186,075,000 boxes. Then number of oranges produced per year is

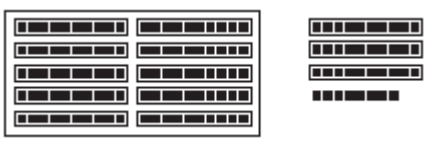
$96 \times 186,075,000 \approx 10^2 \times 1.86 \times 10^8 = 1.86 \times 10^{10}$ (approx.)

b. E. 20 billion

c. The shaded portion of the square is $\frac{1}{6}$ of $\frac{1}{2}$.

$\frac{1}{6} \times \frac{1}{2} = \frac{1}{12}$

d.



4a.

$$2^3 + 3^3 = 8 + 27$$
$$= 35$$

b.

$$(2+3)^3 = 5^3$$
$$= 125$$

c. There are 60 second in a minute. You need to divide 13335 by 60 and integer answer is the number of minutes and the remainder is the number of seconds. Therefore you have 222 minutes and 15 seconds in 13335 seconds.

Now there are 60 minutes in an hour. By similar calculations to above you have 3 hours 42 minutes and 15 seconds in 13335 seconds.

Final answer is:
3 hours : 42 minutes : 15 seconds

d. $(3 \times 10^{12}) \div (215 \times 10^6) =$ 13953.49(approx.)

6a.

$$4\frac{2}{3} = \frac{14}{3}$$
$$4 \times 3 + 2 = 14$$

b.

$$1\frac{5}{8}=\frac{13}{8}$$
$$1\times 8+5=13$$

c.

$$3\frac{3}{4}=\frac{15}{4}$$
$$3\times 4+3=15$$

d.

$$12\frac{5}{9}=\frac{113}{9}$$
$$12\times 9+5=113$$

8a. 6.$\boxed{1}$49 Rounding place digit is marked.
6.1 Digit to the right is a 4, so delete the "49".

b. 4$\boxed{5}$.5 Rounding place digit is marked. Digit to the right is a 5, so
46 add one to the rounding place digit and delete the "0.5".

c. 4$\boxed{5}$.31499 Rounding place digit is marked.
45 Digit to the right is a 3, so delete the "0.31499".

d. 10$\boxed{4}$.996 Rounding place digit is marked. Digit to the right is a 9, so
105.00 add one to the rounding place digit and change the digits to the right of the decimal point to zeros.

10a.

$$4^3 = 4 \times 4 \times 4$$
$$= 64$$

b.

$$9^2 = 9 \times 9$$
$$= 81$$

c. $5.79 \times 10^{-4} = 0.000579$

Move the decimal point 4 places to the left.

d. $4.01 \times 10^5 = 401,000$

Move the decimal point 5 places to the right.

12a.

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

b.

$$\frac{32}{16} = \frac{2 \times 16}{16}$$
$$= 2$$

c.

$$\frac{192}{240} = \frac{4 \times 48}{5 \times 48}$$
$$= \frac{4}{5}$$

d.

$$\frac{128}{384} = \frac{128}{3 \times 128}$$
$$= \frac{1}{3}$$

14a.

$$12 = 2^2 \times 3$$
$$15 = 3 \times 5$$
$$\text{LCD} = 2^2 \times 3 \times 5 = 60$$

b.

$$6 = 2 \times 3$$
$$10 = 2 \times 5$$
$$\text{LCD} = 2 \times 3 \times 5 = 30$$

c.

$$10 = 2 \times 5$$
$$15 = 3 \times 5$$
$$6 = 2 \times 3$$
$$\text{LCD} = 2 \times 3 \times 5 = 30$$

d.

$$24 = 2^3 \times 3$$
$$30 = 2 \times 3 \times 5$$
$$18 = 2 \times 3^2$$
$$\text{LCD} = 2^3 \times 3^2 \times 5 = 360$$

16a.

$$\frac{3}{5}\times\frac{25}{27}=\frac{3\times5\times5}{5\times3\times3\times3}$$
$$=\frac{5}{9}$$

b.

$$\frac{4}{9}\times27=\frac{2\times2\times3\times3\times3}{3\times3}$$
$$=12$$

c.

$$4\frac{1}{6}\times3\frac{2}{5}=\frac{25}{6}\times\frac{17}{5}$$
$$=\frac{5\times5\times17}{2\times3\times5}$$
$$=\frac{85}{6}$$

d.

$$2\frac{3}{4}\times\frac{4}{5}=\frac{11}{4}\times\frac{4}{5}$$
$$=\frac{11\times4}{4\times5}$$
$$=\frac{11}{5}$$

18a.

$$\frac{5}{7}+\frac{3}{7}=\frac{8}{7}$$

b.

$$\frac{6}{11}-\frac{2}{11}=\frac{4}{11}$$

c.

$$12\frac{4}{5}+6\frac{3}{5}=\frac{64}{5}+\frac{33}{5}$$
$$=\frac{97}{5}$$
$$=19\frac{2}{5}$$

d.

$$5\frac{1}{3}-1\frac{2}{3}=\frac{16}{3}-\frac{5}{3}$$
$$=\frac{11}{3}$$
$$=3\frac{2}{3}$$

20a.

$$\frac{2}{3}+\frac{4}{5}\div\frac{1}{2}=\frac{2}{3}+\frac{4}{5}\times\frac{2}{1}$$

Division before addition.

$$=\frac{2}{3}+\frac{8}{5}$$
$$=\frac{10}{15}+\frac{24}{15}$$
$$=\frac{34}{15}$$

b.

$$\frac{2\times 8+3\times 5}{3\times 8}=\frac{16+15}{24} \qquad \textit{Multiplication before addition.}$$
$$=\frac{31}{24}$$

c.

$$\frac{4}{5}\times\frac{12}{23}-\frac{4}{5}\times\frac{2}{23}=\frac{48}{115}-\frac{8}{115} \qquad \textit{Multiplication before subtraction.}$$
$$=\frac{40}{115}$$

d.

$$\frac{4}{5}\left(\frac{12}{23}-\frac{2}{23}\right)=\frac{4}{5}\left(\frac{10}{23}\right) \qquad \textit{Parenthesis first}$$
$$=\frac{40}{115}$$

22a.

$$11011_{two}=1\times 2^4+1\times 2^3+0\times 2^2+1\times 2^1+1\times 2^0$$
$$=16+8+2+1$$
$$=27$$

b.

$$716_{eight}=7\times 8^2+1\times 8^1+6\times 8^0$$
$$=448+8+6$$
$$=462$$

c.

$$
\begin{array}{rl}
0 & \text{Remainder: } 2 \\
5\overline{)2} & \text{Remainder: } 2 \\
5\overline{)12} & \text{Remainder: } 4 \\
5\overline{)64} & \text{Remainder: } 0 \\
5\overline{)320} & \text{Remainder: } 0 \\
5\overline{)1600} & \text{Remainder: } 0 \\
5\overline{)8000} & \text{Remainder: } 0 \\
5\overline{)40000} & \text{Remainder: } 0 \\
5\overline{)200000} & \text{Remainder: } 0 \\
5\overline{)1000000} &
\end{array}
$$

Read down the correct number; 224000000_{five}

d.

$$
\begin{array}{rl}
1 & \text{Remainder: } 1 \\
2\overline{)3} & \text{Remainder: } 1 \\
2\overline{)7} & \text{Remainder: } 1 \\
2\overline{)15} & \text{Remainder: } 1 \\
2\overline{)30} & \text{Remainder: } 0 \\
2\overline{)61} & \text{Remainder: } 1 \\
2\overline{)122} & \text{Remainder: } 0 \\
2\overline{)244} & \text{Remainder: } 0
\end{array}
$$

$2\overline{)488}$ Remainder: 0

$2\overline{)976}$ Remainder: 0

$2\overline{)1953}$ Remainder: 1

$2\overline{)3906}$ Remainder: 0

$2\overline{)7812}$ Remainder: 0

$2\overline{)15625}$ Remainder: 1

$2\overline{)31250}$ Remainder: 0

$2\overline{)62500}$ Remainder: 0

$2\overline{)125000}$ Remainder: 0

$2\overline{)250000}$ Remainder: 0

$2\overline{)500000}$ Remainder: 0

$2\overline{)1000000}$ Remainder: 0

Read down the correct number; $1111010000100100000_{two}$

24. Total cost for one book $= 24.95 + 3.50$

Total cost to fulfill the agreement $= 6 \times (24.95 + 3.50)$

$= 6 \times (28.45)$

$= \$170.70$