1. (Re PT5A pp71-79 Practice 5A)
   #1a,b. 3 : 6 = 1 : 2  \hspace{1cm} 6 : 4 = 3 : 2
   #2.  L : W is 16 : 12 = 4 : 3
   #3.  Saved : Spent = 35 : 15
   #4.  2 : 7 = 4 : ?  \hspace{1cm} ? = 2 \cdot 7 = 14  She used 14 liters of water.
   #5.  60 m is divided into two parts, ratio 2 : 3.  Hmm... 5 parts altogether ... each part is 12 m...

   | 5 parts = 60 m |
   | 1 part = 12 m  |
   | 3 parts = 36 m  |
   | 2 parts = 24 m  |

   Checks out, adds up to 60 m

   The shorter piece is 24 m long.

   #6.  Aw : Jw is 6 : 5.  If Aw is 48 kg, find Jw.

   48 kg is 6 parts, so 1 part is 8 kg, and 5 parts is 40 kg.  John’s ‘weight’ is 40 kg.

   #7.  The ratio of B : G is 2 : 5.  If there are 100 B, how many B & G altogether?

   Algebraic-type solution:
   \[ 2 : 5 = 100 : ? \]
   Solve for ?, get 250.
   So there are 100 + 250 = 350 altogether.

   OR:  \[ 2 : 7 = 100 : ? \]
   Solve for ?  Get 350 , getting the total number of children directly.

   “Scaling” solution:
   OR  \[ 2 \text{ parts} = 100 \]
   \[ 1 \text{ part} = 50 \Rightarrow \text{So there are 7 parts} = 350 \text{ altogether.} \]
   OR  \[ 5 \text{ parts} = 250 \Rightarrow \text{There are} 100 + 250 = 350 \text{ altogether.} \]

   “Bar-diagram” solution:

   3 parts = 30 cm
   1 part = 10 cm
   Cem ent i s “1 part” , so we need 4 m³ of Cement.

2. (Re PT5A, pp 80-82, Practice 5B #4-9)

   #4.  B : G is 7 : 4.  If 121 total, the number of boy is 7 \cdot 11 = 77

   \[ (11 \text{ parts total} = 121, 1 \text{ part is} 11, 7 \text{ parts is} 7 \cdot 11) \]

   #5.  Wm has $120.  Steve has $20 less.  What is ratio of Steve’s $ to Wm’s. $ ?  \[ 100 : 120 = 5 : 6 \]


   a.  What length is G?
   b.  What length is B?

   \[ 3 : 4 : 2 \Rightarrow 9 \text{ parts total.} \]
   \[ 9 \text{ parts} = 90 \text{ cm} \]
   \[ 1 \text{ part} = 10 \text{ cm} \]
   \[ 3 \text{ parts} = 30 \text{ cm} \]

   a.  30 cm length painted Green.
   b.  20 cm length painted Black.

   #7.  Cement, Sand & Stone are mixed in the ratio 1 : 2 : 4.

   If Sand & Stone total is 24 m³....  C = ?  [In class we misread the question!!!]

   Sand & Stone together make 6 parts.  So 6 parts = 24 m³
   \[ \text{and} \text{ 1 part} = 4 \text{ m}³ \]

   Cement is “1 part”, so we need 4 m³ of Cement.
2 cont’d. Teacher’s Solution required for #8 & 9.

If Ryan weighs 30 kg, find the total weight of the 3 boys.”

\[
\begin{array}{c|c|c}
D & R & A \\
\hline
\end{array}
\]

\[
\begin{array}{c|c|c}
30 \text{kg} & 8 \text{ parts} & 5 \text{ parts} = 30 \text{ kg} \\
\hline
0 & 1 \text{ part} = 6 \text{ kg} & 17 \text{ parts} = 6 \cdot 17 = 102 \text{ kg}
\end{array}
\]

The total weight of the three boys is 102 kg.

#9. “3 boys share a sum of money in the ratio 5 : 3 : 2.
If the smallest share is $30, find the biggest share.”

The ratio of the smallest share to the biggest share is 2 : 5.

\[
\begin{array}{c|c|c}
2 \text{ parts} = $30 & 2 \text{ parts} = $30 \\
\hline
1 \text{ part} = $15 & 5 \text{ parts} = 5 \cdot $15 = $75
\end{array}
\]

The biggest share is $75.

3. Ratio 12 to 16

\[
\begin{array}{c|c|c|c|c|c|c|c|c|c}
\hline
& & & & & & & & & \\
\hline
& & & & & & & & & \\
\hline
\end{array}
\]

The above is shown in the style of the text. However,

\[
\begin{array}{c|c|c|c|c|c|c|c|c|c}
\hline
& & & & & & & & & \\
\hline
& & & & & & & & & \\
\hline
\end{array}
\]

\[
\begin{array}{c|c|c|c|c|c|c|c|c|c}
\hline
& & & & & & & & & \\
\hline
& & & & & & & & & \\
\hline
\end{array}
\]

4. (Re PW 5A pp 82-90) text instructs us to not write the answers. Answers to check your work:

Exercise 34 (pp 82-83)

#1a. 3 : 4
#1b. 3 : 4
#2a. 5 : 3
#2b. 3 : 5
#3a. 2 : 3
#3b. 3 : 2
#4a. 5 : 3
#4b. 3 : 5
#5a. 3 : 7
#5b. 7 : 3
#6a. 6 : 5
#6b. 5 : 6

Exercise 35 (pp 84-85)

#1a. 12 : 30 = 2 : 5
#1b. 9 : 15 = 3 : 5
#2. 2 : 3
#3. 3 : 1
#3a. 5
#3b. 32
#3c. 36
#3d. 28
#3e. 1
#3f. 2
#3g. 1
#3h. 12
#3i. 4
#3j. 15
#3k. 1
#3l. 4

#4. Length : width = 60" : 48" = 5 : 4
#5. 24 : 16 = 3 : 2
#6. 52 : 72 = 13 : 18
4 cont’d.

Exercise 36 (pp 86-87)
#1. 4 parts = 60; 7 parts = 105
   There are 105 apples.
#2. 3 parts = 42cm; 8 parts = 112cm
   The ribbon was 112 cm long.
#3. 3 parts = $24; 5 parts = $40  The blouse cost $40.
#4. 10 parts = $280. 4 parts = 4*$28 = $112.  John received $112 more than Peter.

Exercise 37 (pp 88-89)
#1. 4 : 8 : 6    =   2 : 4 : 3
#2. 9 : 6 : 12   =   3 : 2 : 4
#3. 6 : 2 : 8    =   3 : 1 : 4
#4. 12 : 10 : 8   =   6 : 5 : 4
#5. 24 : 18 :30   =   4 : 3 : 5
#6. 12 : 12 : 8   =   3 : 3 : 2

Exercise 38 (p90)
#1 Ratio of B to G to W is 5 : 2 : 3.
   There are 90 B....
   \[ \frac{5}{10} \text{ parts} = 90 \text{ beads} \]
   \[ \frac{10}{10} \text{ parts} = 180 \text{ beads} \]
   There are 180 beads total.
#2. 45 cm total is divided into sides in the ratio 3 : 2 : 4
   Find the length of the longest side.
   9 parts = 45 cm
   4 parts = 20 cm is the longest side’s length.

5. [Study the textbook!  Hey! #@%! What’s #4 about? ] (P.S.  #@% is zrklia for “I love it.”)
(Re PT 6A Teacher’s Solutions for Practice 3A#6,7 & Practice 3B #6-9)
Practice 3A #6:
There are 3 times as many girls as boys in a school choir.
#6a. What is the ratio of Girls to total in Choir?  3 : 4
#6b. What fraction of the children [in the choir] are boys?  One fourth.
#6c. If there are 27 girls, how many children are there altogether?
   3 parts = 27 so 1 part = 9 & 4 parts = 36.  There are 36 children [in the choir].

#7. “The number of men is \( \frac{5}{8} \) the number of women working in a factory.
   If there are 24 more women than men, how many workers are there altogether?”

   Notice everything in this problem is about comparison!
   ←The comparative bar diagram reveals all!
   
   +3 \[ \frac{3}{13} \text{ parts} = 24 \text{ workers} \]
   \[ \frac{1}{13} \text{ part} = 8 \text{ workers} \]
   \[ \frac{13}{13} \text{ parts} = 104 \text{ workers} \]
   There are 104 workers altogether.

But wait! There’s more.......
Practice 3B #6-9:

#6. “A sum of money was shared between Susan and Nancy in the ratio of 2 : 5. Nancy received $36 more than Susan. How much money did Susan receive?”

The setup on this problem is very similar to that of problem #7 above.
Difference: \(3\) parts = $36.
\[\frac{3}{3} \cdot 2\]
Susan: 2 parts = $24
Answer: Susan received $24.

#7. “The ratio of Peter’s money to Paul’s money is 5 : 3. If Peter has $25, how much do they have altogether?”

Peter: \(5\) parts = $25
\[\frac{5}{5} \cdot 5\]
Together: \(8\) parts = $40
Peter and Paul have $40 altogether.
Check: 5 parts = $25, 3 parts = $15. Total is $40, ✔
And ratio is 25 : 15 = 5 : 3 ✔

#8 “The ratio of the number of Chinese books to the number of English books in a library is 4 : 7. There are 2200 Chinese books and English books altogether. How many English books are there?”

There are altogether \((4+7=)\) 11 parts. Those 11 parts = 2200 books.
\[\frac{2200}{11} \cdot 7\]
English books make up 7 parts. Those 7 parts = 1400 books.
There are 1400 English books.
Check: 7 parts = 1400; 4 parts = 800.
Ratio of E to C is 1400 : 800 = 7 : 4 ✔
Total of books = 1400 + 800 = 2200 ✔

#9. “The sides of a triangle are in the ratio 4 : 5 : 6. If the perimeter of the triangle is 60 cm, find the length of the shortest side.”

Perimeter of triangle is the sum of the lengths of the three sides.
There are 15 parts altogether. 15 parts = 60 cm
\[\frac{60}{15} \cdot 4\]
The shortest side has length 16 cm.
Check: 4 parts = 16 cm; 5 parts = 20 cm; 6 parts = 24 cm.
16 cm + 20 cm + 24 cm = 60 cm ✔
16 : 20 : 24 = 4 : 5 : 6 ✔
1a. \(4\cdot10 + 3\cdot1 + 2\cdot\frac{1}{10} + 8\cdot\frac{1}{100} = 43.28\)

1b. \(3 + 7\cdot\left(\frac{1}{10}\right)^2 + 5\cdot\left(\frac{1}{10}\right)^7 = 3.0700005\)

1c. \(18\cdot\left(\frac{1}{10}\right)^5 = 0.00018\)

2a. \(32 + 16000 = (32 + 16)\cdot1000 = 2\cdot1000 = 0.002\)

This is probably easier to visualize in fraction form:
\[
\frac{32}{16000} = \frac{16\cdot2}{16\cdot1000} = \frac{2}{1000} = 0.002
\]

2b. \(52,000,000 \div 130,000 = \frac{52,000,000}{130,000} = \frac{52\cdot10^6}{13\cdot10^4} = 4\cdot10^2 = 400\)

2c. \(0.032 \cdot 0.0010001 = 32\cdot\left(\frac{1}{10}\right)^3\cdot1000\cdot\left(\frac{1}{10}\right)^7 = 320032\cdot\left(\frac{1}{10}\right)^{10} = 0.0000320032\)

4a. \(0.01739\) to the nearest thousandth: 0.017

0.01739 to the nearest ten thousandth: 0.0174

4b. \(0.0495\) to the nearest hundredth: 0.05

0.0495 to the nearest thousandth: 0.050

(Rounded down this would be 0.049

(Rounded up must be 0.049 + .001 = 0.050)

6a. Chip model for 5.73 + 1.67:

<table>
<thead>
<tr>
<th>Units</th>
<th>Tenths</th>
<th>Hundredths</th>
</tr>
</thead>
<tbody>
<tr>
<td>00000</td>
<td>0000</td>
<td>000</td>
</tr>
<tr>
<td>0</td>
<td>0000</td>
<td>000</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

6b. Chip model for 5.3 – 1.72

\[5.30 - 1.72 = 3.58\]

10. \(1.78 \div 0.0047 = \frac{1.78}{.0047} = \frac{17800}{47} \leftarrow\text{largest}\)

\(17.8 \div 0.47 = \frac{17.8}{.47} = \frac{1780}{47} \leftarrow\text{middle}\)

\(17.8 \div 4.7 = \frac{17.8}{4.7} = \frac{178}{47} \leftarrow\text{smallest}\)

11. \(2.6 \div 0.001378 = \frac{2.6}{.001378} = \frac{2600}{1378} = \frac{304}{72} = \frac{2.4}{.007296} = \frac{240}{7296} = \frac{0}{0696} = \frac{9}{96} = \frac{96}{96}\)
1. Express as fractions in simplest form:

   a. \(0.125 = \frac{125}{1000} = \frac{25 \cdot 5}{25 \cdot 40} = \frac{1}{8}\)
   
   b. \(0.0875 = \frac{875}{10000} = \frac{25 \cdot 35}{25 \cdot 400} = \frac{7}{80}\)
   
   c. \(0.525 = \frac{525}{1000} = \frac{25 \cdot 21}{25 \cdot 40} = \frac{21}{40}\)
   
   d. \(0.28125 = \frac{28125}{100000} = \frac{625 \cdot 45}{625 \cdot 160} = \frac{9}{32}\)

2. Can the fraction be written as a finite decimal?

   a. \(\frac{137}{625} = \frac{137 \cdot 16}{10000} = 0.2192\)

   b. \(\frac{221}{1500} = \frac{221}{500 \cdot 3}\)

   and 3 does not divide 221. So this decimal does not terminate.

   c. \(\frac{27}{180} = \frac{9 \cdot 3}{9 \cdot 20} = \frac{3}{20} = \frac{3 \cdot 5}{20 \cdot 5} = 0.15\)

   d. \(\frac{44}{260} = \frac{4 \cdot 11}{4 \cdot 65} = \frac{11}{13 \cdot 5}\)

   Does not terminate. The 13 will cause it to continue.

3. Write as finite or repeating decimals. [Parts f g h not shown. Part h takes the maximum to repeat!]

   a. \(\frac{3}{8} = \frac{3 \cdot 125}{8 \cdot 125} = 0.375\)

   b. \(\frac{23}{20} = \frac{115}{100} = 1.15\)

   c. \(\frac{11}{21} = \frac{523809}{11000000}\)

   d. \(\frac{24}{9} = \frac{2.6}{24.0}\)

   now it repeats...

   this part only.

   e. \(\frac{3}{13} = \frac{0.230769}{30000000}\)

   3 now repeats everything from the first 3
4. Write the following fractions in simplest form. 

a. \(10x = 1.1111111\cdots\) 
\[9x = 1.0000000\cdots\] 
\[= \frac{1}{9}\]

b. \(100x = 1.01010101010\cdots\) 
\[99x = 1\] 
\[= \frac{1}{99}\]

c. \(\overline{.01} = x = \frac{1}{99}\)

d. \(\overline{.1} = x = \frac{1}{9}\)

e. \(1000x = 189.189189189\cdots\) 
\[\overline{.189} = x = \frac{189}{999} = \frac{7}{37}\]

f. \(100x = 50.505050505\cdots\) 
\[\overline{.505} = x = \frac{50}{99}\]

g. \(\overline{.23156} = x = \frac{229}{999}\)

h. \(100x = 231.565656565\cdots\) 
\[\overline{.23156} = x = \frac{229}{999}\]

j. \(10000x = 12345.13451345\cdots\) 
\[\overline{12345.9} = x = \frac{123439}{99990}\]

5a. [Work not shown here.]

\(\overline{.3} = 1\cdots\) which is usually a shock, because we are not accustomed to the fact that numbers can have two different decimal representations.

In fact, every terminating decimal number has two different representations in decimal form.

5b. [Work not shown here.]

\(4329.\overline{3} = 4330\).

PS. You have long been accustomed to the fact that \(\frac{1}{3} = .33333\cdots\) & \(\frac{2}{3} = .66666\cdots\). The logical extension of these observations is that \(3(\frac{1}{3})\) must be \(\frac{99999999\cdots}{1}\). But \(3(\frac{1}{3}) = 1\).

PPS. If you add any tiny decimal number, say \(0.0000000000\), to \(99999999\cdots\), you get a result that is clearly greater than 1. What does that tell you?

6. This is an instructive problem but time does not permit its inclusion. (1/19 is another of those decimal expansions that takes the maximum possible time to repeat.) For the decimal expansion of 3/19, you’d start with the remainder 3 in the division for 1/19.

7. Mental math. Using the facts that \(\overline{.03} = \frac{1}{33}\), and \(\overline{.024} = \frac{36}{111}\), find:

a. \(\overline{.03} = \frac{3}{99} = \frac{1}{33}\)

b. \(\overline{.024} = \frac{324}{999} = \frac{36}{111} = \frac{12}{37}\)

[7c and 7d are not shown.]
6. “A truck contains 1000 pounds of sand and concrete in the ratio 2 : 3. After x pounds of sand is added, the ratio of the sand [to] concrete becomes 4 : 5. Find x.”

2 parts + 3 parts = 1000 pounds, so initial amounts of sand and concrete are 400 & 600 pounds.

\[\frac{400 + x}{600} = \frac{4}{5}\]

We multiply both sides by 600:

\[400 + x = 4 \times 120\]

\[x = 480 - 400 = 80\]

7. (Re PT 6A pp47-53 Practice 4A)

#1. a. 8% = \(\frac{8}{100} = \frac{2}{25}\)  b. 25% = \(\frac{1}{4}\)  c. 50% = \(\frac{1}{2}\)  d. 66% = \(\frac{33}{50}\)

#2. a. 9% = \(\frac{9}{100} = .09\)  b. 90% = \(\frac{90}{100} = .90\)  c. 15% = \(\frac{15}{100} = .15\)  d. 62% = \(\frac{62}{100} = .62\)

#3. a. \(\frac{2}{5} = .40 = 40\%\)  b. \(\frac{7}{8} = .875 = 87.5\%\)  c. \(\frac{9}{20} = \frac{45}{100} = 45\%\)  d. \(\frac{1}{20} = 5\%\)

e. 0.5 = .50 = 50\%  f. 0.08 = 8\%  g. 0.15 = 15\%  h. .245 = 24.5\%

#4. 100% – 45% = 55\%

#5. 100% \{ 45% 20% \?

35% of the pole is painted white.

#6. “36 out of 400 seats are vacant. What percentage of the seats are vacant?”

The whole unit is the 400 seats; the giveaway is underlined above.

\(\frac{36}{400} = 9\%\) are vacant.

#7. \(\frac{2}{5}\) of the students in a school wear glasses. The whole unit is given here.

What percentage of the students in the school wear glasses?

\(\frac{2}{5} = .40 = 40\%\)  40% of the students in the school wear glasses.

#8. “Eva had 3m of cloth. She used 75 cm of it to make a dress for her doll.

What percentage of the cloth did she use for the dress?”

The whole unit

75 cm is what % of the cloth... 75 = ?? of 3m. First rewrite 3m as 3m \(\frac{100cm}{1m} = 300 cm\).

\[75 = X \times 300\]  So \[X = \frac{75}{300} = \frac{25}{100} = 25\%\]  Eva used 25% of the cloth for the dress.

#9. “45 medals were given out[...]. There were 22 bronze medals and 14 silver medals. The rest were gold medals. What percentage of the medals were gold medals?”

The whole unit is the 45 medals that were given out.

45 \{ 22 14 \?

45 – (22+14) = 9 \[\frac{9}{45} = \frac{1}{5} = \frac{20}{100}\]  20% of the medals were gold medals.

#10. K spends 30% of savings & 60% of the remainder. What is left?

Whole unit = original savings.

She spent 30% + 60% of 70% = 30% + 42%, for a total of 72%.

100% – 72% = 28%.  28% of her savings is left.
8. (Re PT 6A, pp 55-59, Practice C)

#1. “Express 480 mL as a percentage of 1.5L.”

First we convert L: 

\[ 1.5 \text{ L} = 1.5 \text{ L} \times \frac{1000 \text{ mL}}{\text{L}} = 1500 \text{ mL}. \]

Our job is to compare 480 mL to 1500 mL.

\[
\begin{array}{c|c}
	ext{1500 mL - 100\%} & \text{Direct method} \\
\hline
1 \text{ mL} - 1/15\% & \text{480 mL} = \frac{160}{500} = \frac{32}{100} = 32\% \\
480 \text{ mL} - 480/15\% = 160/5\% = 32\% \\
\end{array}
\]

Above is the Primary Text’s method.

#2. “What percentage of 2 hours [120 min] is 30 minutes?”

30 minutes is 25\% of 2 hours.

#3. “Express the length of A [36m] as a percentage of the length of B [24m].”

Compare the length of A to the length of B and express as a percentage of B.

“A is 12\% more than B.”

How much longer is A than B? Express result as percentage of B.

A is 12\% longer than B.

#4. “MB had 2.5 kg of sugar. She used 650g of it to make syrup.
What percentage of the sugar was used for making the syrup?”

The whole unit is 2.5 kg (which is 2500 g).

650 g is what part of 2500 g?

\[
\frac{650g}{2500g} = \frac{26}{100} = 26\%
\]

26\% of the 2.5 kg of sugar was used to make syrup.

#5. “The price of a TV was reduced from $200 to $150.
By what percentage was the price reduced?”

The Q asks us to compare the reduction to the original price.

\[
\frac{50}{200} = \frac{25}{100} = 25\%
\]

The price was reduced 25\%.

#6. “A club had 80 members last year. This year it has 96 members.
By what percentage was the membership increased?”

The Q asks us to compare the increase to the old membership.

The membership increased by 20\%.

#7. “The price of beef increased from $12 per kg to $15 per kg. [Express as percent increase.]”

Percent increase or decrease always compares the CHANGE in value to the OLD value.

\[
\frac{\text{Change}}{\text{Old value}} = \frac{3}{12} = \frac{1}{4} = 25\% \quad \text{The price of beef increased 25\%.}
\]

#8. “Kyle bought a pair of shoes for $51. The usual price of the shoes was $60.
How many percent discount was given to Kyle?”

\[
\frac{\text{Change}}{\text{Old value}} = \frac{9}{60} = \frac{3}{20} = \frac{15}{100} = 15\% \quad \text{Kyle was given a 15\% discount.}
\]

#9. “A factory has 600 workers. 250 ... are men and the rest are women.
How many percent more women than men are there?”

350 are women. 100 more women than men. Compare the “more women” to the men.

\[
\frac{100}{250} = \frac{40}{100} = 40\% \quad \text{There are 40\% more women than men.}
\]

[number 10 is not shown.]