Welcome to Level 4 of Applied Mathematics. This lesson continues the basic skills reviewed in level 3. It will review the concepts of how the basic mathematical operations are applied to quantities of money, time and measurement. The problems may be slightly more difficult than level 3, but still are straightforward.

As with level 3, you should already be familiar with the basic operations of addition, subtraction, multiplication and division. As before, you will be able to use a calculator for more difficult problems.
Concepts Covered in Level 4

Some of the other concepts that this lesson will explore are:

- Using percentages,
- Calculating averages,
- Proportions and ratios, and
- Diagrams and graphs.

Each of these topics will begin with a brief review. Then several practice problems will be presented.

Word Problems

This course focuses on how math is used in practical life. Most likely, you do not think of your job as a math problem. Your supervisor would not walk up to you and say, "Please add these numbers for me." However your supervisor might ask you to figure out how long a job will take, or how much material will be needed.

These are math problems in disguise. You have to look at the situation, figure out the facts, and form the math problem in your head. Then you can add the numbers to get the answer.

These kinds of problems are called word problems. We will use these often in this and later lessons.
Math Operations

One of the most difficult parts of word problems is deciding which operation to use – *addition, subtraction, multiplication* or *division*.

To do this you must **read the problem carefully**. Decide what the problem is asking you to find. What is the question it is asking?

Some of the words below can be **clues** to which operation to use:

<table>
<thead>
<tr>
<th>Clues to Add</th>
<th>Clues to Subtract</th>
<th>Clues to Multiply</th>
<th>Clues to Divide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum</td>
<td>Change</td>
<td>How many in all</td>
<td>How many in each</td>
</tr>
<tr>
<td>Total</td>
<td>Remaining</td>
<td>Total</td>
<td>Per</td>
</tr>
<tr>
<td>How many</td>
<td>Decrease</td>
<td>Double</td>
<td>Divide equally</td>
</tr>
<tr>
<td>Altogether</td>
<td>Difference</td>
<td>Product</td>
<td></td>
</tr>
<tr>
<td>Increase</td>
<td>How many less</td>
<td>Twice</td>
<td></td>
</tr>
<tr>
<td>Gain</td>
<td>How many left</td>
<td>Triple</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How many more</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loss</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Clues to Divide*:
- How many in each
- Per
- Divide equally
This Level is Divided into Seven Lessons:

- Money, Time and Quantity Review
- Fractions and Decimals
- Percentages
- Measurement
- Averages
- Proportions and Ratios, and
- Diagrams and Graphs.
This section will review how basic math operations can be used to work with quantities, money and time. These types of operations form the basis of most everyday math problems.

You should already know how to identify common U.S. currency and how to read time. If you wish, you may review these now by going back to these topics in the Level 3 lesson using the map sign below.
Money, Time & Quantity Review Problem 1

You buy a camera for $76.27. If you give the cashier $100, how much change should you get? Circle the correct number of bills and coins you should receive as change from those shown below.
Money, Time & Quantity Review Problem 2

If you buy three pairs of pants for $17.00, $18.95 and $20.50 (inc. tax), how much change should you get if you gave a $50 bill and a $20 bill. Circle the correct number of bills and coins you should receive as change from those shown below.
Money, Time & Quantity Review Problem 3

This problem lets you add times. Be sure to include a.m. or p.m. in the answer.

3:20 P.M.

What is the time that is 7 hours and 50 minutes after the time shown?

Answer: ____________________________
Money, Time & Quantity Review Problem 4

What is the time that is 8 hours and 30 minutes after the time shown?

Answer: ____________________________

This problem lets you **add times**. Be sure to include a.m. or p.m. in the answer.
This problem lets you **add times**. Be sure to include a.m. or p.m. in the answer.

What is the time that is 7 hours and 20 minutes after the time shown?

Answer: __________________________
Money, Time & Quantity Review Problem 6

9:50 A.M.

This problem lets you add times. Be sure to include a.m. or p.m. in the answer.

What is the time that is 11 hours and 45 minutes after the time shown?

Answer: ___________________________
Money, Time & Quantity Review Problem 7

This problem lets you add times. Be sure to include a.m. or p.m. in the answer.

What is the time that is 6 hours and 5 minutes after the time shown?

Answer: ____________________________
This problem lets you **add times**. Be sure to include a.m. or p.m. in the answer.

What is the time that is 2 hours and 30 minutes after the time shown?

Answer: _____________________________
Money, Time & Quantity Review Problem 9

4:50 A.M.

This problem lets you **add times**. Be sure to include a.m. or p.m. in the answer.

What is the time that is 11 hours and 30 minutes after the time shown?

Answer: ___________________________
Money, Time & Quantity Review Problem 10

This problem lets you **subtract times**. Be sure to include a.m. or p.m. in the answer.

What is the time that is 11 hours and 35 minutes before the time shown?

Answer: ______________________________
Money, Time & Quantity Review Problem 11

What is the time that is 11 hours and 50 minutes before the time shown?

Answer: ____________________________
Money, Time & Quantity Review Problem 12

7:30 P.M.

This problem lets you **subtract times**. Be sure to include a.m. or p.m. in the answer.

What is the time that is 7 hours and 25 minutes before the time shown?

Answer: ____________________________
This problem lets you **subtract times**. Be sure to include a.m. or p.m. in the answer.

What is the time that is 5 hours and 35 minutes before the time shown?

Answer: ____________________________
Money, Time & Quantity Review Problem 14

What is the time that is 8 hours and 40 minutes before the time shown?

Answer: ___________________________
Money, Time & Quantity Review Problem 15

5:45 A.M.

This problem lets you subtract times. Be sure to include a.m. or p.m. in the answer.

What is the time that is 11 hours and 50 minutes before the time shown?

Answer: ____________________________
**Word Problems**

In most real life situations, you use math to solve problems that you encounter in your job or everyday life. These problems are not set up as math equations for you, such as "2 + 2 =". Rather, the math is disguised as a combination of facts and numbers.

For instance, a real life problem would be:

You work in a theater and must compute the cost of 3 adult and 2 child tickets. The cost of the tickets are: Adults - $5.75, Children - $3.50.

These types of problems are known as word problems. You will encounter many of these in life and in the WorkKeys assessments. To solve these problems you must determine what you are being asked, what the facts are, and then set up and solve the problem. Then check your answer to make sure it is right.
Solving Word Problems

Most word problems can be solved by following four simple steps:

1) *First, read the problem carefully. What is the problem asking?*
   
   You need to add up the cost of 3 adult and 2 child tickets.

2) *What are the facts?*
   
   1 adult ticket is $5.75
   1 child ticket is $3.50

3) *Set up and solve the problem.*
   
   Adult: $5.75 \times 3 = $17.25$
   Child: $3.50 \times 2 = $7.00
   
   $17.25 + $7.00 = $24.25$

4) *Check that the answer is reasonable.*
   
   Use estimation to check the answer.
   
   5 tickets at an average of around $5 would be $25. So $24.25 is reasonable.
Solving Word Problems

Here is another practice problem:

You need to be at work by 8:00. To get ready for work you need 20 minutes to get dressed, 25 minutes to eat breakfast, 17 minutes to take children to school and 21 minutes to drive to your work.

What time should you wake up to get to work on time?

1) First, read the problem carefully. What is the problem asking?
   What time should you get up? You must have time for all the Activities before 8:00 a.m.

2) What are the facts?
   
<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dressing</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Breakfast</td>
<td>25 minutes</td>
</tr>
<tr>
<td>Children to school</td>
<td>17 minutes</td>
</tr>
<tr>
<td>Drive to work</td>
<td>21 minutes</td>
</tr>
</tbody>
</table>

3) Set up and solve the problem.
   
   Add times above = 83 minutes.
   
   83 minutes = 1 hour and 23 minutes.

   8:00 - 1 hour = 7:00 a.m.
   
   7:00 - 23 minutes = 6:37 a.m.

4) Check that the answer is reasonable.
   
   Estimate time needed as 80 minutes.

   8:00 - 80 minutes = 6:40, so OK
Money, Time & Quantity

Review Problem 16

A bank account for Sally’s Sandwich Shop has a balance of $2,398.66. The business has the following expenses: rent -- $1,165.22, electricity -- $84.00, supplies -- $449.43 and taxes $321.05.

After all the expenses are paid, how much money will be left? Check the correct answer.

_____ A. $57.91

_____ B. $378.96

_____ C. $462.96

_____ D. $700.01
Money, Time & Quantity
Review Problem 17

A stock has a price of $28.25. You purchased 100 shares. If the price increases by ¼ ($0.25) how much do you gain?

How much money have you gained? Check the correct answer.

_____ A. $25.00
_____ B. $28.50
_____ C. $2,500.00
_____ D. $2,850.00
Money, Time & Quantity
Review Problem 18

You need to order supplies for your office from the list below. You need 3 boxes of computer diskettes, 2 packages of pens, 6 boxes of paper and 1 printer ribbon.

Price List

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pens</td>
<td>$2.50 per package</td>
</tr>
<tr>
<td>Printer Ribbon</td>
<td>$25.00 each</td>
</tr>
<tr>
<td>Computer Disks</td>
<td>$8.99 per box</td>
</tr>
<tr>
<td>Paper</td>
<td>$22.95 per box</td>
</tr>
</tbody>
</table>

How much will your order be (do not include shipping or tax)? Check the correct answer.

_____ A. $134.39

_____ B. $159.38

_____ C. $169.67

_____ D. $194.67
Money, Time & Quantity
Review Problem 19

It usually takes 240 minutes to paint the windows in a house.

How many hours does it take to paint the windows? Check the correct answer.

_____ A. 2 hours
_____ B. 4 hours
_____ C. 6 hours
_____ D. 8 hours
Money, Time & Quantity

Review Problem 20

It takes you 1 hour, 30 minutes to complete a lab test.

At this rate, how many hours would it take you to complete 5 of the lab tests? Check the correct answer.

_____ A. 10 hours, 30 minutes
_____ B. 7 hours, 30 minutes
_____ C. 7 hours
_____ D. 3 hours
Money, Time & Quantity

Review Problem 21

You are attending classes according to the schedule below.

<table>
<thead>
<tr>
<th>Time</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 a.m.</td>
<td>Safety Training</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>Benefits</td>
</tr>
<tr>
<td>11:20 a.m.</td>
<td>Break</td>
</tr>
<tr>
<td>11:30 a.m.</td>
<td>Computer Skills</td>
</tr>
<tr>
<td>12:00 noon</td>
<td>Corporate Talk</td>
</tr>
</tbody>
</table>

According to this class schedule, how long does the benefits class run? Check the correct answer.

_____ A. 1 hour

_____ B. 1 hour, 20 minutes

_____ C. 1 hour, 30 minutes

_____ D. 2 hours
Money, Time & Quantity Review

Problem 22

A company has a goal of producing 950 cases of pencils during the third and fourth week of the month of January. They produced 419 cases in the third week and 537 in the fourth week.

Did they achieve their goal? Check the correct answer.

_____ A. Yes

_____ B. No

_____ C. Not enough information
Money, Time & Quantity Review

Problem 23

An employee has 279 bonus points in an award contest at his job. He was then awarded 24 points each week for 3 weeks.

How many bonus points did he have at the end of these 3 weeks? Check the correct answer.

_____ A. 303

_____ B. 341

_____ C. 351

_____ D. 375
Money, Time & Quantity

Summary

The basic math skills that you practiced here will be required to solve the problems in the remainder of this course.

Most math problems in life and in the WorkKeys assessment will be presented more like the word problems introduced in this section. You will build on your word problems skills throughout this course.

You have now completed the review of money, time and quantities. Next you will use these skills while focusing on several different types of problems.
This section will further explore the topic of fractions and decimals. It will also cover mixed fractions, which are combinations of whole numbers with fractions.

You should become comfortable working the fractions and decimals. You will need to work with these often, especially when measuring lengths and weights.

Notice that you may see fractions written upright or on a single line:

\[
\frac{1}{2} = \frac{2}{3}
\]
Fractions

Fractions are used to represent how a whole is divided into a number of parts. For instance,

\[ \frac{1}{2} \] means 1 part out of 2.

The number of parts which the whole is divided into is on the bottom. The number of parts you have is on top. Therefore,

\[ \frac{3}{4} \] means 3 part out of 4.

Fractions are often used when the number of parts is small.

Decimals

Decimals are a way of showing how numbers can be divided by 10’s, 100’s, etc. For instance,

0.1 means one-tenth, or one part in ten.

0.01 means one-hundredth, or one part in one hundred.

Decimals are often used for precise measurements, or when the number of parts is very large.
Fractions and Decimals

Level 3 reviewed methods for converting fractions to decimals and vice-versa. You wish to review this topic now by returning to the Level 3 section Fractions and Decimals.

On the next couple of pages you will be able to practice some more conversions. These will now include some more complex fractions such as eighths.

For review, remember that 5/6 means 5 divided by 6. Try that on your calculator.

\[
\begin{array}{c|c}
6 & 5.0 \\
\hline
4.8 \\
.20 \\
18 \\
20 \\
18 \\
20 \\
\end{array}
\]

If you round the answer to 3 decimal places, \(\frac{5}{6} = 0.833\).
Fractions & Decimals Problem 1

The next 10 problems will give you practice converting fractions to decimals.

Convert this fraction to a decimal: \( \frac{1}{4} \)

Answer: ________________

Fractions & Decimals Problem 2

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal: \( \frac{3}{8} \)

Answer: ________________
Fractions & Decimals Problem 3

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal: \( \frac{5}{8} \)

Answer: ________________

Fractions & Decimals Problem 4

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal: \( \frac{3}{4} \)

Answer: ________________
Fractions & Decimals Problem 5

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal: \( \frac{7}{8} \)

Answer: ____________________

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Fractions & Decimals Problem 6

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal: \( \frac{2}{3} \)

Answer: ____________________
Fractions & Decimals Problem 7

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal: \( \frac{1}{3} \)

Answer: ________________

Fractions & Decimals Problem 8

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal: \( \frac{1}{8} \)

Answer: ________________
Fractions & Decimals Problem 9

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal: \( \frac{3}{10} \)

Answer: _________________

Fractions & Decimals Problem 10

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal: \( \frac{7}{10} \)

Answer: _________________
Fractions & Decimals Problem 11

The next 10 problems will give you practice converting decimals to fractions.

Convert this decimal to a fraction: 0.375

Answer: ________________

Fractions & Decimals Problem 12

This problem will give you practice converting decimals to fractions.

Convert this decimal to a fraction: 0.625

Answer: ________________
Fractions & Decimals Problem 13

This problem will give you practice converting decimals to fractions.

Convert this decimal to a fraction: 0.667

Answer: ___________________

Fractions & Decimals Problem 14

This problem will give you practice converting decimals to fractions.

Convert this decimal to a fraction: 0.875

Answer: ___________________
Fractions & Decimals Problem 15

This problem will give you practice converting decimals to fractions.

Convert this decimal to a fraction: 0.333

Answer: _________________

Fractions & Decimals Problem 16

This problem will give you practice converting decimals to fractions.

Convert this decimal to a fraction: 0.75

Answer: _________________
Fractions & Decimals Problem 17

This problem will give you practice converting decimals to fractions.

Convert this decimal to a fraction: 0.9

Answer: 

Fractions & Decimals Problem 18

This problem will give you practice converting decimals to fractions.

Convert this decimal to a fraction: 0.2

Answer: 

Fractions & Decimals Problem 19

This problem will give you practice converting decimals to fractions.

Convert this decimal to a fraction: 0.125

Answer: ________________

Fractions & Decimals Problem 20

This problem will give you practice converting decimals to fractions.

Convert this decimal to a fraction: 0.25

Answer: ________________
Mixed Fractions

Mixed Fractions are just combinations of whole number and fractions.

$1\frac{1}{2}$ means 1 whole and one half.

$2\frac{1}{4}$ means 2 wholes and one quarter.
Fractions and Decimals Problem 21

Identify the mixed fraction indicated by the drawing below.

Which number matches the diagram shown at right? Check the correct answer.

_____ A. 1

_____ B. $1 \frac{1}{4}$

_____ C. $1 \frac{1}{2}$

_____ D. $4 \frac{1}{2}$
Fractions and Decimals Problem 22

Identify the mixed fraction indicated by the drawing below.

Which number matches the diagram shown at right? Check the correct answer.

_____ A.  $\frac{1}{4}$

_____ B.  2

_____ C.  $2\frac{1}{8}$

_____ D.  $2\frac{1}{4}$
Fractions and Decimals Problem 23

Identify the mixed fraction indicated by the drawing below.

Which number matches the diagram shown at right? Check the correct answer.

_____ A.  $3 \frac{1}{3}$

_____ B.  $4 \frac{1}{3}$

_____ C.  $4 \frac{1}{2}$

_____ D.  $4 \frac{3}{4}$
Fractions and Decimals Problem 24

Identify the mixed fraction indicated by the drawing below.

Which number matches the diagram shown at right? Check the correct answer.

_____ A. 2

_____ B. $2\frac{1}{4}$

_____ C. $2\frac{1}{3}$

_____ D. $2\frac{3}{8}$
Fractions and Decimals Problem 25

Identify the mixed fraction indicated by the drawing below.

Which number matches the diagram shown at right? Check the correct answer.

_____ A. $\frac{3}{6}$

_____ B. $\frac{3}{3}$

_____ C. $\frac{3}{2}$

_____ D. $\frac{3}{4}$
Fractions and Decimals Problem 26

The next 10 problems will give you practice converting fractions to decimals.

Convert this fraction to a decimal:

\[
9 \frac{1}{8}
\]

Answer: _________________

Fractions and Decimals Problem 27

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal:

\[
2 \frac{2}{3}
\]

Answer: _________________
Fractions and Decimals Problem 28

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal:

\[
\frac{4}{4} + \frac{3}{4}
\]

Answer: ________________

Fractions and Decimals Problem 29

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal:

\[
\frac{5}{10} + \frac{3}{10}
\]

Answer: ________________
Fractions and Decimals Problem 30

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal:

$$\frac{7}{8}$$

Answer: ________________

Fractions and Decimals Problem 31

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal:

$$\frac{3}{8}$$

Answer: ________________
Fractions and Decimals Problem 32

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal:

\[ \frac{5}{8} \]

Answer: ________________

Fractions and Decimals Problem 33

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal:

\[ \frac{1}{3} \]

Answer: ________________
Fractions and Decimals Problem 34

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal:

\[ \frac{6 \frac{1}{4}}{1} \]

Answer: ________________

Fractions and Decimals Problem 35

This problem will give you practice converting fractions to decimals.

Convert this fraction to a decimal:

\[ \frac{7 \frac{9}{10}}{1} \]

Answer: ________________
Fractions and Decimals Problem 36

The next ten problems will give you practice converting decimals to fractions.

Convert this decimal to a fraction:

1.2

Answer: ________________

Fractions and Decimals Problem 37

The next ten problems will give you practice converting decimals to fractions.

Convert this decimal to a fraction:

1.333

Answer: ________________
Fractions and Decimals Problem 38

The next ten problems will give you practice converting decimals to fractions.

Convert this decimal to a fraction:

9.667

Answer: ________________

Fractions and Decimals Problem 39

The next ten problems will give you practice converting decimals to fractions.

Convert this decimal to a fraction:

5.875

Answer: ________________
Fractions and Decimals Problem 40
The next ten problems will give you practice converting decimals to fractions.

Convert this decimal to a fraction:

6.625

Answer: ________________

Fractions and Decimals Problem 41
The next ten problems will give you practice converting decimals to fractions.

Convert this decimal to a fraction:

7.9

Answer: ________________
Fractions and Decimals Problem 42

The next ten problems will give you practice converting decimals to fractions.

Convert this decimal to a fraction:

5.75

Answer: ____________________

Fractions and Decimals Problem 43

The next ten problems will give you practice converting decimals to fractions.

Convert this decimal to a fraction:

9.375

Answer: ____________________
Fractions and Decimals Problem 44

The next ten problems will give you practice converting decimals to fractions.

Convert this decimal to a fraction:

9.125

Answer: ________________

Fractions and Decimals Problem 45

The next ten problems will give you practice converting decimals to fractions.

Convert this decimal to a fraction:

4.6

Answer: ________________
Adding Fractions

To add fractions with the same denominator (the bottom number):
- Add the top number (the numerators)
- Use the same denominator.

\[ \frac{1}{4} + \frac{1}{4} = \frac{2}{4} \quad (= \frac{1}{2}) \]

After adding you may be able to simplify the fraction by dividing the top and bottom by the same number. For instance, \( \frac{2}{4} \) is the same as \( \frac{1}{2} \).

To simplify \( \frac{2}{4} \), divide the top and bottom by 2 and get \( \frac{1}{2} \).

Adding Mixed Numbers

To add mixed numbers:
- Add the whole numbers and fractions separately, then
- Add the resulting whole number and fraction together.

\[ 1 \frac{2}{3} + 2 \frac{2}{3} = ? \]

1) Add the whole numbers: \( 1 + 0 = 1 \)
2) Add the fractions: \( \frac{2}{3} + \frac{2}{3} = \frac{4}{3} \)
3) Simplify (reduce) the fraction: \( \frac{4}{3} = 1 \frac{1}{3} \)
4) Add the whole number and fraction: \( 1 + 1 \frac{1}{3} = 2 \frac{1}{3} \)
Fractions and Decimals Problem 46

The next ten problems will let you practice adding mixed numbers.

Add the two mixed numbers below:

\[
5\frac{1}{8} + \frac{3}{8} = ?
\]

Answer: _________________

Fractions and Decimals Problem 47

The next ten problems will let you practice adding mixed numbers.

Add the two mixed numbers below:

\[
1\frac{1}{2} + \frac{1}{2} = ?
\]

Answer: _________________
Fractions and Decimals Problem 48

The next ten problems will let you practice adding mixed numbers.

Add the two mixed numbers below:

\[ 2\frac{1}{6} + 3\frac{4}{6} = ? \]

Answer: __________________

Fractions and Decimals Problem 49

The next ten problems will let you practice adding mixed numbers.

Add the two mixed numbers below:

\[ 2\frac{1}{8} + 2\frac{3}{8} = \]

Answer: __________________
Fractions and Decimals Problem 50

The next ten problems will let you practice adding mixed numbers.

Add the two mixed numbers below:

\[ 6\frac{1}{3} + 1\frac{1}{3} = \]

Answer: _________________

Fractions and Decimals Problem 51

The next ten problems will let you practice adding mixed numbers.

Add the two mixed numbers below:

\[ 1\frac{1}{4} + 3\frac{2}{4} = \]

Answer: _________________
Fractions and Decimals Problem 52

The next ten problems will let you practice adding mixed numbers.

Add the two mixed numbers below:

\[ 1\frac{1}{3} + 3\frac{2}{3} = \]

Answer: _________________

Fractions and Decimals Problem 53

The next ten problems will let you practice adding mixed numbers.

Add the two mixed numbers below:

\[ 1\frac{1}{4} + 4\frac{3}{4} = \]

Answer: _________________
Fractions and Decimals Problem 54

The next ten problems will let you practice adding mixed numbers.

Add the two mixed numbers below:

\[ \frac{1}{2} + 3 = \]

Answer: _________________

Fractions and Decimals Problem 55

The next ten problems will let you practice adding mixed numbers.

Add the two mixed numbers below:

\[ 1 + \frac{2}{3} = \]

Answer: _________________
Fractions and Decimals Problem 56

A bakery worker needs $15\frac{3}{4}$ cups of flour to make bread and $12\frac{1}{4}$ cups of flour to make muffins.

How much flour did he use in all? Check the correct answer.

_____ A. 27  
_____ B. $27\frac{3}{4}$  
_____ C. 28  
_____ D. $28\frac{1}{4}$
Fractions and Decimals

Problem 57

Three different stocks were purchased. The purchase prices were $6\frac{3}{8}$ dollars, $11\frac{3}{8}$ dollars and $13\frac{5}{8}$ dollars.

How much was spent? Check the correct answer.

_____ A. $30\frac{3}{8}$

_____ B. $31\frac{1}{8}$

_____ C. $31\frac{1}{4}$

_____ D. $31\frac{3}{8}$
**Fractions and Decimals**

**Problem 58**

The lumber yard where you work sold a customer two boards. They measure $10\frac{1}{4}$ feet and $8\frac{1}{2}$ feet.

What was the total length of the two boards? Check the correct answer.

_____ A. 18

_____ B. $18\frac{1}{4}$

_____ C. $18\frac{1}{2}$

_____ D. $18\frac{3}{4}$
Fractions and Decimals Problem 59

The Chlorine division sold \( \frac{2}{5} \) million gallons on Monday, \( \frac{1}{5} \) million gallons on Tuesday and \( \frac{3}{5} \) million gallons on Wednesday.

How many million gallons were sold during these three days? Check the correct answer.

_____ A. \( \frac{6}{5} \)

_____ B. 7

_____ C. \( \frac{7}{5} \)

_____ D. \( \frac{8}{5} \)
Fractions and Decimals Problem 60

A carpenter earns $11.00 per hour. He worked $3\frac{1}{4}$ hours on Wednesday, $7\frac{1}{4}$ hours on Thursday, and $5\frac{2}{4}$ hours on Friday.

What were his total earnings? (Hint: You must first determine the total number of hours he worked in those 3 days.) Check the correct answer.

_____ A. $16.00

_____ B. $166.00

_____ C. $173.25

_____ D. $176.00
Summary – Fractions & Decimals

In this section you have seen problems involving fractions and decimals.

In the next section you will deal with percentages. These are also a way to show portions of a whole. You will see a relationship between percentages and what you have done here.
Percent means per hundred. Therefore a percentage is the number of parts out of 100 total parts.

The symbol for percent is %.

Therefore 35% means 35 out of 100. If 35% of the children in a school like spinach, this means that for every 100 children, 35 of them like spinach.
**Percentages**

Percentages are a very common way to deal with portions. It is very useful when dealing with taxes, interest and other money transactions.

**Match the Ratio to the Percentage**

Match the percentages below to the matching ratios at right.

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>15%</td>
<td>28/100</td>
</tr>
<tr>
<td>4%</td>
<td>15/100</td>
</tr>
<tr>
<td>28%</td>
<td>4/100</td>
</tr>
</tbody>
</table>
Match the Ratio to the Percentage

Did you match these correctly?

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>15%</td>
<td>28/100</td>
</tr>
<tr>
<td>4%</td>
<td>15/100</td>
</tr>
<tr>
<td>28%</td>
<td>4/100</td>
</tr>
</tbody>
</table>

Percentages Problem 1

You will practice converting percentages to decimals in the next ten problems.

Convert the percentage below to a decimal:

7%

Answer: ________________
Explanation

7% = \frac{7}{100} = 7 \div 100 = 0.07

Percentages Problem 2

You will practice converting a percentage to a decimal in this problem.

Convert the percentage below to a decimal:

92%

Answer: _____________________
**Percentages Problem 3**

You will practice converting a percentage to a decimal in this problem.

Convert the percentage below to a decimal:

40%

Answer: ____________________

**Percentages Problem 4**

You will practice converting a percentage to a decimal in this problem.

Convert the percentage below to a decimal:

30%

Answer: ____________________
Percentages Problem 5

You will practice converting a percentage to a decimal in this problem.

Convert the percentage below to a decimal:

93%

Answer: ________________________

Percentages Problem 6

You will practice converting a percentage to a decimal in this problem.

Convert the percentage below to a decimal:

80%

Answer: ________________________
**Percentages Problem 7**

You will practice converting a percentage to a decimal in this problem.

Convert the percentage below to a decimal:

2%

Answer: __________________

**Percentages Problem 8**

You will practice converting a percentage to a decimal in this problem.

Convert the percentage below to a decimal:

86%

Answer: __________________
Percentages Problem 9

You will practice converting a percentage to a decimal in this problem.

Convert the percentage below to a decimal:

43%

Answer: ____________________

Percentages Problem 10

You will practice converting a percentage to a decimal in this problem.

Convert the percentage below to a decimal:

14%

Answer: ____________________
Multiplying by a Percentage

Multiplying by a percentage is the same as multiplying by the equivalent decimal:

\[ 60 \times 20\% = 60 \times 0.2 = 12 \]

Another way to think of the same problem is to multiply by the percentage as a number, and then divide by 100:

\[ 60 \times 20\% = 60 \times \frac{20}{100} = \frac{1200}{100} = 12 \]

Percentages Problem 11

The next ten problems will let you practice determining percentages.

19% of 5 =

Answer ____________________
**Percentages Problem 12**

This problem will let you practice determining percentages.

36% of 92 = 

Answer __________________

---

**Percentages Problem 13**

This problem will let you practice determining percentages.

20% of 24 = 

Answer __________________
**Percentages Problem 14**

This problem will let you practice determining percentages.

47% of 40 =

Answer ____________________

**Percentages Problem 15**

This problem will let you practice determining percentages.

43% of 13 =

Answer ____________________
Percentages Problem 16

This problem will let you practice determining percentages.

\[
7\% \text{ of } 56 = \text{ Answer: } \\
\]

Percentages Problem 17

This problem will let you practice determining percentages.

\[
91\% \text{ of } 37 = \text{ Answer: } \\
\]
Percentages Problem 18

This problem will let you practice determining percentages.

94% of 62 =

Answer ________________________

Percentages Problem 19

This problem will let you practice determining percentages.

51% of 73 =

Answer ________________________
Percentages Problem 20

This problem will let you practice determining percentages.

99% of 8 =

Answer ________________
Using a Percentage to Describe a Group

Percentages are often used to describe groups of objects or people:

An elementary class has 38 students. It has 21 boys and 17 girls. What percentage of the class are girls?

To find the percentage, divide the number of girls by the total number in the class:

$$\frac{17 \text{ girls}}{38 \text{ students total}} = 0.447368... = 44.7368\%$$

When dividing numbers such as these, you may often have long fractions. To simplify the description of the class, you may often round to the nearest percent:

$$44.7368\% = 45\%$$
Percentages Problem 21

You will practice describing a group of objects using a percentage in this problem.

71 out of 84 chairs are blue. What percentage of the chairs are blue?

Answer: ____________________________

Percentages Problem 22

You will practice describing a group of objects using a percentage in this problem.

20 out of 60 blocks are large. What percentage of the blocks are large?

Answer: ____________________________
Percentages Problem 23

You will practice describing a group of objects using a percentage in this problem.

55 out of 75 jars are black. What percentage of the jars are black?

Answer: ________________________

Percentages Problem 24

You will practice describing a group of objects using a percentage in this problem.

12 of 35 shirts are old. What percentage of the shirts are old?

Answer: ________________________
**Percentages Problem 25**

You will practice describing a group of objects using a percentage in this problem.

26 out of 48 books are small. What percentage of the books are small?

Answer: __________________________

**Percentages Problem 26**

You will practice describing a group of objects using a percentage in this problem.

43 out of 69 triangles are large. What percentage of the triangles are large?

Answer: __________________________
Percentages Problem 27

You will practice describing a group of objects using a percentage in this problem.

51 out of 77 birds are large. What percentage of the birds are large?

Answer: 

Percentages Problem 28

You will practice describing a group of objects using a percentage in this problem.

7 out of 40 chairs are large. What percentage of the chairs are large?

Answer: 
Percentages Problem 29

You will practice describing a group of objects using a percentage in this problem.

80 out of 90 books are yellow. What percentage of the books are yellow?

Answer: _____________________________

Percentages Problem 30

You will practice describing a group of objects using a percentage in this problem.

49 out of 55 triangles are orange. What percentage of the triangles are orange?

Answer: _____________________________
**Percentages Problem 31**

The video store where you work has a 15% off sale.

What will the customer save on a $29.99 video? Check the correct answer.

_____ A. $3.00

_____ B. $4.50

_____ C. $7.50

_____ D. $25.49
Percentages Problem 32

While working at a building supply store you sell an item priced at $225. The sales tax is 7%.

How much tax should you charge the customer? Check the correct answer.

_____ A.  $13.50
_____ B.  $15.75
_____ C.  $31.50
_____ D.  $32.14
Percentages Problem 33

A baseball glove is marked at $20. The store is having a 25% off sale.

How much do you have to pay for the glove (excluding sales tax)? Check the correct answer.

_____ A. $4.50
_____ B. $5.00
_____ C. $10.00
_____ D. $15.00
Percentages Problem 34

You sell a camera to a customer for $79.98.

If the sales tax is 6%, how much should you charge her? Check the correct answer.

_____ A. $4.80

_____ B. $5.60

_____ C. $79.98

_____ D. $84.78
Percentages Problem 35

A real estate agent sold your house for $89,000. You pay her 7% commission.

How much will you have to pay the agent? Check the correct answer.

_____ A. $623
_____ B. $5,340
_____ C. $6,230
_____ D. $6,320
Percentages Problem 36

Last summer at the local bookstore, they sold 95 out of 100 books they had in a certain section.

What percent of the books did they sell? Check the correct answer.

_____ A. 5%
_____ B. 50%
_____ C. 75%
_____ D. 95%
Percentages Problem 37

A car dealership has an average monthly sales of $114,000.

If one employee made 30% of all the sales, what was his total sales? Check the correct answer.

_____ A. $3,240
_____ B. $7,890
_____ C. $34,200
_____ D. $79,800
Percentages Problem 38

The machine you are operating produces 50 items per day. On Monday, you have to waste 5 items.

What percentage was wasted? Check the correct answer.

_____ A.  5%
_____ B.  10%
_____ C.  25%
_____ D.  50%
On a recent buying trip, a window salesperson found some windows that he wanted to purchase. He needed 12 windows. They were priced at $92.95 each, but he gets a forty percent discount.

How much will he save on the total cost of the windows? Check the correct answer.

_____ A. $37.18
_____ B. $223.08
_____ C. $446.16
_____ D. $1,115.40
Summary – Percentages

This concludes the percentages topic.

As you work with percentages, try to visualize what the percentage means. If someone tells you that 30% of the cars in a parking lot are white, can you see the lot in your mind? About one third of the cars should be white.

As you learn to visualize percentages, you will be able to better estimate answers and make judgments quickly.
The ability to measure things is essential to modern technology.

Level 3 reviewed some of the basic units of measurement. If you are unfamiliar with units such as *inches, feet, yards, meters*, or *miles* you may want to review that section now.

In this section we will **focus on converting measurements from one unit to another**.
**Converting Units**

To convert a measurement from one unit to another, you multiply by the ratio of one unit to another. For instance, we know that one yard equals 3 feet, so:

\[
2 \text{ yards} \times \frac{3 \text{ feet}}{1 \text{ yard}} = 6 \text{ feet}
\]

When you do this, the like units on the top and bottom of the fractions cancel each other out:

\[
2 \text{ yards} \times \frac{3 \text{ feet}}{1 \text{ yard}} = 6 \text{ feet}
\]

**Conversion Charts**

The formula chart on the following page gives conversion factors between several common units of measurement. You may use this page to help you answer questions in this level.
Formulas and Conversions

MEASUREMENT

Distance
1 foot (ft.) = 12 inches (in.)
1 yard (yd.) = 3 feet
1 mile (mi.) = 5,280 feet
1 mile ≈ 1.61 kilometers (km.)
1 inch = 2.540 centimeters (cm.)
1 foot = 0.3048 meters (m.)
1 meter = 1,000 millimeters (mm.)
1 meter = 100 centimeters
1 kilometer = 1,000 meters
1 kilometer ≈ 0.62 miles

Area
1 square foot (sq. ft.) = 144 square inches (sq. in.)
1 square yard (sq. yd.) = 9 square feet
1 acre = 43,560 square feet

Volume
1 cup (C.) = 8 fluid ounces
1 quart (qt.) = 2 pints (pt.) = 4 cups
1 gallon (gal.) = 4 quarts
1 gallon (gal.) = 231 cubic inches (cu. in.)
1 liter (l.) = 0.264 gallons = 1.056 quarts
1 cubic foot (cu. ft.) = 1,728 cubic inches
1 cubic foot = 7.48 gallons
1 cubic yard (cu. yd.) = 27 cubic feet
1 board foot = 1 inch by 12 inches by 12 inches

Weight
1 ounce (oz.) ≈ 28.350 grams (g.)
1 pound (lb.) = 16 ounces
1 pound ≈ 453.592 grams
1 milligram (mg.) = 0.001 grams
1 kilogram (kg.) = 1,000 grams
1 kilogram ≈ 2.2 pounds
1 ton = 2,000 pounds

Temperature
° C = .56(° F – 32) or 5/9(° F – 32)
° F = 1.8(° C) + 32 or (9/5 x ° C) + 32
(C = Celsius and F = Fahrenheit)

Electricity
1 kilowatt-hour = 1,000 watt-hours
amps = watts / volts

FORMULAS
(x is used to indicate multiply
pi is equal to 3.14)

Rectangle
perimeter = 2(length + width)
area = length x width

Rectangular Solid (Box)
volume = length x width x height

Cube
volume = (length of side)3

Triangle
sum of angles = 180°
area = ½ (base x height)

Circle
number of degrees in a circle = 360°
circumference ≈ 3.14 x diameter or
pi x diameter
area ≈ 3.14 x (radius)2 or
pi x (radius)2

Cylinder
volume ≈ 3.14 x (radius)2 x height or
pi x (radius)2 x height

Cone
volume ≈ 3.14 x (radius)2 x height
3

Sphere (Ball)
volume ≈ 4 x 3.14 x (radius)3
3

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Measurement Problem 1

The next 20 problems will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 5 feet to inches:

Answer: ________________

Measurement Problem 2

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 9 feet to yards:

Answer: ________________
Measurement Problem 3

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 9 millimeters to centimeters:

Answer: ________________

Measurement Problem 4

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 9 pints to quarts:

Answer: ________________
**Measurement Problem 5**

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 8 inches to feet:

Answer: _______________

**Measurement Problem 6**

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 5 gallons to quarts:

Answer: _______________
**Measurement Problem 7**

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 8 liters to milliliters:

Answer: ____________________

**Measurement Problem 8**

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 10 quarts to pints:

Answer: ____________________
Measurement Problem 9

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 6 grams to kilograms:

Answer: ____________________

Measurement Problem 10

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 1 centimeter to meters:

Answer: ____________________
**Measurement Problem 11**

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 10 milliliters to liters:

Answer: ________________

**Measurement Problem 12**

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 5 hours to minutes:

Answer: ________________
**Measurement Problem 13**

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 9 yards to feet

Answer: ____________________

**Measurement Problem 14**

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 10 meters to centimeters:

Answer: ____________________
**Measurement Problem 15**

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 7 quarts to gallons:

Answer: _________________

**Measurement Problem 16**

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 4 centimeters to millimeters:

Answer: _________________
**Measurement Problem 17**

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 4 ounces to pounds:

Answer: ________________

**Measurement Problem 18**

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 1 kilogram to grams:

Answer: ________________
Measurement Problem 19

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 6 minutes to hours:

Answer: ________________

Measurement Problem 20

This problem will give practice in converting one unit to another. For decimals with more than 3 places, round to the nearest thousandth.

Convert 9 pounds to ounces:

Answer: ________________
**Converting English to Metric**

You can convert from English to Metric units the same way. For instance, one yard is equal to 0.9144 meters. To convert 10 yards to meters, multiply by 0.9144:

$$10 \text{ yards} \times \frac{0.9144 \text{ meters}}{1 \text{ yard}} = ?$$

When you do this, the yards on the top and bottom cancel each other out:

$$10 \text{ yards} \times \frac{0.9144 \text{ meters}}{1 \text{ yard}} = ?$$
Measurement Problem 21

One gallon equals 3.78 liters.

How many liters are there in three gallons? Check the correct answer.

_____ A. 1.26 liters

_____ B. 3.78 liters

_____ C. 7.56 liters

_____ D. 11.34 liters
Measurement Problem 22

One kilogram equals 2.2 pounds.

How many pounds are in 10 kilograms? Check the correct answer.

_____ A. 4.5 pounds
_____ B. 12.21 pounds
_____ C. 22 pounds
_____ D. 220 pounds
Perimeters

A perimeter is the distance around the outside of a shape. This is useful in many practical situations. If you wanted to fence a space in your backyard, you would calculate the perimeter of the space to determine how much fence to buy.

To calculate the perimeter of a shape made of straight sides, add together the length of the sides:

\[ \text{Perimeter} = 6 \text{ ft.} + 8 \text{ ft.} + 8 \text{ ft.} + 6 \text{ ft.} = 28 \text{ ft.} \]
**Measurement Problem 23**

*This problem involves the use of perimeter.*

How much framing material would you have to buy to make the frame shown below? Ignore any wasted material. Check the correct answer.

_____ A. 48 centimeters

_____ B. 54 centimeters

_____ C. 96 centimeters

_____ D. 108 centimeters

27 cm.

21 cm.
Measurement Problem 24

This problem involves the use of perimeter.

What is the perimeter of the tract of land containing a lake, as shown below? Check the correct answer.

_____ A. 11 miles
_____ B. 12 miles
_____ C. 13 miles
_____ D. 14 miles
Measurement Problem 25

This problem involves the use of perimeter.

A square quilt displayed at the Colonial Museum measured 425 centimeters on each side. How much binding did the quilt maker use to bind the edges of the quilt? Ignore any waste. Check the correct answer.

_____ A. 1,275 cm.

_____ B. 1,450 cm.

_____ C. 1,680 cm.

_____ D. 1,700 cm.
Area

The area of a region is the number of square units of space needed to cover the region. This is commonly used to determine the size or amount of space in a shape. For instance, the size of rooms in a house can be measured in square feet.

The area of a rectangle or square can be found by multiplying the length by the width.

Suppose you wanted to cover the area shown below with one-foot square tiles. To determine the number of tiles, you would multiply $7 \times 8 = 56$ tiles. This is the same as finding the area in square feet.

\[
\begin{align*}
8 \text{ ft.} & \\
\begin{array}{|c|c|c|c|c|c|c|c|c|}
\hline
& & & & & & & & \\
\hline
& & & & & & & & \\
\hline
& & & & & & & & \\
\hline
& & & & & & & & \\
\hline
& & & & & & & & \\
\hline
7 \text{ ft.} & & & & & & & & \\
\end{array}
\end{align*}
\]

\[
Length \times Width = Area
\]

\[
8 \text{ ft.} \times 7 \text{ ft.} = 56 \text{ sq. ft.}
\]
Measurement Problem 26

Use area calculations to solve this problem.

You have a piece of material that is 2 yards long and 36 inches wide. How many square yards can you cover with this material? Check the correct answer.

_____ A. 2 sq. yd.
_____ B. 4 sq. yd.
_____ C. 72 sq. in.
_____ D. 144 sq. in.
Measurement Problem 27

Use area calculations to solve this problem.

A glass company is to make a panel of glass for a front door. What is the area of the glass panel if it is 120 cm. long and 20 cm. wide? Check the correct answer.

_____ A. 240 sq. cm.

_____ B. 2,400 sq. cm.

_____ C. 2,600 sq. cm.

_____ D. 2,800 sq. cm.
Measurement Summary

This concludes the Level 4 topic on measurement.

In later levels you may find that you will have to convert measurements from one unit to another as part of other problems. You may find it useful to keep a unit conversion chart handy for later lessons in this course, and for your job.
Averages, like percentages, are a way of describing a group of objects or people.

Percentages tell how many in the group are different. For instance, you may have 10 different pieces of lumber. If 30% of the pieces are 6' long, you know that the other 70% are not 6' long.

Averages tell you something about all of the individuals in the group. If the average length of the 20 pieces of lumber is 6', then you know that some are longer and some are shorter than 6'.
Averages

To find the *average* of a set of numbers:

- Find the sum of the numbers (add them together)
- Divide the sum by the number of numbers in the set.

**Example:**

Find the average of this set of numbers: 12, 20, 17, 24, 35 and 18.

1. Add the numbers:
   
   \[
   \begin{align*}
   12 & \\
   20 & \\
   17 & \\
   24 & \\
   35 & \\
   +18 & \\
   \hline
   126 & 
   \end{align*}
   \]

2. Divide by the number of number in the set:

   \[
   126 \div 6 = 21 = \text{Average}
   \]
Averages Problem 1

The next 10 problems will give you practice in determining averages. Round your answer to the nearest whole number.

What is the average of 49, 17 and 90?

Answer: _________________________

Averages Problem 2

This problem will give you practice in determining averages. Round your answer to the nearest whole number.

What is the average of 16, 50 and 32?

Answer: _________________________
Averages Problem 3

This problem will give you practice in determining averages. Round your answer to the nearest whole number.

What is the average of 41, 36 and 26?

Answer: ______________________

Averages Problem 4

This problem will give you practice in determining averages. Round your answer to the nearest whole number.

What is the average of 48, 75 and 3?

Answer: ______________________
Averages Problem 5

This problem will give you practice in determining averages. Round your answer to the nearest whole number.

What is the average of 86, 56 and 45?

Answer: _________________

Averages Problem 6

This problem will give you practice in determining averages. Round your answer to the nearest whole number.

What is the average of 7, 18 and 92?

Answer: _________________
Averages Problem 7

This problem will give you practice in determining averages. Round your answer to the nearest whole number.

What is the average of 60, 13 and 11?

Answer: _______________________

Averages Problem 8

This problem will give you practice in determining averages. Round your answer to the nearest whole number.

What is the average of 41, 72 and 51?

Answer: _______________________

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Averages Problem 9

This problem will give you practice in determining averages. Round your answer to the nearest whole number.

What is the average of 43, 92 and 58?

Answer: _______________________

Averages Problem 10

This problem will give you practice in determining averages. Round your answer to the nearest whole number.

What is the average of 25, 9 and 47?

Answer: _______________________
Averages

Remember that the *average* of a group will never be larger than the largest number in the group, or smaller than the smallest.

This is an easy way to check and see if you calculated the average correctly.
Averages Problem 11

You work for a car dealership. During one month you sold 9 cars the first week. During each of the next three weeks you sold 6 cars, 10 cars and 7 cars.

What was the average number of cars you sold each week? Check the correct answer.

_____ A.  4
_____ B.  7
_____ C.  8
_____ D.  32
Averages Problem 12

On a recent business trip, a salesman traveled 52 miles the first hour, 64 miles the second hour, and 49 miles the third hour.

How many miles did he average per hour? Check the correct answer.

_____ A. 52
_____ B. 55
_____ C. 56
_____ D. 165
Averages Problem 13

Your neighbor works for a real estate office. During one month the office made commissions of $8,400, $4,193, $6,860, $5,995 and $10,850.

Find the average commissions for the month? Check the correct answer.

_____ A. $6,860.00

_____ B. $7,259.60

_____ C. $7,275.60

_____ D. $9,072.00
Averages Summary

You have finished the averages topic.

Averages are important in determining many business statistics. For instance, your business may be judged on its average monthly sales or average costs.

Remember that the average tells you something about a group as a whole, but not about individual members of the group. The average age of a class may be 25, but that does not mean that any member of the class is actually 25.
Proportions and ratios are methods to compare amounts. They are very useful when reading drawings, scaling sizes, and adjusting recipes.
Ratios

A *ratio* is a *comparison of two numbers*. For example, if a baseball player gets 3 hits for every 7 times at bat, the *ratio* of *hits to times at bat* is *3 to 7*.

This can be written as:

3 to 7 or 3:7 or 3/7

The most common form is as a fraction.

**Match the Ratios to the Description**

Draw a line matching the ratios below to the matching description at right.

<table>
<thead>
<tr>
<th>Ratios</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>25/100 = 1/4</td>
<td>The ratio of inches in a foot to inches in a yard.</td>
</tr>
<tr>
<td>4/6 = 2/3</td>
<td>The value of a quarter to that of a dollar.</td>
</tr>
<tr>
<td>12/36 = 1/3</td>
<td>The ratio of 4 switches to 6 wall outlets.</td>
</tr>
</tbody>
</table>
**Match the Ratios to the Description**

How did you do? Check your answers against those below.

<table>
<thead>
<tr>
<th>Ratios</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{25}{100} = \frac{1}{4})</td>
<td>The ratio of inches in a foot to inches in a yard.</td>
</tr>
<tr>
<td>(\frac{4}{6} = \frac{2}{3})</td>
<td>The value of a quarter to that of a dollar.</td>
</tr>
<tr>
<td>(\frac{12}{36} = \frac{1}{3})</td>
<td>The ratio of 4 switches to 6 wall outlets.</td>
</tr>
</tbody>
</table>
Proportions

When two ratios are equal, you call it a proportion. Suppose you normally fix a batch of chemical by mixing 2 pounds of solvent with 3 gallons of water.

However, today you need to make twice as much. To make twice as much of the same chemical, you use twice as much ingredients, but in the same proportion.

\[
\frac{2 \text{ lbs. solvent}}{3 \text{ gal. water}} = 2 : 3 \quad \text{or} \quad \frac{4 \text{ lbs. solvent}}{6 \text{ gal. water}} = \frac{2}{3}
\]

These ratios are the same since 4/6 can be reduced to 2/3. Similarly, you could make three times as much of the chemical by mixing 6 lbs. of solvent with 9 gal. of water.

Using Charts or Diagrams to Show Proportions

Another methods that can be used to show proportions is a chart or diagram.

If you have a job that earns $120 in 2 days, how much would you earn in 6 days? Use a chart to show the proportion of earnings for different numbers of days.

<table>
<thead>
<tr>
<th>Days</th>
<th>Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>$120</td>
</tr>
<tr>
<td>4</td>
<td>$240</td>
</tr>
<tr>
<td>6</td>
<td>$360</td>
</tr>
</tbody>
</table>
Using Proportions to Change Recipes

You can use proportions to change recipes to any size you want. Suppose now that you need to mix the same chemical, but you need to mix it with 7 gallons of water. How much solvent should you use?

You know that the proportions should be the same:

\[
\frac{2 \text{ lbs. solvent}}{3 \text{ gal. water}} = 2:3 \quad \text{or} \quad \frac{2}{3} = \frac{? \text{ lbs. solvent}}{7 \text{ gal. water}}
\]

or

\[
7 \times \frac{2}{3} = \frac{?}{?} \times \frac{2}{3} = 4.67 \text{ lbs. solvent}
\]

To solve for the unknown amount of solvent, multiply both sides of the equation by 7. You can see that you need \( \frac{2}{3} \times 7 = 4.67 \) lbs. of solvent.
Proportions and Ratios Problem 1

A drawing of a room is made using a scale of 2 centimeters to 1 meter.

If the drawing shows the room is 12 centimeters long, how long is the actual room? Check the correct answer.

_____ A.  5 meters
_____ B.  6 meters
_____ C.  12 meters
_____ D.  24 meters
Proportions and Ratios Problem 2

300 yards of fabric is bought for a sewing company for $1,275.

At this price, how much would 1,200 yards of the same fabric cost? Check the correct answer.

_____ A. $2,775
_____ B. $3,825
_____ C. $5,100
_____ D. $5,300
Proportions and Ratios Problem 3

The telephone company purchased 95 yards of wire for $1,235 in September. They plan on making a purchase of 285 yards in October.

How much will the same wire cost them? Check the correct answer.

_____ A.  $412

_____ B.  $2,470

_____ C.  $3,705

_____ D.  $4,940
Proportions and Ratios Problem 4

On a scale drawing, a machine part is shown to be 3 centimeters long. The actual length of the part is 21 centimeters.

What is the actual length of a part that measures 12 centimeters on the drawing? Check the correct answer.

_____ A. 21 cm.
_____ B. 36 cm.
_____ C. 63 cm.
_____ D. 84 cm.
Proportions and Ratios Problem 5

A catering service is serving a party with 75 guests. The recipe for corn bread calls for 9 cups of flour and will serve 15 people.

How much flour will be needed to serve corn bread to the 75 guests? Check the correct answer.

_____ A. 30 cups
_____ B. 45 cups
_____ C. 54 cups
_____ D. 69 cups
Proportions and Ratios Summary

You have finished the section on proportions and ratios.

The technique of cross-multiplying proportions can be used to solve many common problems. In fact, this is one of the simplest forms of algebra - using mathematical relationships to find unknown quantities.
It is often easier to understand a quantity or mathematical concept using pictures. *Diagrams, graphs* and *charts* are all *ways to communicate quantities in a more visual way*. Many times this is much faster than equations or numbers.

This section will review some of the most *common forms of graphs* - *pie charts, bar charts and line graphs*. 
Pie Charts

*Pie charts* show how something is divided up into sections. The larger a piece of the whole, the larger the "piece of the pie" it gets.

*Pie charts* are a circular type of graph:

- Each piece of the pie represents a part of the whole.
- The whole circle represents 100%.
- They usually have labels to describe each section of the chart.
- Sometimes the numbers are shown as percentages of the whole, instead of the actual numbers.

Sample Pie Chart

For instance, the graph below shows that 69% of all the rain that falls in the United States evaporates back into the air.
Diagrams and Graphs Problem 1

Now you can try answering a typical Level 3 question about this graph.

Rainfall in the United States

24% Returned unused to sea
69% Returned to air by evaporation
7% Used by people

How much of the water which falls in the U.S. is used by people? Check the correct answer.

_____ A. 7%
_____ B. 24%
_____ C. 69%
Diagrams and Graphs Problem 2

Rainfall in the United States

According to the chart above, how much more water returns to the sea unused than is used by people? Check the correct answer.

_____ A. About twice as much
_____ B. About three times as much
_____ C. About 10 times as much
**Diagrams and Graphs Problem 3**

Recall that the size of the pie “slice” in a pie chart depends on the percentage of the subject that each piece represents.

Draw a line between the *labels* shown below and the *correct sections of the pie* chart at right.

<table>
<thead>
<tr>
<th>LABELS</th>
<th>SECTIONS OF THE PIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>Cities</td>
</tr>
<tr>
<td>42%</td>
<td>Industry</td>
</tr>
<tr>
<td>8%</td>
<td>Irrigation</td>
</tr>
</tbody>
</table>

*How Water is Used*
Diagrams and Graphs Problem 4

Refer to the chart below to answer the following question.

Sales at Tiny Baby Shop

Furniture 15%
Diapers 29%
Clothes 30%
Toys 26%

What percentage of sales at the Tiny Baby Shop are toys? Check the correct answer.

_____ A. 15%
_____ B. 26%
_____ C. 29%
_____ D. 30%
Pie Charts Summary

Sales at Tiny Baby Shop

Furniture 15%
Diapers 29%
Clothes 30%
Toys 26%

You will see many pie charts in newspapers and reports. Remember the purpose of a pie chart. It tells you how something is divided. The parts with large pieces of the pie have the most. The parts with smaller pieces have less.
Bar Graphs

Like pie charts, bar graphs are a good way to compare amounts. However, unlike the pie chart, the amounts compared do not need to be parts of a single group.

For instance, you could compare the cost of a typical car to the cost of a typical pickup truck. In addition, bar graphs are better at showing the actual amount, not just a relative comparison.

In a bar graph, parallel bars or rectangles are used to show the amounts. The lengths of the bars represent specific numbers.

To read the bar, follow the top of the bar straight across to the labeled axis. The place where the top of the bar crosses the axis is the amount for the item labeled at the bottom of the bar.

For instance, an average new pickup would cost about $15,000.
Types of Bar Graphs

Bar graphs may be **vertical** or **horizontal**. One axis always shows the **labels** for the **groups being compared**. The other axis shows the **number scale for the amounts**.

The **two graphs** above are different ways of **showing the same data**.
Creating A Bar Graph

Here are some data about the amount of fruit sold in a store in one hour. If we want to easily compare the amounts of fruit sold, we can use a bar graph. Try making a bar graph below by following these steps:

1. Choose a scale for the axis. Since apples sold the most (19) you can make the scale go up to 20 as a good round number. Label the vertical axis from 0 to 20.

2. Write labels for the four groups evenly along the horizontal axis.

3. For each group, draw a bar from the horizontal axis up to a point even with the number that fruit sold.

4. Add a descriptive title for the graph.

<table>
<thead>
<tr>
<th>Fruit Store Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peaches</td>
</tr>
<tr>
<td>Oranges</td>
</tr>
<tr>
<td>Apples</td>
</tr>
<tr>
<td>Bananas</td>
</tr>
</tbody>
</table>

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Explanation

When completed your graph should look similar to this one.

![Graph of Fruit Sold in One Hour](image-url)
Bar graphs are also very popular for showing how something changes with time. To do this, the groups are the same item at different times.

Refer to the bar graph above to answer this question.

What was the budget for office supplies in 1992? Check the correct answer.

_____ A. $120,000

_____ B. $1.20

_____ C. $150,000

_____ D. $170,000
Diagrams and Graphs Problem 6

The graph below compares the number of different types of balls sold in a sporting goods store. Use it to answer the question that follows.

Which type of ball was sold the most? Check the correct answer.

_____ A. Football
_____ B. Tennis
_____ C. Basketball
_____ D. Baseball
Bar Graph Summary

You have now completed the topic on bar graphs.

Bar graphs are one of the most common charts you will see in everyday communication. The **height** of the bar shows the **amount of each group**. The **groups are labeled** at the **bottom of the bar**. This makes it easy to see how amounts compare for the different groups.
Line Graphs

*Line graphs relate two sets of numbers.* Each set contains different values of a different quantity or variable. The line graph shows how the two quantities or variables are related.

For instance, it can show how a car's speed affects its gas mileage.

1. When reading a line graph, you choose a number on either axis that matches the information you want to read.

2. Move from that point straight up or straight over until you reach the line in the graph.

3. Move straight towards the other axis and read the corresponding point.

Therefore in this example, at a speed of 50 miles per hour the car got 19 miles per gallon.
Creating a Line Graph

To create a line graph, you should begin with pairs of numbers representing the data to graph. In this case, it is the number of visitors to a park each week for eight weeks.

1. Choose a scale for each axis that has all of the values to be graphed. In this case, the weeks should run from 1 to 8 and the number of visitors from at least 160 to 210. (Note: it is not necessary that the number of visitors start at 0.)

2. Plot each pair of points by moving straight in from the point on each axis. Place a point where the two points meet.

3. Repeat this process for each pair of points in the data set.

Using the data from above, mark on the graph below where the point for the third week would go.

<table>
<thead>
<tr>
<th>Week</th>
<th>Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>170</td>
</tr>
<tr>
<td>2</td>
<td>180</td>
</tr>
<tr>
<td>3</td>
<td>210</td>
</tr>
<tr>
<td>4</td>
<td>200</td>
</tr>
<tr>
<td>5</td>
<td>190</td>
</tr>
<tr>
<td>6</td>
<td>180</td>
</tr>
<tr>
<td>7</td>
<td>170</td>
</tr>
<tr>
<td>8</td>
<td>190</td>
</tr>
</tbody>
</table>
**Explanation**

Did you place your mark in the position shown below? From the given data you know that 210 people visited the park in week number 3. Find the value 210 on the vertical axis and go across until you meet the value of 3 on the horizontal axis.
Diagrams and Graphs Problem 7

Here are some practice exercises using line graphs. Refer to the line graph below to answer the question that follows.

New Car Dealers in the U.S.

Which of the following years had the largest number of dealerships? Check the correct answer.

_____ A. 1975
_____ B. 1980
_____ C. 1985
_____ D. 1995
Diagrams and Graphs Problem 8

This additional question on the new car dealerships graph requires you to examine a period of time, not just a single point.

New Car Dealers in the U.S.

What is the highest number of dealerships opened in the 1980’s decade? Check the correct answer.

_____ A. 11,000

_____ B. 15,000

_____ C. 20,000

_____ D. 25,000
Diagrams and Graphs Problem 9

Line graphs are an excellent way to show how something changes with time. In this case, the graph shows how the monthly rainfall changes in January through September.

Which are the two driest months in Maui? Check the correct answer.

_____ A. May and June
_____ B. June and July
_____ C. July and August
_____ D. January and February
Diagrams and Graphs Problem 10

However, note that the graph does not show the rainfall on any particular day. Instead, only the total amount during the entire month is shown. Even during a dry month, there may have been days with heavy rain.

Which are the three rainiest months on Maui? Check the correct answer.

_____ A. January, February and March
_____ B. January, February and December
_____ C. February, March and April
_____ D. August, September and October
Line Graphs vs. Bar Graphs

Line graphs are much like bar graphs. In a bar graph, the height of the bar indicates how much there is of something. In line graphs, how far up the line is at a certain point indicates the amount.

One difference is that in line graphs there may not be distinct groups. One way to tell this is because the line is a smooth curve. There are no marks on the line for specific points.

On this graph, the gas mileage can be read at any speed from 40 to 70 mph. For instance, the gas mileage at 65 mph is about 18.2 mpg.

Other line graphs are for specific groups, just like bar graphs.

This chart shows the rainfall total for each month. You can tell because the curve is made of straight lines between specific points. You can also tell that months are distinct groups. There is no time “between” the months of January and February.
Diagrams and Graphs Summary

There are many different types of graphs. The ones that have been reviewed here are some of the more simple types. Often several different types of graphs will be used together.

If you would like a further review of this subject, then refer to the Locating Information course in the KeyTrain series.
Money, Time & Quantity Review - Answers

Money, Time & Quantity Review Problem 1:
Amount change = $100 - $76.27 = $23.73

$20.00  +  $3.00  +  $0.50  +  $0.20  +  $0.03  =  $23.73

Money, Time & Quantity Review Problem 2:
Cost of pants:  $17.00  +  $18.95  +  $20.50  =  $56.45
Amount paid:  $50.00  +  $20.00  =  $70.00
Amount change  =  $70.00  -  $56.45  =  $13.55

Money, Time & Quantity Review Problem 3:
3:20 p.m.  +  7 hours and 50 minutes  =  11:10 p.m.

Money, Time & Quantity Review Problem 4:
6:30 p.m.  +  8 hours and 30 minutes  =  3:00 a.m.

Money, Time & Quantity Review Problem 5:
11:35 a.m.  +  7 hours and 20 minutes  =  6:55 p.m.
Money, Time & Quantity Review Problem 6:
9:50 a.m. + 11 hours and 45 minutes = 9:35 p.m.

Money, Time & Quantity Review Problem 7:
3:50 p.m. + 6 hours and 5 minutes = 9:55 p.m.

Money, Time & Quantity Review Problem 8:
12:25 p.m. + 2 hours and 30 minutes = 2:55 p.m.

Money, Time & Quantity Review Problem 9:
4:50 a.m. + 11 hours and 30 minutes = 4:20 p.m.

Money, Time & Quantity Review Problem 10:
11:05 p.m. - 11 hours and 35 minutes = 11:30 a.m.

Money, Time & Quantity Review Problem 11:
1:25 p.m. - 11 hours and 50 minutes = 1:35 a.m.

Money, Time & Quantity Review Problem 12:
7:30 p.m. - 7 hours and 25 minutes = 12:05 p.m.

Money, Time & Quantity Review Problem 13:
4:45 p.m. - 5 hours and 35 minutes = 11:10 a.m.

Money, Time & Quantity Review Problem 14:
2:50 a.m. - 8 hours and 40 minutes = 6:10 p.m.

Money, Time & Quantity Review Problem 15:
5:45 a.m. - 11 hours and 50 minutes = 5:55 p.m.
Money, Time & Quantity Review Problem 16:
The correct answer is B.

What is the problem asking?
How much money is left in the account?

What are the facts?
- Opening Balance = $2,398.66
- Expenses: rent -- $1,165.22; electricity -- $84.00; supplies -- $449.43; taxes -- $321.05

Set up and solve the problem:
- Expenses = $1,165.22 + $84.00 + $449.43 + $321.05 = $2,019.70
- Final Balance = Opening Balance - Expenses
  = $2,398.66 - $2,019.70 = $378.96

Money, Time & Quantity Review Problem 17:
The correct answer is A.

What is the problem asking?
What is the gain on the stock?

What are the facts?
- Original stock price = $28.25
- 100 shares purchased
- Price increased by ¼ or $0.25

Set up and solve the problem:
- Original amount spent:
  $28.25 × 100 = $2,825.00
- New Price per share:
  $28.25 + 0.25 = $28.50
- New Stock Value:
  $28.50 × 100 = $2,850.00
- Gain = $2,850.00 - $2,825.00 = $25
  OR
- $0.25 gain × 100 shares = $25
Money, Time & Quantity Review Problem 18:
The correct answer is D.

What is the problem asking?
What will the cost of the order be?

What are the facts?
Prices as listed
- Computer disks -- 3 boxes
- Pens -- 2 packages
- Paper -- 6 boxes
- Printer ribbon -- 1

Set up and solve the problem:
Add the number times the price:

\[
\begin{align*}
3 \times (8.99) &= 26.97 \\
2 \times (2.50) &= 5.00 \\
6 \times (22.95) &= 137.70 \\
1 \times (25.00) &= 25.00 \\
\text{TOTAL} &= 194.67
\end{align*}
\]

Money, Time & Quantity Review Problem 19:
The correct answer is B.

What is the problem asking?
How long to varnish the windows (in hours)?

What are the facts?
- 240 minutes to varnish
- 60 minutes = 1 hour (conversion)

Set up and solve the problem:

\[
\frac{240 \text{ minutes}}{60 \text{ minutes/hour}} = 4 \text{ hours}
\]

Money, Time & Quantity Review Problem 20:
The correct answer is B.

What is the problem asking?
How long does it take to complete lab tests?

What are the facts?
- 1 hour 30 minutes per 1 lab test
- 5 lab tests to be performed

Set up and solve the problem:

Time to complete = 1 hour, 30 minutes \times 5

Split up the problem:

\[
\begin{align*}
5 \times 1 \text{ hour} &= 5 \text{ hours} \\
5 \times 30 \text{ minutes} &= 150 \text{ minutes} = 2 \text{ hours 30 minutes} \\
\text{Total} &= 5 \text{ hours} + 2 \text{ hours 30 minutes} = 7 \text{ hours 30 minutes}
\end{align*}
\]
Money, Time & Quantity Review Problem 21:
The correct answer is B.

What is the problem asking?
How long is the benefits class?

What are the facts?
Table as listed:
Benefits class starts at 10:00 a.m.
Break starts at 11:20 a.m.

Set up and solve the problem:
10 a.m. to 11:20 a.m. = 1 hour 20 minutes

Money, Time & Quantity Review Problem 22:
The correct answer is A.

What is the problem asking?
Was the company goal met?

What are the facts?
Goal: 950
Week 3: 419
Week 4: 537

Set up and solve the problem:
Add the production for weeks 3 and 4:
419 + 537 = 956
The goal of 950 was achieved

Money, Time & Quantity Review Problem 23:
The correct answer is C.

What is the problem asking?
How many bonus points are there at the end of 3 weeks?

What are the facts?
Bonus points: 279
Awarded 24 points each week for 3 weeks

Set up and solve the problem:
Total points = original number of bonus points + (24 × 3)
= 279 + 72
= 351 points
Fractions and Decimals – Answers

Fractions and Decimals Problem 1:
\[ \frac{1}{4} = 1 \div 4 = 0.25 \]

Fractions and Decimals Problem 2:
\[ \frac{3}{8} = 3 \div 8 = 0.375 \]

Fractions and Decimals Problem 3:
\[ \frac{5}{8} = 5 \div 8 = 0.625 \]

Fractions and Decimals Problem 4:
\[ \frac{3}{4} = 3 \div 4 = 0.75 \]

Fractions and Decimals Problem 5:
\[ \frac{7}{8} = 7 \div 8 = 0.875 \]

Fractions and Decimals Problem 6:
\[ \frac{2}{3} = 2 \div 3 = 0.667 \]

Fractions and Decimals Problem 7:
\[ \frac{1}{3} = 1 \div 3 = 0.333 \]

Fractions and Decimals Problem 8:
\[ \frac{1}{8} = 1 \div 8 = 0.125 \]

Fractions and Decimals Problem 9:
\[ \frac{3}{10} = 3 \div 10 = 0.3 \]
Fractions and Decimals Problem 10:
\[
\frac{7}{10} = 7 \div 10 = 0.70
\]

Fractions and Decimals Problem 11:
\[
0.375 = \frac{375}{1,000} = \frac{375 \div 125}{1,000 \div 125} = \frac{3}{8}
\]

Fractions and Decimals Problem 12:
\[
0.625 = \frac{625}{1,000} = \frac{625 \div 125}{1,000 \div 125} = \frac{5}{8}
\]

Fractions and Decimals Problem 13:
\[
0.667 = \frac{2}{3} \left( \frac{2}{3} \right. \text{ is really } 0.666\overline{6} \text{ where } \overline{6} \text{ means continuing. It is commonly rounded to } 0.667 \right)
\]

Fractions and Decimals Problem 14:
\[
0.875 = \frac{875}{1,000} = \frac{875 \div 125}{1,000 \div 125} = \frac{7}{8}
\]

Fractions and Decimals Problem 15:
\[
0.333 = \frac{1}{3} \left( \frac{1}{3} \right. \text{ is really } 0.333\overline{3} \text{ where } \overline{3} \text{ means continuing. It is commonly rounded to } 0.333 \right)
\]

Fractions and Decimals Problem 16:
\[
0.75 = \frac{75}{100} = \frac{75 \div 25}{100 \div 25} = \frac{3}{4}
\]

Fractions and Decimals Problem 17:
\[
0.9 = \frac{9}{10}
\]

Fractions and Decimals Problem 18:
\[
0.2 = \frac{2}{10} = \frac{2 \div 2}{10 \div 2} = \frac{1}{5}
\]
Fractions and Decimals Problem 19:
\[
0.125 = \frac{125}{1,000} = \frac{125 \div 125}{1,000 \div 125} = \frac{1}{8}
\]

Fractions and Decimals Problem 20:
\[
0.25 = \frac{25}{100} = \frac{25 \div 25}{100 \div 25} = \frac{1}{4}
\]

Fractions and Decimals Problem 21:
The correct answer is C.
\[
\frac{4}{4} + \frac{2}{4} = \frac{6}{4} = 1\frac{1}{2}
\]

Fractions and Decimals Problem 22:
The correct answer is D.
\[
\frac{4}{4} + \frac{4}{4} + \frac{1}{4} = \frac{9}{4} = 2\frac{1}{4}
\]

Fractions and Decimals Problem 23:
The correct answer is B.
\[
\frac{3}{3} + \frac{3}{3} + \frac{3}{3} + \frac{1}{3} = \frac{13}{3} = 4\frac{1}{3}
\]

Fractions and Decimals Problem 24:
The correct answer is D.
\[
1 + 1 + \frac{3}{8} = 2\frac{3}{8}
\]

Fractions and Decimals Problem 25:
The correct answer is A.
\[
1 + 1 + \frac{1}{6} = 3\frac{1}{6}
\]

Fractions and Decimals Problem 26:
\[
9\frac{1}{8} = 9 + (1 \div 8) = 9.125
\]
Fractions and Decimals Problem 27:
\[
2 \frac{2}{3} = 2 + (2 \div 3) = 2.667
\]

Fractions and Decimals Problem 28:
\[
4 \frac{3}{4} = 4 + (3 \div 4) = 4.75
\]

Fractions and Decimals Problem 29:
\[
5 \frac{3}{10} = 5 + (3 \div 10) = 5.30
\]

Fractions and Decimals Problem 30:
\[
1 \frac{7}{8} = 1 + (7 \div 8) = 1.875
\]

Fractions and Decimals Problem 31:
\[
6 \frac{3}{8} = 6 + (3 \div 8) = 6.375
\]

Fractions and Decimals Problem 32:
\[
3 \frac{5}{8} = 3 + (5 \div 8) = 3.625
\]

Fractions and Decimals Problem 33:
\[
1 \frac{1}{3} = 1 + (1 \div 3) = 1.333
\]

Fractions and Decimals Problem 34:
\[
6 \frac{1}{4} = 6 + (1 \div 4) = 6.25
\]

Fractions and Decimals Problem 35:
\[
7 \frac{9}{10} = 7 + (9 \div 10) = 7.90
\]
Fractions and Decimals Problem 36:
\[ 1.2 = 1 + \frac{2}{10} = 1 + \frac{2 \div 2}{10 \div 2} = 1 \frac{1}{5} \]

Fractions and Decimals Problem 37:
\[ 1.333 = 1 \frac{1}{3} \text{ (} \frac{1}{3} \text{ is really 0.333\ldots where } \ldots \text{ means continuing. It is commonly rounded to 0.333)} \]

Fractions and Decimals Problem 38:
\[ 9.667 = 9 \frac{2}{3} \text{ (} \frac{2}{3} \text{ is really 0.666\ldots where } \ldots \text{ means continuing. It is commonly rounded to 0.667)} \]

Fractions and Decimals Problem 39:
\[ 5.875 = 5 + \frac{875}{1000} = 5 + \frac{875 \div 125}{1000 \div 125} = 5 \frac{7}{8} \]

Fractions and Decimals Problem 40:
\[ 6.625 = 6 + \frac{625}{1000} = 6 + \frac{625 \div 125}{1000 \div 125} = 6 \frac{5}{8} \]

Fractions and Decimals Problem 41:
\[ 7.9 = 7 + \frac{9}{10} = 7 \frac{9}{10} \]

Fractions and Decimals Problem 42:
\[ 5.75 = 5 + \frac{75}{100} = 5 + \frac{75 \div 25}{100 \div 25} = 5 \frac{3}{4} \]

Fractions and Decimals Problem 43:
\[ 9.375 = 9 + \frac{375}{1000} = 9 + \frac{375 \div 125}{1000 \div 125} = 9 \frac{3}{8} \]

Fractions and Decimals Problem 44:
\[ 9.125 = 9 + \frac{125}{1000} = 9 + \frac{125 \div 125}{1000 \div 125} = 9 \frac{1}{8} \]
Fractions and Decimals Problem 45:
\[
4.6 = 4 + \frac{6}{10} = 4 + \frac{6}{10} = 4 \frac{3}{5}
\]

Fractions and Decimals Problem 46:
\[
5.875 = 5 \frac{1}{8} + \frac{3}{8} = 5 + \frac{1}{8} + \frac{3}{8} = 5 + \frac{4}{8} = 5 + \frac{1}{2} = 5 \frac{1}{2}
\]

Fractions and Decimals Problem 47:
\[
1 \frac{1}{2} + \frac{1}{2} = \frac{3}{2} + \frac{1}{2} = \frac{4}{2} = 2
\]

Fractions and Decimals Problem 48:
\[
2 \frac{1}{6} + 3 \frac{4}{6} = \frac{13}{6} + \frac{22}{6} = \frac{35}{6} = 5 \frac{5}{6}
\]

Fractions and Decimals Problem 49:
\[
2 \frac{1}{8} + 2 \frac{3}{8} = \frac{17}{8} + \frac{19}{8} = \frac{36}{8} = 4 \frac{4}{8} = 4 \frac{1}{2}
\]

Fractions and Decimals Problem 50:
\[
6 \frac{1}{3} + 1 \frac{1}{3} = \frac{19}{3} + \frac{4}{3} = \frac{23}{3} = 7 \frac{2}{3}
\]

Fractions and Decimals Problem 51:
\[
1 \frac{1}{4} + 3 \frac{2}{4} = \frac{5}{4} + \frac{14}{4} = \frac{19}{4} = 4 \frac{3}{4}
\]

Fractions and Decimals Problem 52:
\[
1 \frac{1}{3} + 3 \frac{2}{3} = \frac{4}{3} + \frac{11}{3} = \frac{15}{3} = 5
\]

Fractions and Decimals Problem 53:
\[
1 \frac{1}{4} + 4 \frac{3}{4} = \frac{5}{4} + \frac{19}{4} = \frac{24}{4} = 6
\]
Fractions and Decimals Problem 54:
\[
\frac{1}{2} + 3 = \frac{1}{2} + \frac{6}{2} = \frac{7}{2} = 3 \frac{1}{2}
\]

Fractions and Decimals Problem 55:
\[
1 + \frac{2}{3} = \frac{3}{3} + \frac{2}{3} = \frac{5}{3} = 1 \frac{2}{3}
\]

Fractions and Decimals Problem 56:
The correct answer is C.

What is the problem asking?
How much flour is used?

What are the facts?
Bread uses 15 \( \frac{3}{4} \) cups; muffins use 12 \( \frac{1}{4} \) cups

Set up and solve the problem:
Add the amounts, add the fractions first:
\[
\frac{3}{4} + \frac{1}{4} = 1
\]
Then add the whole numbers:
15 + 12 = 27
Total = 1 + 27 = 28 cups of flour

Fractions and Decimals Problem 57:
The correct answer is D.

What is the problem asking?
How much was spent?

What are the facts?
Prices: \( \frac{3}{8} \) dollars; \( \frac{11}{8} \) dollars; \( \frac{13}{8} \) dollars

Set up and solve the problem:
Add the fractions first:
\[
\frac{3}{8} + \frac{3}{8} + \frac{5}{8} = \frac{11}{8} = 1 \frac{3}{8}
\]
Then add the whole numbers:
6 + 1 + 13 = 30
Total = \( 1 \frac{3}{8} + 30 = 31 \frac{3}{8} \) dollars
Fractions and Decimals Problem 58:
The correct answer is D.
What is the problem asking?
What is the total length of the two boards?
What are the facts?

Board 1: $10\frac{1}{4}$ feet

Board 2: $8\frac{1}{2}$ feet

Set up and solve the problem:
Add the two:
Add fractions first: $\frac{1}{4} + \frac{1}{2} = \frac{1}{4} + \frac{2}{4} = \frac{3}{4}$
Add whole numbers: $10 + 8 = 18$

Total $= \frac{3}{4} + 18 = 18\frac{3}{4}$

Fractions and Decimals Problem 59:
The correct answer is C.
What is the problem asking?
How many millions of gallons were sold?
What are the facts?

Monday - $3\frac{2}{5}$; Tuesday - $2\frac{1}{5}$; Wednesday - $1\frac{3}{5}$

Set up and solve the problem:
Add the three:
Add fractions first: $\frac{2}{5} + \frac{1}{5} + \frac{3}{5} = \frac{6}{5} = 1\frac{1}{5}$
Add the whole numbers: $3 + 2 + 1 = 6$

Total $= 1\frac{1}{5} + 6 = 7\frac{1}{5}$
Fractions and Decimals Problem 60:
The correct answer is D.

What is the problem asking?
What were the total earnings?

What are the facts?
Earnings: $11.00 per hour
Wednesday - - $3 \frac{1}{4}$; Thursday - - $7 \frac{1}{4}$; Friday - - $5 \frac{2}{4}$

Set up and solve the problem:
Add the number of hours:
Add the fractions: $\frac{1}{4} + \frac{1}{4} + \frac{2}{4} = \frac{4}{4} = 1$

Add the whole numbers: $3 + 7 + 5 = 15$
Total: $1 + 15 = 16$ hours
Total Earnings = $11.00$ per hour $\times$ 16 hours = $176.00$
Percentages – Answers

Percentages Problem 1:
\[ 7\% = \frac{7}{100} = 7 \div 100 = 0.07 \]

Percentages Problem 2:
\[ 92\% = \frac{92}{100} = 92 \div 100 = 0.92 \]

Percentages Problem 3:
\[ 40\% = \frac{40}{100} = 40 \div 100 = 0.40 \]

Percentages Problem 4:
\[ 30\% = \frac{30}{100} = 30 \div 100 = 0.30 \]

Percentages Problem 5:
\[ 93\% = \frac{93}{100} = 93 \div 100 = 0.93 \]

Percentages Problem 6:
\[ 80\% = \frac{80}{100} = 80 \div 100 = 0.80 \]

Percentages Problem 7:
\[ 2\% = \frac{2}{100} = 2 \div 100 = 0.02 \]

Percentages Problem 8:
\[ 86\% = \frac{86}{100} = 86 \div 100 = 0.86 \]

Percentages Problem 9:
\[ 43\% = \frac{43}{100} = 43 \div 100 = 0.43 \]
Percentages Problem 10:
\[
14\% = \frac{14}{100} = 14 \div 100 = 0.14
\]

Percentages Problem 11:
\[
19\% \text{ of } 5 = 5 \times 0.19 = 0.95
\]

Percentages Problem 12:
\[
36\% \text{ of } 92 = 92 \times 0.36 = 33.12
\]

Percentages Problem 13:
\[
20\% \text{ of } 24 = 24 \times 0.20 = 4.8
\]

Percentages Problem 14:
\[
47\% \text{ of } 40 = 40 \times 0.47 = 18.8
\]

Percentages Problem 15:
\[
43\% \text{ of } 13 = 13 \times 0.43 = 5.59
\]

Percentages Problem 16:
\[
7\% \text{ of } 56 = 56 \times 0.07 = 3.92
\]

Percentages Problem 17:
\[
91\% \text{ of } 37 = 37 \times 0.91 = 33.67
\]

Percentages Problem 18:
\[
94\% \text{ of } 62 = 62 \times 0.94 = 58.28
\]

Percentages Problem 19:
\[
51\% \text{ of } 73 = 73 \times 0.51 = 37.23
\]

Percentages Problem 20:
\[
99\% \text{ of } 8 = 8 \times 0.99 = 7.92
\]

Percentages Problem 21:
\[
\frac{71 \text{ blue chairs}}{84 \text{ chairs total}} = 71 \div 84 = 0.845 = 85\% \text{ (round 0.845 to 0.85)}
\]
Percentages Problem 22:
\[
\frac{20 \text{ large blocks}}{60 \text{ blocks total}} = 20 \div 60 = 0.333 = 33\% \text{ (round 0.333 to 0.833)}
\]

Percentages Problem 23:
\[
\frac{55 \text{ black jars}}{75 \text{ jars total}} = 55 \div 75 = 0.733 = 73\% \text{ (round 0.733 to 0.73)}
\]

Percentages Problem 24:
\[
\frac{12 \text{ old shirts}}{35 \text{ shirts total}} = 12 \div 35 = 0.342 = 34\% \text{ (round 0.342 to 0.34)}
\]

Percentages Problem 25:
\[
\frac{26 \text{ small books}}{48 \text{ books total}} = 26 \div 48 = 0.541 = 54\% \text{ (round 0.541 to 0.54)}
\]

Percentages Problem 26:
\[
\frac{43 \text{ large triangles}}{69 \text{ triangles total}} = 43 \div 69 = 0.623 = 62\% \text{ (round 0.623 to 0.62)}
\]

Percentages Problem 27:
\[
\frac{51 \text{ large birds}}{77 \text{ birds total}} = 51 \div 77 = 0.662 = 66\% \text{ (round 0.662 to 0.66)}
\]

Percentages Problem 28:
\[
\frac{7 \text{ large chairs}}{40 \text{ chairs total}} = 7 \div 40 = 0.175 = 18\% \text{ (round 0.175 to 0.18)}
\]

Percentages Problem 29:
\[
\frac{80 \text{ yellow books}}{90 \text{ books total}} = 80 \div 90 = 0.888 = 89\% \text{ (round 0.888 to 0.89)}
\]

Percentages Problem 30:
\[
\frac{49 \text{ orange triangles}}{55 \text{ triangles total}} = 49 \div 55 = 0.890 = 89\% \text{ (round 0.890 to 0.89)}
\]
Percentages Problem 31:
The correct answer is B.
*What is the problem asking?*
What are the savings on the video?
*What are the facts?*
15% off sale
Video cost $29.99 originally
*Write and solve the problem:*
15% off means $0.15 saved on each dollar.
$29.99 \times 0.15 = $4.4985
(round off to $4.50)

Percentages Problem 32:
The correct answer is B.
*What is the problem asking?*
How much tax should be charged?
*What are the facts?*
Item price $225.00
Sales Tax Rate is 7%
*Write and solve the problem:*
Multiply the price by the percentage (converted to decimal)
7% = 0.07
Tax = $225 \times 0.07 = $15.75

Percentages Problem 33:
The correct answer is D.
*What is the problem asking?*
How much do you pay for the glove?
*What are the facts?*
Glove price $20.00
Discount 25% off
*Write and solve the problem:*
25% off means $0.25 saved on each dollar.
$20.00 \times 0.25 = $5.00
So you pay $20.00 - $5.00 = $15.00
Percentages Problem 34:
The correct answer is D.
What is the problem asking?
How much tax should be charged?
What are the facts?
   Camera cost $79.98
   Sales Tax 6%
Write and solve the problem:
   6% means $0.06
   $79.98 \times $0.06 = $4.7988 (round tax to $4.80)
   Total = $79.98 + $4.80 = $84.78

Percentages Problem 35:
The correct answer is C.
What is the problem asking?
How much do you pay the agent?
What are the facts?
   Sale price $89,000
   Commission 7%
Write and solve the problem:
   Commission is 7% or $0.07 per dollar.
   ($89,000) \times ($0.07) = $6,230

Percentages Problem 36:
The correct answer is D.
What is the problem asking?
What is the percent of books sold?
What are the facts?
   95 out of 100 books sold
Write and solve the problem:
   95 out 100 means: \frac{95}{100} = 95\%
Percentages Problem 37:
The correct answer is C.

What is the problem asking?
What was the value of the total sales?

What are the facts?
Monthly sales $114,000
One employee made 30% of sales

Write and solve the problem:
30% of all sales means 0.30 of sales.

\[(114,000) \times (0.30) = 34,200\]

Percentages Problem 38:
The correct answer is B.

What is the problem asking?
What percentage of items was wasted?

What are the facts?
50 total items produced
5 items wasted

Write and solve the problem:
5 out of 50 means \(\frac{5}{50}\)

\[\frac{5}{50} \times \frac{2}{2} = \frac{10}{100} = 10\%\]

Percentages Problem 39:
The correct answer is C.

What is the problem asking?
How much will he save on the total cost of the windows?

What are the facts?
12 windows
$92.95 per window
40% discount

Write and solve the problem:
Two step problem
Step 1:
Total cost of windows = 12 \times 92.95 = $1,115.40
Step 2:
Calculate the discount:
Discount = (1,115.40) \times (0.40) = $446.16
Measurement - Answers

Measurement Problem 1:
Conversion: 1 foot = 12 inches

\[ 5 \text{ feet} \times \frac{12 \text{ inches}}{1 \text{ foot}} = 60 \text{ inches} \]

Measurement Problem 2:
Conversion: 1 yard = 3 feet

\[ 9 \text{ feet} \times \frac{1 \text{ yard}}{3 \text{ feet}} = 3 \text{ yards} \]

Measurement Problem 3:
Conversion: 1 centimeter = 10 millimeters

\[ 9 \text{ millimeters} \times \frac{1 \text{ centimeter}}{10 \text{ millimeters}} = 0.9 \text{ centimeters} \]

Measurement Problem 4:
Conversion: 1 quart = 2 pints

\[ 9 \text{ pints} \times \frac{1 \text{ quart}}{2 \text{ pints}} = 4.5 \text{ quarts} \]

Measurement Problem 5:
Conversion: 1 foot = 12 inches

\[ 8 \text{ inches} \times \frac{1 \text{ foot}}{12 \text{ inches}} = 0.667 \text{ feet} \]

Measurement Problem 6:
Conversion: 1 gallon = 4 quart

\[ 5 \text{ gallons} \times \frac{4 \text{ quarts}}{1 \text{ gallon}} = 20 \text{ quarts} \]
Measurement Problem 7:
Conversion: 1 liter = 1,000 milliliters

\[8 \text{ liters} \times \frac{1,000 \text{ milliliters}}{1 \text{ liter}} = 8,000 \text{ milliliters}\]

Measurement Problem 8:
Conversion: 1 quart = 2 pints

\[10 \text{ quarts} \times \frac{2 \text{ pints}}{1 \text{ quart}} = 20 \text{ pints}\]

Measurement Problem 9:
Conversion: 1 kilogram = 1,000 grams

\[6 \text{ grams} \times \frac{1 \text{ kilogram}}{1,000 \text{ grams}} = 0.006 \text{ kilograms}\]

Measurement Problem 10:
Conversion: 1 meter = 100 centimeters

\[1 \text{ centimeter} \times \frac{1 \text{ meter}}{100 \text{ centimeters}} = 0.01 \text{ meters}\]

Measurement Problem 11:
Conversion: 1 liter = 1,000 milliliters

\[10 \text{ milliliters} \times \frac{1 \text{ liter}}{1,000 \text{ milliliters}} = 0.01 \text{ liters}\]

Measurement Problem 12:
Conversion: 1 hour = 60 minutes

\[5 \text{ hours} \times \frac{60 \text{ minutes}}{1 \text{ hour}} = 300 \text{ minutes}\]

Measurement Problem 13:
Conversion: 1 yard = 3 feet

\[9 \text{ yards} \times \frac{3 \text{ feet}}{1 \text{ yard}} = 27 \text{ feet}\]
**Measurement Problem 14:**
Conversion: 1 meter = 100 centimeters

\[ 10 \text{ meters} \times \frac{100 \text{ centimeters}}{1 \text{ meter}} = 1,000 \text{ centimeters} \]

**Measurement Problem 15:**
Conversion: 1 gallon = 4 quarts

\[ 7 \text{ quarts} \times \frac{1 \text{ gallon}}{4 \text{ quarts}} = 1.75 \text{ gallons} \]

**Measurement Problem 16:**
Conversion: 1 centimeter = 10 millimeters

\[ 4 \text{ centimeter} \times \frac{10 \text{ millimeters}}{1 \text{ centimeter}} = 40 \text{ millimeters} \]

**Measurement Problem 17:**
Conversion: 1 pound = 16 ounces

\[ 4 \text{ ounces} \times \frac{1 \text{ pound}}{16 \text{ ounces}} = 0.25 \text{ pounds} \]

**Measurement Problem 18:**
Conversion: 1 kilogram = 1,000 grams

\[ 1 \text{ kilogram} \times \frac{1,000 \text{ grams}}{1 \text{ kilogram}} = 1,000 \text{ grams} \]

**Measurement Problem 19:**
Conversion: 1 hour = 60 minutes

\[ 6 \text{ minutes} \times \frac{1 \text{ hour}}{60 \text{ minutes}} = 0.1 \text{ hours} \]

**Measurement Problem 20:**
Conversion: 1 pound = 16 ounces

\[ 9 \text{ pounds} \times \frac{16 \text{ ounces}}{1 \text{ pound}} = 144 \text{ ounces} \]
Measurement Problem 21:
The correct answer is D.
What is the problem asking?
   How many liters?
What are the facts?
   1 gallon = 3.78 liters
Set up and solve the problem:
   1 gallon = 3.78 liters
   3 gallons = ?
   Therefore 3 gallons = 3 \times 2.78 = 11.34 liters

Measurement Problem 22:
The correct answer is C.
What is the problem asking?
   How many pounds?
What are the facts?
   1 kilogram = 2.2 pounds
   kg = kilogram
   lbs = pounds
Set up and solve the problem:
   Us cross multiplication :
       \[
       \begin{align*}
       \frac{1 \text{ kg}}{2 \text{ lbs}} &= \frac{10 \text{ kg}}{n \text{ lbs}} \\
       n &= 10 \times 2.2 \text{ lbs} = 22 \text{ lbs}
       \end{align*}
       \]

Measurement Problem 23:
The correct answer is C.
What is the problem asking?
   What is the perimeter of the frame?
What are the facts?
   Each side is 27 centimeters long
   The top and bottom are 21 centimeters long
Set up and solve the problem:
   Perimeter = add up all the sides
   = 27 + 27 + 21 + 21 = 96 centimeters
Check math by estimating:
   Round each side to nearest 10:
   30 + 30 + 20 + 20 = 100 cm. OK.
Measurement Problem 24:
The correct answer is D.

What is the problem asking?
What is the perimeter of the land?

What are the facts?
There are 6 edges to the land
The lengths are: 4, 3, 3, 1, 1 and 2 miles.

Set up and solve the problem:
Perimeter = add up all the sides
= 4 + 3 + 3 + 1 + 1 + 2 = 14 miles

Measurement Problem 25:
The correct answer is D.

What is the problem asking?
What is the perimeter of the quilt?

What are the facts?
Each of the four sides is 425 centimeters long

Set up and solve the problem:
Perimeter = add up all the sides
= 425 + 425 + 425 + 425 = 1,700 centimeters

Check math by estimating:
Round each side to 400:
4 x 400 = 1,600 This is close, but you would actually have to solve the problem to know that 1,700 is the answer, not 1680.

Measurement Problem 26:
The correct answer is A.

What is the problem asking?
How much can be covered with the material?
(The amount the fabric can cover is equal to the area of the fabric.)

What are the facts?
The material is 2 yards long and 36 inches wide.

Set up and solve the problem:
Convert to the same units first:
You can always convert to the smaller units, but in this case we know that 36 inches equals 1 yard.

\[
36 \text{ inches} \times \frac{1 \text{ foot}}{12 \text{ inches}} \times \frac{1 \text{ yard}}{3 \text{ feet}} = 1 \text{ yard}
\]

Now find the area:
2 yards \times 1 \text{ yards} = 2 \text{ square yards}
Measurement Problem 27:
The correct answer is B.

What is the problem asking?
What is the area of the window?

What are the facts?
The window is 120 centimeters long and 20 centimeters wide

Set up and solve the problem:
Area = length × width
= 120 cm × 20 cm = 2,400 square centimeters

Check math by estimating:
Round height to 100 cm:
100 cm × 20 cm = 2,000 sq. cm.
So we know 240 cm could not be right.
Averages - Answers

Averages Problem 1:
Average = sum of the numbers ÷ the number of numbers in the set
= (49 + 17 + 90) ÷ 3
= 156 ÷ 3 = 52

Averages Problem 2:
Average = sum of the numbers ÷ the number of numbers in the set
= (16 + 50 + 32) ÷ 3
= 98 ÷ 3 = 32.66 (round to 33)

Averages Problem 3:
Average = sum of the numbers ÷ the number of numbers in the set
= (41 + 36 + 26) ÷ 3
= 103 ÷ 3 = 34.33 (round to 34)

Averages Problem 4:
Average = sum of the numbers ÷ the number of numbers in the set
= (48 + 75 + 3) ÷ 3
= 126 ÷ 3 = 42

Averages Problem 5:
Average = sum of the numbers ÷ the number of numbers in the set
= (86 + 56 + 45) ÷ 3
= 187 ÷ 3 = 62.33 (round to 62)

Averages Problem 6:
Average = sum of the numbers ÷ the number of numbers in the set
= (7 + 18 + 92) ÷ 3
= 117 ÷ 3 = 39

Averages Problem 7:
Average = sum of the numbers ÷ the number of numbers in the set
= (60 + 13 + 11) ÷ 3
= 84 ÷ 3 = 28

Averages Problem 8:
Average = sum of the numbers ÷ the number of numbers in the set
= (41 + 72 + 51) ÷ 3
= 164 ÷ 3 = 54.66 (round to 55)
Averages Problem 9:
Average = sum of the numbers ÷ the number of numbers in the set
= (43 + 92 + 58) ÷ 3
= 193 ÷ 3 = 64.33 (round to 64)

Averages Problem 10:
Average = sum of the numbers ÷ the number of numbers in the set
= (25 + 9 + 47) ÷ 3
= 81 ÷ 3 = 27

Averages Problem 11:
The correct answer is C.
What is the problem asking?
What is the average number of cars sold each week?
What are the facts?
Week 1 sold 9 cars; week 2 sold 6 cars; week 3 sold 10 cars, week 4 sold 7 cars.
Set up and solve the problem:
Average = sum of the numbers ÷ the number of numbers in the set
= (9 + 6 + 10 + 7) ÷ 4
= 32 ÷ 4 = 8 is the average number of cars sold per week

Averages Problem 12:
The correct answer is B.
What is the problem asking?
How many miles were averaged per hour?
What are the facts?
First hour 52 miles; second hour 64 miles, third hour 49 miles
Set up and solve the problem:
Average = sum of the numbers ÷ the number of numbers in the set
= (52 + 64 + 49) ÷ 3
= 165 miles ÷ 3 hours = 55 miles per hour is the average

Averages Problem 13:
The correct answer is B.
What is the problem asking?
What is the average commission for the month?
What are the facts?
Commissions: $8,400, $4,193, $6,860, $5,995 and $10,850
Set up and solve the problem:
Average = sum of the numbers ÷ the number of numbers in the set
= ($8,400 + $4,193 + $6,860 + $5,995 + $10,850) ÷ 5
= $36,298 ÷ 5 = $7,259.60 is the average commission
Proportions and Ratios - Answers

Proportions and Ratios Problem 1:
The correct answer is B.

What is the problem asking?
How long is the actual room?

What are the facts?
The scale is 2 centimeters to 1 meter
On the drawing the room is 12 centimeters long

Write and solve the problem:
Cross multiply:
\[
\frac{2 \text{ centimeters}}{1 \text{ meter}} = \frac{12 \text{ centimeters}}{X \text{ meters}}
\]

\[
2X = 12
\]

\[
X = (12 \div 2) = 6 \text{ meters is the length of the room}
\]

Proportions and Ratios Problem 2:
The correct answer is C.

What is the problem asking?
How much would the fabric cost?

What are the facts?
300 yards bought for $1,275

Write and solve the problem:
Use cross multiply method:
\[
\frac{300 \text{ yards}}{$1,275} = \frac{1,200 \text{ yards}}{n}
\]

\[300n = 1,200 \times $1,275\]

\[n = \frac{1,200 \times $1,275}{300} = 1,530,000 \div 300 = $5,100 \text{ for 1,200 yards of fabric}\]
Proportions and Ratios Problem 3:
The correct answer is C.
What is the problem asking?
How much will the wire cost?
What are the facts?
95 yards of wire cost $1,235 in September
285 yards are bought in October
Write and solve the problem:
Use cross multiply method:
\[
\frac{95 \text{ yards}}{1,235} = \frac{285 \text{ yards}}{n}
\]
\[95n = 285 \times 1,235\]
\[n = \frac{285 \times 1,235}{95} = 315,975 \div 95 = 3,705\text{ for 285 yards of wire}
\]

Proportions and Ratios Problem 4:
The correct answer is D.
What is the problem asking?
What is the length of the actual part?
What are the facts?
First machine part is 3 centimeters on drawing and actual length is 21 centimeters
Second machine part is 12 centimeters on drawing
Write and solve the problem:
Use cross multiply method:
\[
\frac{3 \text{ centimeters}}{21 \text{ centimeters}} = \frac{12 \text{ centimeters}}{n}
\]
\[3n = 21 \times 12\]
\[n = \frac{21 \times 12}{3} = 252 \div 3 = 84\text{ centimeters is the actual length of the second machine part}
\]

OR
Use a chart:
<table>
<thead>
<tr>
<th>Scale Drawing</th>
<th>Actual Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 + 3 cm</td>
<td>21 cm + 21</td>
</tr>
<tr>
<td>3 + 6 cm</td>
<td>42 cm + 21</td>
</tr>
<tr>
<td>3 + 9 cm</td>
<td>63 cm + 21</td>
</tr>
<tr>
<td>12 cm</td>
<td>84 cm</td>
</tr>
</tbody>
</table>
Proportions and Ratios Problem 5:
The correct answer is B.

What is the problem asking?
- How much flour is needed?

What are the facts?
- 9 cups of flour serves 15 people
- there will be 75 guests

Write and solve the problem:

Use cross multiply method:
\[
\frac{9 \text{ cups}}{15 \text{ people}} = \frac{n \text{ cups}}{75 \text{ people}}
\]

\[15n = 9 \times 75\]

\[n = \frac{9 \times 75}{15} = 45 \text{ cups of flour}\]

OR

Use a chart:

<table>
<thead>
<tr>
<th>Cups of Flour</th>
<th>Guests Served</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>9 + 9</td>
<td>15 + 15</td>
</tr>
<tr>
<td>9 + 18</td>
<td>30 + 15</td>
</tr>
<tr>
<td>9 + 27</td>
<td>45 + 15</td>
</tr>
<tr>
<td>9 + 36</td>
<td>60 + 15</td>
</tr>
<tr>
<td>45 cups</td>
<td>75 people</td>
</tr>
</tbody>
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Diagrams and Graphs - Answers

Diagrams and Graphs Problem 1:
The correct answer is A.
Look at the pie chart and find the section labeled Used by people. The percentage, 7%, is shown next to the label.

Diagrams and Graphs Problem 2:
The correct answer is B.
Look at the pie chart and find the section labeled Used by people. The percentage, 7%, is shown next to the label. Look at the pie chart and find the section labeled Returned unused to the sea. The percentage, 24%, is shown next to the label. 24% is approximately 3 times 7%.

Diagrams and Graphs Problem 3:
You know that 50% is the same as half of something. The section of the pie chart labeled Irrigation takes up half the circle. Irrigation is 50%. The smallest section of the pie chart is labeled Cities. The smallest percentage show is 8%. Cities is 8%. The section of the pie chart labeled Industry is slightly smaller than the section labeled Irrigation but much larger than the section labeled Cities. Industry is 42%.

Diagrams and Graphs Problem 4:
The correct answer is B.
Look at the pie chart and find the section labeled Toys. The percentage, 26% is shown next to the label.

Diagrams and Graphs Problem 5:
The correct answer is A.
The bar for 1992 goes up about halfway between the marks 1.0 and 1.5 of the vertical axis. The vertical axis is labeled in $100,000. So a bar that is about halfway between 1.0 ($100,000) and 1.5 ($150,000) would be $120,000.

Diagrams and Graphs Problem 6:
The correct answer is B.
The type of ball that sold the most will have the largest bar on the graph. The bar that goes up the highest on the graph (up to 500) is labeled Tennis.

Diagrams and Graphs Problem 7:
The correct answer is A.
Of the years shown in the answers (1975, 1980, 1985 and 1995), the mark for 1975 is the highest mark on the line graph. There were more car dealerships in 1970, but 1970 was not a possible answer.
Diagrams and Graphs Problem 8:
The correct answer is B.
The 1980’s decade is 1980 – 1989. The highest mark shown for that time period is 1985 with 15,000 dealerships.

Diagrams and Graphs Problem 9:
The correct answer is B.
The two driest months will be the two lowest marks on the line graph. June and July are the two lowest points on the line and are therefore the two driest months.

Diagrams and Graphs Problem 10:
The correct answer is A.
The three rainiest months will be the months with the highest marks on the line graph. January, February and March are the three highest points on the line and are therefore the three rainiest months.