Unit 3
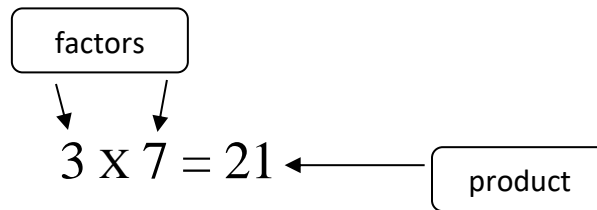## Multiplying Decimals

Topic A: Multiplying Decimals

Multiplying decimals uses the same method that you learned for multiplying whole numbers. Review multiplication of whole numbers.

Vocabulary Review – Review the diagram below and try to write in the three explanations of the mathematical terms. You may refer to the glossary, if you wish. For right now it is mostly important to remember what factor means.

factors

$$3 \times 7 = 21$$

product

Product:

_____

_____

Factors:

_____

_____

Multiplying Decimals:

Multiplying decimals follows almost the same steps as multiplying whole numbers. On the next few pages you will be shown two methods of how to multiply decimals together.

Where do you place the decimal point?

Method One:
One method is to **estimate the product using whole numbers.**

Example A: $4.3 \times 5.7 \approx 4 \times 6 = 24$

The **answer** will be **around 24** which is two whole number places. It will **not** be **2.4** and it will **not** be **240**.

When you actually multiply 4.3×5.7 (as if the decimals were not there) the numerals in the product are **2451**. Your estimate tells you the decimal point will be after 24, so $4.3 \times 5.7 = 24.51$

$$
\begin{array}{r}
5.7 \\
\times\, 4.3 \\
\hline
171 \\
2280 \\
\hline
24.51
\end{array}
$$

Example B: $23.24 \times 3.9 \approx 23 \times 4 = 92$

The answer will be **around 92**. It will **not** be **9.2** and it will **not** be **920**.

When you actually multiply 23.24×3.9 the numerals in the product are **90636**. Your estimate tells you the whole number will be two whole number places, so $23.24 \times 3.9 = 90.636$

$$
\begin{array}{r}
23.24 \\
\times\, 3.9 \\
\hline
20916 \\
69720 \\
\hline
90.636
\end{array}
$$

If the whole numbers in the question are large, you can round to the nearest ten or hundred and be able to tell where to put the decimal point. This is a **quick estimate**.

Example C: $383.298 \times 213.87 \approx 400 \times 200 = 80\ 000$

The answer will be **around 80 000**. It will **not** be **8 000 or 800 000**. When you actually multiply 383.298 by 213.87 the numerals in the product are **8197594326**. Your estimate tells you the whole number will go up to the ten-thousands place, which is five whole number places, so

$383.298 \times 213.87 = 81975.94326$ **Whew!**

$$
\begin{array}{r}
383.298 \\
\times\, 213.87 \\
\hline
81975.94326
\end{array}
$$

Exercise One

All the multiplying has been done already. Your task is to put the decimal point in the product by doing a whole number estimate of the question.

a)
$$\begin{array}{r} 2.8 \\ \times 4.3 \\ \hline 84 \\ \underline{1120} \\ 12.04 \end{array} \qquad \begin{bmatrix} 3 \\ \times 4 \\ \hline 12 \end{bmatrix}$$

b)
$$\begin{array}{r} 56.9 \\ \times 12.3 \\ \hline 1707 \\ 11380 \\ \underline{56900} \\ 699.87 \end{array} \qquad \begin{bmatrix} 60 \\ \times 10 \\ \hline 600 \end{bmatrix}$$

c)
$$\begin{array}{r} 7.3 \\ \times 19.6 \\ \hline 14308 \end{array}$$

d)
$$\begin{array}{r} 28.7 \\ \times 64.97 \\ \hline 1864639 \end{array}$$

e)
$$\begin{array}{r} 428.6 \\ \times 4.9 \\ \hline 210014 \end{array}$$

f)
$$\begin{array}{r} 5.6 \\ \times 0.9 \\ \hline 504 \end{array}$$

g)
$$\begin{array}{r} 73.2 \\ \times 1.6 \\ \hline 11712 \end{array}$$

h)
$$\begin{array}{r} 1.8 \\ \times 1.3 \\ \hline 234 \end{array}$$

i)
$$\begin{array}{r} 38.4 \\ \times 29.25 \\ \hline 1123200 \end{array}$$

j)
$$\begin{array}{r} 16.437 \\ \times 8.973 \\ \hline 147489201 \end{array}$$

k)
$$\begin{array}{r} 48.29 \\ \times 55.6 \\ \hline 2684924 \end{array}$$

l)
$$\begin{array}{r} 91.2 \\ \times 1.5 \\ \hline 13680 \end{array}$$

Method Two:

Another way of locating the decimal point in the product is to **look** at the **decimal places** in the decimals you are multiplying.

Example A:

$$43.\mathbf{23} \quad \textit{2 decimal places}$$
$$\underline{\times\ 19.\mathbf{6}} \quad \textit{1 decimal place}$$

Then add the number of decimal places you counted above $(2+1 = 3)$

This is the number of decimal places you will have in your answer.

$$43.23 \quad \textit{2 decimal places}$$
$$\underline{\times\ 19.6} \quad \textit{+ 1 decimal place}$$
$$847.\mathbf{.}\underline{3}\,\underline{0}\,\underline{8} \quad \textit{3 decimal places}$$

Example B:

$$0.35 \quad \textit{2 decimal places}$$
$$\underline{\times\ 0.47} \quad \textit{+ 2 decimal places}$$
$$\underline{0.\underline{1}\,\underline{6}\,\underline{4}\,\underline{5}} \quad \textit{4 decimal places}$$

Example C:

$$13.452 \quad \textit{3 decimal places}$$
$$\underline{\times\ \ 30} \quad \textit{+ 0 decimal places}$$
$$403.\underline{5}\,\underline{6}\,\underline{0} \quad \textit{3 decimal places}$$

Exercise Two

Again, the multiplying has been done. Use the method of multiplying the understood denominators to put the decimal point in the product.

a)
$$\begin{array}{r} 9.2 \\ \times\,0.3 \\ \hline 2.76 \end{array}$$
  1 decimal place
  + 1 decimal place
  2 decimal places

b) 0.27
$$\begin{array}{r} 0.27 \\ \times\,1.8 \\ \hline 0.486 \end{array}$$
  2 decimal places
  + 1 decimal place
  3 decimal places

c)
$$\begin{array}{r} 6.8 \\ \times\,0.4 \\ \hline 272 \end{array}$$

d)
$$\begin{array}{r} 2.4 \\ \times\,0.13 \\ \hline 0312 \end{array}$$

e)
$$\begin{array}{r} 240 \\ \times\,0.05 \\ \hline 1200 \end{array}$$

f)
$$\begin{array}{r} 0.72 \\ \times\,2.8 \\ \hline 2016 \end{array}$$

g)
$$\begin{array}{r} 0.66 \\ \times\,0.25 \\ \hline 01650 \end{array}$$

h)
$$\begin{array}{r} 0.8 \\ \times\,2.6 \\ \hline 208 \end{array}$$

i)
$$\begin{array}{r} 0.91 \\ \times\,6.2 \\ \hline 5642 \end{array}$$

j)
$$\begin{array}{r} 0.29 \\ \times\,1.2 \\ \hline 0348 \end{array}$$

k)
$$\begin{array}{r} 0.87 \\ \times\,0.19 \\ \hline 01653 \end{array}$$

l)
$$\begin{array}{r} 1.08 \\ \times\,0.2 \\ \hline 0216 \end{array}$$

m)
$$\begin{array}{r} 2.65 \\ \times\,1.5 \\ \hline 3975 \end{array}$$

n)
$$\begin{array}{r} 6.2 \\ \times\,0.18 \\ \hline 1116 \end{array}$$

o)
$$\begin{array}{r} 7.3 \\ \times\,3.8 \\ \hline 2774 \end{array}$$

p)
$$\begin{array}{r} 4.24 \\ \times\,0.07 \\ \hline 02968 \end{array}$$

q)
$$\begin{array}{r} 0.042 \\ \times\,60 \\ \hline 2520 \end{array}$$

Exercise Three

If you had trouble with the first two exercises, then get help from your instructor. Here is extra practice if you want or need it.

a)
```
        41     0 decimal places
     × 0.061   + 3 decimal places
      2.501    3 decimal places total
```

b)
```
       7.8    1 decimal place
     × 0.5   + 1 decimal  place
      3.90    2 decimal places total
```

c)
```
    59.275
   ×  0.08
   474200
```

d)
```
     7.18
   × 23.46
  1684428
```

e)
```
     0.84
    × 2.1
    1764
```

f)
```
     5.3
    × 21
    1113
```

g)
```
     2.8
   × 1.5
    420
```

h)
```
    0.32
   × 2.5
   0800
```

i)
```
    18.6
   × 0.3
    558
```

j)
```
    100
  × 0.35
   3500
```

k)
```
    0.72
   × 3.4
   2448
```

Exercise Four

Multiply to find the product. Remember to put the decimal point in the correct place; you know two methods!

a)
$$\begin{array}{r} 13.8 \\ \times\ 3.9 \\ \hline 1242 \\ 4140 \\ \hline 53.82 \end{array}$$

b)
$$\begin{array}{r} 0.076 \\ \times\ 24 \\ \hline \end{array}$$

c)
$$\begin{array}{r} 2.05 \\ \times\ 1.7 \\ \hline \end{array}$$

d)
$$\begin{array}{r} 0.95 \\ \times\ 0.76 \\ \hline \end{array}$$

e)
$$\begin{array}{r} 0.168 \\ \times\ 2.1 \\ \hline \end{array}$$

f)
$$\begin{array}{r} 84.3 \\ \times\ 1.2 \\ \hline \end{array}$$

g)
$$\begin{array}{r} 0.429 \\ \times\ 7.5 \\ \hline \end{array}$$

h)
$$\begin{array}{r} 0.063 \\ \times\ 100 \\ \hline \end{array}$$

i)
$$\begin{array}{r} 96 \\ \times\ 0.2 \\ \hline \end{array}$$

j)
$$\begin{array}{r} 1.79 \\ \times\ 0.33 \\ \hline \end{array}$$

k)
$$\begin{array}{r} 2.5 \\ \times\ 26 \\ \hline \end{array}$$

l)
$$\begin{array}{r} 40.1 \\ \times\ 0.9 \\ \hline \end{array}$$

Answers to Exercise Four

a) 53.82	b) 1.824	c) 3.485	d) 0.722
e) 0.3528	f) 101.16	g) 3.2175	h) 6.300
i) 19.2	j) 0.5907	k) 65.0	l) 36.09

Prefixing Zeros

Remember this skill?

$$\frac{23}{1000} = 0.\mathbf{0}23$$

$$\frac{7}{100} = 0.\mathbf{0}7$$

$$\frac{8}{1000} = 0.\mathbf{00}8$$

$$\frac{19}{10000} = 0.\mathbf{00}19$$

When changing from a fraction to a decimal: If you do not have enough digits to fill all the places, zeros are put between the decimal point and the digits from the fraction—this is called **prefixing zeros**.

How does this apply to multiplying decimals? Look at the examples.

Example A:
1.

0.07	*2 decimal places*
X 0.5	*1 decimal places*
35	*3 decimal places*
	Uh oh! There are not enough places to make the decimals fit in!

2.

0.07	
× 0.5	
0035	*Add in zeros before (prefix the zeros!) your product.*
3 2 1 ← count	*It is completely within the rules of math to do that.*

3.

0.07	
× 0.5	
0.035	*Then put in the decimal in the place in the correct*
3 2 1 ← count	*place.*

Example B: 0.25   *2 decimal places*
                      × 0.03   *+2 decimal places*
                      . _ _ 7 5   *4 decimal places in product*
                      4 3 2 1   ← count

Example C: Look carefully at this one - it is tricky!

                      0.05   *2 decimal places*
                      × 0.8   *1 decimal place*
                      . _ 4 0   *3 decimal places in product*
                      3 2 1   ← count

Because the last digit, the zero, is the result of multiplying 8×5, you **must count it** when working out the decimal places to put in the decimal point.

The product is forty thousandths:

$$\frac{40}{1000} = 0.004$$

which can now also be written as four hundredths:

$$\frac{40}{100} = 0.04$$

Note that if you had **not counted** that zero, you would have written 0.004 which is four thousandths and **not correct**.

Exercise Five

Find the products. Be certain to place all decimal points correctly.

a)
$$
\begin{array}{r}
0.35 \\
\times\,0.13 \\
\hline
105 \\
350 \\
\hline
0.0455
\end{array}
$$

b)
$$
\begin{array}{r}
1.8 \\
\times\,0.05 \\
\hline
\end{array}
$$

c)
$$
\begin{array}{r}
300 \\
\times\,0.04 \\
\hline
\end{array}
$$

d)
$$
\begin{array}{r}
0.16 \\
\times\,0.16 \\
\hline
\end{array}
$$

e)
$$
\begin{array}{r}
2.3 \\
\times\,0.016 \\
\hline
\end{array}
$$

f)
$$
\begin{array}{r}
88 \\
\times\,1.1 \\
\hline
\end{array}
$$

g)
$$
\begin{array}{r}
1.3 \\
\times\,0.027 \\
\hline
\end{array}
$$

h)
$$
\begin{array}{r}
500 \\
\times\,0.073 \\
\hline
\end{array}
$$

i)
$$
\begin{array}{r}
0.603 \\
\times\,0.4 \\
\hline
\end{array}
$$

j)
$$
\begin{array}{r}
0.036 \\
\times\,0.03 \\
\hline
\end{array}
$$

k)
$$
\begin{array}{r}
9.26 \\
\times\,1.3 \\
\hline
\end{array}
$$

l)
$$
\begin{array}{r}
0.635 \\
\times\,0.8 \\
\hline
\end{array}
$$

m)   38.2   n)   0.025   o)   3.5
      × 1.9   × 0.25   × 0.018

p)   3.14   q)   2.86   r)   3.721
     × 0.006   × 3.9   × 25

s)   0.043   t)   0.013   u)   0.201
      × 3.3   × 1.4   × 2.1

Answers to Exercise Five

a) 0.0455   b) 0.09   c) 12.00   d) 0.0256

e) 0.0368   f) 96.8   g) 0.0351   h) 36.500

i) 0.2412   j) 0.00108   k) 12.038   l) 0.508

m) 72.58   n) 0.00625   o) 0.063   p) 0.01884

q) 11.154   r) 93.025   s) 0.1419   t) 0.0182

u) 0.4221

Multiplying by 10, 100, 1 000, 10 000 ...

There is a pattern that you can see when we multiply by a decimal number by 10, 100, 1 000, 10 000, and so on. Look at the following example and try to find the pattern:

45.9264 X 10 = 459.264

45.9264 X 100 = 4592.64

45.9264 X 1 000 = 45926.4

45.9264 X 10 000 = 459264

Do you see a pattern?

> When **multiplying** by 10, 100, 1 000, 10 000, etc., count the zeros in the 10, 100, 1 000, etc. and move the decimal point that same number of places to the right.

Exercise Six   Try these questions.

When you **multiply by ten**, **move** the **decimal point one place to the right**. Remember that every whole number can have a decimal point at the right.

$$.37 \times 10 = .3 . 7 = 3.7$$

$$13 \times 10 = 13. . = 130.$$

a) $2.2 \times 10 =$ _____

b) $\$27.00 \times 10 =$ _____

c) $6.67 \times 10 =$ _____

d) $1.47 \times 10 =$ _____

e) $12 \times 10 =$ _____

f) $2 \times 10 =$ _____

Now do these:

When you **multiply** by 100, **move** the decimal point **two** places to the right. Note that zeros may be needed at the **end** of the numeral

$$4.2 \times 100 = 4.2 \underset{\longrightarrow}{\smile} \,.= 42\textbf{0.}$$

$$6 \times 100 = 6. \smile \smile \,.= 6\textbf{00.}$$

g) $5.67 \times 100 =$ _____   h) $87 \times 100 =$ _____

i) $92.737 \times 100 =$ _____   j) $0.3 \times 100 =$ _____

k) $2.1 \times 100 =$ _____   l) $25.00 \times 100 =$ _____

And do these questions:

To **multiply by 1000 move** the **decimal point three places to the right**.

$$4.2 \times 1000 = 4.2 \smile \smile \,.= 42\textbf{00.}$$

m) $6.721 \times 1000 =$ _____   n) $1.56 \times 1000 =$ _____

o) $6.7 \times 1000 =$ _____   p) $\$2 \times 1000 =$ _____

q) $0.7246 \times 1000 =$ _____   r) $2.1 \times 1000 =$ _____

Exercise Seven   Write the products using the short method you now know.

a) $0.4 \times 10 =$ _____   b) $1.6 \times 10 =$ _____

c) $0.27 \times 10 =$ _____   d) $\$1.47 \times 10 =$ _____

e) $10 \times 0.926 =$ _____   f) $10 \times 77.6 =$ _____

g) $10 \times 0.09 =$ _____   h) $10 \times 0.047 =$ _____

i) $0.62 \times 100 =$ _____   j) $3.56 \times 100 =$ _____

k) $0.119 \times 100 =$ _____   l) $5.6 \times 100 =$ _____

m) $100 \times 2.03 =$ _____   n) $100 \times 0.55 =$ _____

o) $100 \times 0.345 =$ _____   p) $100 \times 14.4 =$ _____

q) $1.934 \times 1000 =$ _____   r) $\$.36 \times 1000 =$ _____

s) $28.9 \times 100 =$ _____   t) $0.892 \times 1000 =$ _____

u) $1000 \times 7.654 =$ _____

v) $1000 \times 0.068 =$ _____

w) $1000 \times 5.4 =$ _____

x) $1000 \times 32.36 =$ _____

Answers to Exercise Seven

a) 4	b) 16	c) 2.7	d) $14.70
e) 9.26	f) 776	g) 0.9	h) 0.47
i) 62	j) 356	k) 11.9	l) 560
m) 203	n) 55	o) 34.5	p) 1 440
q) 1 934	r) $360.00	s) 2 890	t) 892
u) 7 654	v) 68	w) 5 400	x) 32 360

Exercise Eight

The area of an object is: the measurement of the amount of space the object surface covers. Area is described in square units.

Find the **area** of the **rectangles** described below. The measures of the length (*l*) and width (*w*) have been given. You should draw and label a sketch for each.

a) $l = 10.5$ cm
$w = 6.6$ cm
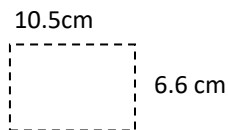
b) $l = 100.04$ km
$w = 70.2$ km

c) $l = 15.5$ mm
$w = 10.5$ mm

10.5cm

6.6 cm

$A = l \times w$
$A = 10.5 \times 6.6$ cm
$A =$

d) $l = 9.75$ cm   e) $l = 40.43$ km   f) $l = 19.6$ cm
    $w = 3.5$ cm $w = 10.9$ km $w = 2.8$ cm

Answers to Exercise Eight

a) 69.3 cm^2 b) 7022.808 km^2 c) 162.75 mm^2 d) 34.125 cm^2
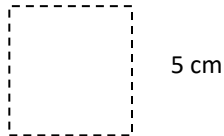
e) 440.687 km^2 f) 54.88 cm^2

Exercise Nine

Find the area of each square described in the questions below. Even though this is a simple square, it is still good practice to draw the picture.

a)   A $_{square}$, if $s = 5$ cm   b) A $_{square}$, if $s = 12.5$ km

5 cm

c)   A $_{square}$, if $s = 45.3$ mm   d) A $_{square}$, if $s = 100.9$ m

e)   A $_{square}$, if $s = 1.4$ km   f) A $_{square}$, if $s = 25.4$ cm

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Answers to Exercise Nine

a) 25 cm^2 b) 156.25 km^2 c) 2 052.09 mm^2 d) 10 180.81 m^2

e) 1.96 km^2 f) 645.16 cm^2

Problems Using Multiplication of Decimals

Multiplication problems usually give information about one thing and ask you to find a total amount for several of the same things. Look for this pattern in the following problems. Also look for key words.

Key words which point to **multiplication** include:

product	**total**
altogether	**of**

Multiplication by a decimal or fraction often uses the word "**of**" in word problems. "**Of**" means multiply **if "of" has a decimal or fraction right before it and is followed by a number** or a word which stands for a number. For example,

> She spends 0.25 **of** her salary on rent. Her salary is $1445 a month. How much is her rent? (The word "salary" stands for the number $1445.)

> $0.25 \times \$1445 = \$361.25$
> She spends $361.25 on rent every month.

Remember to always draw a picture to help yourself visualize how to solve the problem.

Exercise Ten
Solve these problems. Do an estimation first.

a) One package of juice costs $11.73 How much will five packages cost?

Estimation:

Actual Solution:

b) It takes George 0.75 hours to reupholster a vinyl chair. A restaurant wants him to reupholster 35 chairs. How many hours of labour will George charge the restaurant for this job?

Estimation:

Actual Solution:

c) The new carpet for the bedroom was on sale for $21.80 per square metre ($m^2$). The amount of carpet needed was 18.5 m^2. Find the total cost of the carpet, before taxes.

Estimation:

Actual Solution:

d) Your 4X4 truck averages 7.75 kilometres per litre of gas. How far could your truck travel with 52 L of gas?

Estimation:

Actual Solution:

e) The distance between Jackie's home and her work place is 6.6 km. She walks **to and from** work five days a week. What is the total distance Jackie walks per week on these trips back and forth to work?

Estimation:

Actual Solution:

f) The four young men who run on the 4×100 metre relay team have an average time for the 100 m of 11.4 seconds each. How long should it take them to run the relay race if they each run 100 m, one after the other?

Estimation:

Actual Solution:

g) The express bus on the Caribou route averages 75.5 kilometres per hour (km/h). How far does it travel on the non-stop overnight run that lasts 6.25 hours?

Estimation:

Actual Solution:

h) Each roof truss for the new house uses 25.2 m of lumber. The house needs 21 trusses. How much lumber will be used to build all these trusses?

Estimation:

Actual Solution:

i) Mary makes fantastic pickles every fall. Her recipe calls for 4.25 kg of cucumbers. This year she is going to make 3.5 times her usual recipe and give these pickles as gifts at Christmas. How many kilograms of cucumbers does she need?

Estimation:

Actual Solution:

j) On statutory holidays, union workers who work are paid double time and a half. This is 2.5 times their regular pay.

       i) The employees at the smelter earn $17.37 per hour. How much are they paid per hour if they work on a statutory holiday?

       ii) Jesse worked a 7.5 hour shift at the smelter on Labour Day last year. What were his **gross** (before deductions) earnings for that day?

k) Phil is going to fence his large 50.5 m square vegetable garden to keep the deer out. The fence will be made with four strands of barbed wire. How much barbed wire should Phil buy?

       The fence will look like this:
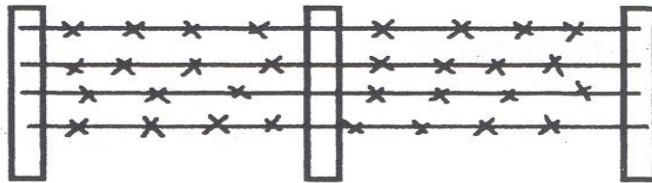
l) Janice plans to sew lace on the edge of a tablecloth that is 132.5 cm in width and 218.8 cm long. How much lace does she need? Give your answer in centimetres and also in metres.

m) One physical education teacher starts each class by having everyone jog around the school 4 times. The school is rectangular (shaped like a rectangle) and 160 m long and 95 m wide. About how far do the students jog each class?

   Note: *160 m long and 95 m wide* may be written as "160 m by 95 m."

n) How many metres of baseboard are needed for a rectangular room 4.5 m by 3.2 m? There are two doorways, each measuring one meter in width. Be sure to deduct the amount needed for the doorways.

o) Calculate the total amount of weather-stripping needed to go around the following windows in a house. Round the answer to the nearest hundredth of a metre.

3 windows each measuring 76.2 cm by 122 cm

2 windows each measuring 152 cm by 135 cm

p) The Nelsons are going to replace the fascia board (the trim at the edge of a roof) with new pressure-treated cedar board. Their flat roof is 14.4 m by 12.3 m. How much fascia board is needed?

q) Chung Cha wants to put a pool into her back yard. The pool she wants is 20.5 m by 6.4 m. Her back yard measures 464.5 m². Will the pool she wants fit in her back yard?

r) The carpet for Frank's living room is $24.95 for one square metre. He must also buy underlay at $5/m^2 and pay $4.50/m^2 for the carpet layer's labour. The living room is square with a 5.5 m length per side. What is the total cost of the installed carpet (all taxes are included in the prices already)?

s) The directions on a carpet shampoo say one bottle will clean 50 m^2 of carpet. Joyce wants to clean the wall-to-wall carpet in three rooms. One room is 6 m by 4.5 m, the bedroom is 3 m by 4 m, and the hall is 1.2 m by 5 m. How many bottles of carpet shampoo should she buy? (Calculate the area of each of the rooms and then find the total area to be cleaned.)

t) Diane bought a souvenir poster in Sweden. The souvenir poster is 0.5 metres square. Diane wants to put non-glare glass over the poster and was told the glass costs $12 per m². How much will the glass cost for Diane's poster?

Answers to Exercise Ten

a) Estimation: $\$12 \times 5 \approx \$60$

Actual Solution: $\$11.73 \times 5 = \$58.65$

Five packages of juice will cost $58.65

b) Estimation: $1 \times 35 \approx 35$ hours

Actual Solution: $0.75 \times 35 = 26.25$ hours

It will take George 26.25 hours to reupholster the chairs.

c) Estimation: $\$20 \times 20 \approx \$400$

Actual Solution: $\$21.80 \times 18.5 = \$403.30$

The total cost of the carpet, before taxes, is $403.30.

d) Estimation: $8 \text{ km} \times 50 \text{ L} \approx 400$ km

Actual Solution: $7.75 \text{ km} \times 52 \text{ L} = 403$ km

The truck could travel 403 km.

E) Estimation: $7 \text{ km} \times 10$ (to and from)

≈ 70 km

Actual Solution: $6.6 \text{ km} \times 10 = 66$ km

Jackie walks 66 km each week.

f) Estimation: 4×11 seconds ≈ 44 seconds

Actual Solution: 4×11.4 seconds $= 45.6$ seconds

It should take them 45.6 seconds to run the relay race.

g) Estimation: $80 \text{ km} \times 6$ hours ≈ 480 km

Actual Solution: 75.5×6.25 hours $= 471.875$ km

The bus will travel 471.875 km.

h) Estimation: $25 \text{ m} \times 20 \approx 500$ m

Actual Solution: $25.2 \text{ m} \times 21 = 529.2$ m

There will be 529.2 m of lumber used for the trusses.

i) Estimation: $4 \text{ kg} \times 4 \approx 16$ kg

Actual Solution: $4.25 \text{ kg} \times 3.5 = 14.875$ kg

Mary will need 14.875 kg of cucumbers.

j) i) $\$17.37 \times 2.5 = \$43.425$ per hour

ii) $\$43.425 \times 7.5$ hours $= \$325.69$

Jesse earned $325.69 on Labour Day.

k) Estimation: $50 + 50 + 50 + 50 = 200$ m

$200 \text{ m} \times 4 = 800$ m

Actual Solution: $50.5 \text{m} \times 4 = 202$m

$202 \text{ m} \times 4 = 808$ m

Phil should buy 808 m of barbed wire.

l) Estimation: $130\text{cm} + 130\text{cm} + 220\text{cm} + 220\text{cm}$

700 cm or 7 m

Actual Solution: $132.5\text{cm} + 132.5\text{cm} + 218.8\text{cm}$

218.8 cm = 702.6 cm or 7.026 m

Janice needs 702.6cm or 7.026 m of lace.

m) Estimation: $(150\text{m} + 150\text{m} + 100\text{m} + 100\text{m}) \times 4$

2000 m

Actual Solution: $(160 \text{ m} + 160 \text{ m} + 95 \text{ m} + 95 \text{ m}) \times 4$

2040 m

The students jog 2040 m each class.

n) Estimation: $5\text{m} + 5\text{m} + 3\text{m} + 3\text{m} = 16$ m

$16 \text{ m} - 2\text{m} = 14$ m

Actual Solution: $4.5 \text{ m} + 4.5 \text{ m} + 3.2 \text{ m} + 3.2 \text{ m}$

15.4 m

$15.4 \text{ m} - 2 \text{ m} = 13.4$ m

13.4 m of baseboard are needed for the room.

o) Estimation: $80\text{cm} + 80\text{cm} + 120\text{cm} + 120\text{cm}$

400 cm

$400 \text{ cm} \times 3 = 1200$ cm

$150\text{cm} + 150\text{cm} + 140\text{cm} + 140\text{cm} = 580$ cm

$580\text{cm} \times 2 = 1160$ cm

$1160 \text{ cm} + 1200 \text{ cm} = 2360$ cm or 23.6 m

o) Actual Solution: 76.2cm + 76.2cm + 122cm + 122cm = 396.4 cm

396.4 cm × 3 = 1189.2 cm

152cm + 152cm + 135cm + 135cm = 574 cm

574cm × 2 = 1148 cm

1148 cm + 1189.2 cm = 2337.2 cm or 23.372 m

The total amount of weather stripping is 23.37 m.

p) Estimation: 14m + 14m + 12m + 12 m = 52 m

Actual Solution: 14.4 m + 14.4 m + 12.3 m + 12. 3m = 53.4m

53.4 m of fascia board will be needed.

q) Estimation: 20 m × 6 m = 120 m^2 So, yes, the pool will fit.

Actual Solution: 20.5 m × 6.4 m = 131.2 m^2

Yes, her pool will fit in her back yard.

r) Estimation: 5m × 5 m = 25 m^2

$25 + $5 + $5 = $35

$35 × 25 m^2 n= $875

Actual Solution: 5.5m × 5.5 m = 30.25 m^2

$24.95 + $5.00 + $4.50 = $34.45

$34.45 × 30.25 m^2 n= $1042.11

The cost will be $1042.11 for the carpet

Actual Solution: same as estimate.

s) Estimation: 6 m × 5 m = 30 m^2

 3 m × 4 m = 12 m^2

1 m × 5m = 5 m^2

30 m^2 + 12 m^2 + 5m^2 = 47 m^2

Joyce should buy just one bottle of carpet cleaner.

Actual Solution: 6 m × 4.5 m = 27 m^2

3 m × 4 m = 12 m^2

1.2 m × 5m = 6 m^2

27 m^2 + 12 m^2 + 6m^2 = 45 m^2

Joyce should buy just one bottle of carpet cleaner.

t) Estimation: 0.5 m × 0.5 m = 0.25 m^2

0.25 m^2 × $12/m^2 = $3.00

Diane's glass will cost $3.00

Topic A: Self-Test

Mark   /10   Aim 8/10

A. Find the product.   **6 marks**

a)   66   b)   7.25   c)   8.2
         $\times\,0.7$ $\times\,12$ $\times\,0.4$

d)   6.5   e)   19.5   f)   0.025
         $\times\,0.6$ $\times\,0.07$ $\times\,0.12$

B. Problems   **4 marks**

a) Maria bought 3.4 m of lace at $2.89 a metre. What was the cost of the lace before taxes?
   (Round to the nearest cent.)

Estimation:

Actual Solution:

b) Alan averages 90.5 km an hour on his motorcycle. How far will he go in 2.5 hours, travelling his average speed?

Estimation:

Actual Solution:

Unit 3 Review

1. Put the decimals in the correct place for the answer:

a)
$$
\begin{array}{r}
66 \\
\times\,0.9 \\
\hline
594
\end{array}
$$

b)
$$
\begin{array}{r}
7.25 \\
\times\,1.2 \\
\hline
00087
\end{array}
$$

c)
$$
\begin{array}{r}
101 \\
\times\,0.4 \\
\hline
404
\end{array}
$$

d)
$$
\begin{array}{r}
19.5 \\
\times\,3.47 \\
\hline
67665
\end{array}
$$

2. Find the product:

a)
$$
\begin{array}{r}
0.78 \\
\times\,1.4 \\
\hline
\end{array}
$$

b)
$$
\begin{array}{r}
3.42 \\
\times\,0.1 \\
\hline
\end{array}
$$

c)
$$
\begin{array}{r}
3.469 \\
\times\,4.63 \\
\hline
\end{array}
$$

d)
$$
\begin{array}{r}
7.94 \\
\times\,4.02 \\
\hline
\end{array}
$$

3. Multiply by 10, 100, or 1 000:

a. $0.53 \times 10 = $ _____

b. $7.89 \times 10 = $ _____

c. $0.472 \times 10 = $ _____

d. $100.3 \times 10 = $ _____

e. $1.476 \times 100 = $ _____

f. $3.7834 \times 100 = $ _____

g. $46.3214 \times 100 = $ _____

h. $42.42 \times 100 = $ _____

i. $4.3247 \times 1\,000 = $ _____

j. $0.4113 \times 1\,000 = $ _____

k. $10.321 \times 1\ 000 =$ _____   l. $4.89 \times 1\ 000 =$ _____

4.   Solve the following word problems:

a. Mark could bike at about 11.4 km an hour, how much distance did he cover in a 7.5 hour bike ride?

b. If Johnny spent 3.25 hours cleaning the learning center twice a week, how many hours did he work each week?

c. If Johnny got paid $7.85 an hour, how much did he get paid each week?

d. Joe and Kat's rectangular family tent measures 3.4 m by 2.9 m. How much area does the floor of the tent cover?

Answer Key to Review Section:

1)
a) 59.4
b) 0.087
c) 40.4
d) 67.665

2)
a) 1.092
b) 0.342
c) 31.9188
d) 16.06147

3)
a) 5.3
b) 78.9
c) 4.72

d) 1 003
e) 147.6
f) 378.34
g) 4 632.14
h) 4 242
i) 4 324.7
j) 411.3
k) 10 321
l) 4 890

4)
a) 85.5km
b) 6.5 hours
c) $51.03
d) 9.86m^2

Test time!

Please see your instructor to get
your practice test.

When you are confident, you can write
your unit 3 test.

Congratulations!