Unit Two
Multiplication

Topic A: Multiplying Larger Numbers

It is usually easier to multiply larger numbers if they are written underneath each other. The bottom number is called the **multiplier.**

To find the product of a one digit multiplier, use as many of these steps as you need to complete each multiplication question:

Step 1: Multiply the ones digit in the large number by the one digit multiplier.

Step 2: Multiply the tens digit in the large number by the multiplier.

Step 3: Multiply the hundreds digit in the large number by the multiplier.

Step 4: Multiply the thousands digit in the large number by the multiplier.

Example A: $62 \times 4 =$ _____

Step 1: 4×2 ones = 8 ones

$$\begin{array}{r} 62 \\ \times\ 4 \\ \hline 8 \end{array}$$

Step 2: 4×6 tens = 24 tens = 2 hundreds and 4 tens

$$\begin{array}{r} 62 \\ \times\ 4 \\ \hline 248 \end{array}$$

The **product** of 62×4 is 248

Exercise One

Find the product. Check your work using the answer key at the end of the exercise.

a) 72×2

b) 81×5

c) 21×8

d) 80×6

e) 73×3

f) 71×3

g) 40×7

h) 90×9

i) 82×4

j) 40×5

k) 92×4

l) 83×3

m) 90×8

n) 71×9

o) 53×2

p) 30×6

q) 81×7

r) 61×2

s) 70×8

t) 41×6

u) 90×5

v) 60×9

w) 92×3

x) 81×4

Answers to Exercise One

a) 144	b) 405	c) 168	d) 480	e) 219	f) 213	g) 280
h) 810	i) 328	j) 200	k) 368	l) 249	m) 720	n) 639
o) 106	p) 180	q) 567	r) 122	s) 560	t) 246	u) 450
v) 540	w) 276	x) 324				

Exercise Two

Find the product. Check your work using the answer key at the end of the exercise.

a) $\begin{array}{r} 90 \\ \times\ 7 \\ \hline \end{array}$	b) $\begin{array}{r} 84 \\ \times\ 2 \\ \hline \end{array}$	c) $\begin{array}{r} 63 \\ \times\ 3 \\ \hline \end{array}$	d) $\begin{array}{r} 92 \\ \times\ 2 \\ \hline \end{array}$
e) $\begin{array}{r} 72 \\ \times\ 4 \\ \hline \end{array}$	f) $\begin{array}{r} 52 \\ \times\ 3 \\ \hline \end{array}$	g) $\begin{array}{r} 41 \\ \times\ 3 \\ \hline \end{array}$	h) $\begin{array}{r} 51 \\ \times\ 4 \\ \hline \end{array}$
i) $\begin{array}{r} 71 \\ \times\ 6 \\ \hline \end{array}$	j) $\begin{array}{r} 61 \\ \times\ 5 \\ \hline \end{array}$	k) $\begin{array}{r} 90 \\ \times\ 6 \\ \hline \end{array}$	l) $\begin{array}{r} 71 \\ \times\ 7 \\ \hline \end{array}$
m) $\begin{array}{r} 60 \\ \times\ 4 \\ \hline \end{array}$	n) $\begin{array}{r} 71 \\ \times\ 5 \\ \hline \end{array}$	o) $\begin{array}{r} 81 \\ \times\ 8 \\ \hline \end{array}$	p) $\begin{array}{r} 51 \\ \times\ 9 \\ \hline \end{array}$
q) $\begin{array}{r} 41 \\ \times\ 4 \\ \hline \end{array}$	r) $\begin{array}{r} 50 \\ \times\ 8 \\ \hline \end{array}$	s) $\begin{array}{r} 61 \\ \times\ 6 \\ \hline \end{array}$	t) $\begin{array}{r} 30 \\ \times\ 7 \\ \hline \end{array}$

u) $\begin{array}{r} 90 \\ \times\ 9 \\ \hline \end{array}$ v) $\begin{array}{r} 30 \\ \times\ 5 \\ \hline \end{array}$ w) $\begin{array}{r} 41 \\ \times\ 8 \\ \hline \end{array}$ x) $\begin{array}{r} 51 \\ \times\ 7 \\ \hline \end{array}$

Answers to Exercise Two

a) 630	b) 168	c) 189	d) 184	e) 288	f) 156	g) 123
h) 204	i) 426	j) 305	k) 540	l) 497	m) 240	n) 355
o) 648	p) 459	q) 164	r) 400	s) 366	t) 210	u) 810
v) 150	w) 328	x) 357				

Example B: $523 \times 3 =$ ____

$$\begin{array}{r} 523 \\ \times\ \ 3 \\ \hline 1\,569 \end{array}$$

Step 1: 3×3 ones = 9 ones

Step 2: 3×2 tens = 6 tens

Step 3: 3×5 hundreds = 15 hundreds = 1 thousand and 5 hundreds

The **product** of **523×3 is 1 569.**

Example C: $901 \times 8 =$ _____

$$\begin{array}{r} 901 \\ \times \quad 8 \\ \hline 7\,2\mathbf{0}8 \end{array}$$

Step 1: 8×1 one = 8 ones

Step 2: 8×0 tens = 0 tens

Step 3: 8×9 hundreds = 72 hundreds = 7 thousands and 2 hundreds

The **product** of **901 $\times$ 8 is 7 208.**

Exercise Three

Find the product. Check your work using the answer key at the end of the exercise.

a) $\begin{array}{r} 601 \\ \times \ 7 \\ \hline \end{array}$

b) $\begin{array}{r} 423 \\ \times \ 3 \\ \hline \end{array}$

c) $\begin{array}{r} 641 \\ \times \ 2 \\ \hline \end{array}$

d) $\begin{array}{r} 922 \\ \times \ 4 \\ \hline \end{array}$

e) $\begin{array}{r} 820 \\ \times \ 4 \\ \hline \end{array}$

f) $\begin{array}{r} 211 \\ \times \ 5 \\ \hline \end{array}$

g) $\begin{array}{r} 803 \\ \times \ 2 \\ \hline \end{array}$

h) $\begin{array}{r} 542 \\ \times \ 2 \\ \hline \end{array}$

i) 813 × 3

j) 610 × 4

k) 901 × 6

l) 711 × 8

m) 720 × 3

n) 910 × 5

o) 801 × 6

p) 932 × 3

q) 731 × 2

r) 701 × 5

s) 521 × 2

t) 632 × 3

u) 720 × 4

v) 942 × 2

w) 710 × 9

x) 601 × 8

Answers to Exercise Three

a) 4 207 b) 1 269 c) 1 282 d) 3 688 e) 3 280 f) 1 055 g) 1 606
h) 1 084 i) 2 439 j) 2 440 k) 5 406 l) 5 688 m) 2 160 n) 4 550
o) 4 806 p) 2 796 q) 1 462 r) 3 505 s) 1 042 t) 1 896 u) 2 880
v) 1 884 w) 6 390 x) 4 808

Exercise Four

Find the product. Check your work using the answer key at the end of the exercise.

a) $4\,224 \times 2$

b) $1\,203 \times 3$

c) $3\,012 \times 4$

d) $6\,001 \times 9$

e) $8\,412 \times 2$

f) $6\,012 \times 4$

g) $7\,011 \times 5$

h) $9\,021 \times 3$

i) $5\,110 \times 8$

j) $6\,130 \times 2$

k) $8\,101 \times 6$

l) $5\,301 \times 3$

m) $9\,310 \times 2$

n) $7\,231 \times 3$

o) $5\,021 \times 4$

p) $7\,034 \times 2$

q) $6\,010 \times 7$

r) $5\,123 \times 2$

s) $\begin{array}{r} 8\,302 \\ \times\ 3 \\ \hline \end{array}$

t) $\begin{array}{r} 8\,110 \\ \times\ 7 \\ \hline \end{array}$

u) $\begin{array}{r} 8\,021 \\ \times\ 4 \\ \hline \end{array}$

v) $\begin{array}{r} 7\,012 \\ \times\ 4 \\ \hline \end{array}$

w) $\begin{array}{r} 9\,011 \\ \times\ 9 \\ \hline \end{array}$

x) $\begin{array}{r} 6\,001 \\ \times\ 6 \\ \hline \end{array}$

Answers to Exercise Four

a)	8 448	b)	3 609	c)	12 048	d)	54 009	e)	16 824	f)	24 048	g)	35 055
h)	27 063	i)	40 880	j)	12 260	k)	48 606	l)	15 903	m)	18 620	n)	21 693
o)	20 084	p)	14 068	q)	42 070	r)	10 246	s)	24 906	t)	56 770	u)	32 084
v)	28 048	w)	81 099	x)	36 006								

Renaming and Carrying

In the times tables, the products are often two digit numbers. You must **rename** and **carry**. The amount you carry is **added onto** the **product** of the next column.

Example A:

$$\begin{array}{r} 68 \\ \times\ 7 \\ \hline \end{array}$$

Step 1: Multiply the ones by the multiplier.
7×8 ones = 56 ones = 5 tens + 6 ones
Write the 6 ones in the product.
Carry the 5 tens to the tens column and make a note of it for yourself. You might write it above the tens column.

$$\begin{array}{r} {\scriptstyle 5\ \ } \\ 68 \\ \times\ 7 \\ \hline 6 \end{array}$$

Step 2: Multiply the tens by the multiplier.
7×6 tens = 42 tens
Now add on the 5 tens that you carried.
42 tens + 5 tens = 47 tens = 4 hundreds and 7 tens

$$\begin{array}{r} {\scriptstyle 5\ \ } \\ 68 \\ \times\ 7 \\ \hline 476 \end{array}$$

Exercise Five

Find the product. Check your work using the answer key at the end of the exercise.

a) $\begin{array}{r} 16 \\ \times\ 8 \\ \hline \end{array}$ b) $\begin{array}{r} 62 \\ \times\ 6 \\ \hline \end{array}$ c) $\begin{array}{r} 37 \\ \times\ 4 \\ \hline \end{array}$ d) $\begin{array}{r} 14 \\ \times\ 9 \\ \hline \end{array}$

e) 36 × 7

f) 92 × 9

g) 48 × 6

h) 17 × 2

i) 26 × 4

j) 54 × 7

k) 58 × 8

l) 45 × 4

m) 56 × 3

n) 47 × 5

o) 39 × 6

p) 75 × 6

q) 38 × 5

r) 82 × 7

s) 98 × 3

t) 29 × 5

u) 47 × 3

v) 74 × 8

w) 56 × 5

x) 98 × 4

Answers to Exercise Five

a) 128	b) 372	c) 148	d) 126	e) 252	f) 828	g) 288
h) 34	i) 104	j) 378	k) 464	l) 180	m) 168	n) 235
o) 234	p) 450	q) 190	r) 574	s) 294	t) 145	u) 141
v) 592	w) 280	x) 392				

Exercise Six

Find the product. Check your work using the answer key at the end of the exercise.

a) 59×8	b) 77×6	c) 63×4	d) 93×9
e) 38×2	f) 57×9	g) 14×6	h) 35×3
i) 29×4	j) 78×9	k) 63×6	l) 83×5
m) 64×4	n) 46×2	o) 93×7	p) 56×5
q) 97×2	r) 85×4	s) 67×3	t) 57×8
u) 83×9	v) 74×7	w) 98×8	x) 28×2

Answers to Exercise Six

a) 472	b) 462	c) 252	d) 837	e) 76	f) 513	g) 84
h) 105	i) 116	j) 702	k) 378	l) 415	m) 256	n) 92
o) 651	p) 280	q) 194	r) 340	s) 201	t) 456	u) 747
v) 518	w) 784	x) 56				

Example B: $4 \times 224 =$ _____

$\overset{1}{224}$	$\overset{1}{224}$	$\overset{1}{224}$
$\times\ 4$	$\times\ 4$	$\times\ 4$
6	96	896

Step 1: 4×4 ones = 16 ones = 1 ten and 6 ones
Write the 6 ones in the product and carry the one ten.

Step 2: 4×2 tens = 8 tens
8 tens + 1 ten we carried = 9 tens

Step 3: 4×2 hundreds = 8 hundreds

Example C: $4 \times 456 =$ _____

$\overset{3}{456}$	$\overset{2\ 3}{456}$	$\overset{2\ 3}{456}$
$\times\ 5$	$\times\ 5$	$\times\ 5$
0	80	2 280

Step 1: 5×6 ones = 30 ones = 3 tens and 0 ones
The **0** must be written to hold the ones place.
Carry the 3 tens.

Step 2: 5×5 tens = 25 tens
25 tens + 3 tens = 28 tens = 2 hundreds and 8 tens
Write the 8 tens in the product. Carry the 2 hundreds.

Step 3: 5×4 hundreds = 20 hundreds + 2 hundreds = 22 hundreds
= 2 thousands and 2 hundreds

Exercise Seven

Find the products. Check your work using the answer key at the end of the exercise.

a)	648 × 9	b)	240 × 7	c)	457 × 8	d)	404 × 2
e)	106 × 9	f)	156 × 4	g)	407 × 8	h)	239 × 6
i)	118 × 9	j)	425 × 7	k)	139 × 8	l)	565 × 2
m)	248 × 3	n)	604 × 6	o)	239 × 4	p)	576 × 3
q)	857 × 6	r)	478 × 9	s)	674 × 7	t)	629 × 8
u)	893 × 5	v)	583 × 8	w)	952 × 9	x)	293 × 7

Answers to Exercise Seven

a) 5 832	b) 1 680	c) 3 656	d) 808	e) 954	f) 624
g) 3 256	h) 1 434	i) 1 062	j) 2 975	k) 1 112	l) 1 130
m) 744	n) 3 624	o) 956	p) 1 728	q) 5 142	r) 4 302
s) 4 718	t) 5 032	u) 4 465	v) 4 664	w) 8 568	x) 2 051

Exercise Eight

Find the products. Check your work using the answer key at the end of the exercise.

a) 975 × 2	b) 409 × 4	c) 167 × 5	d) 473 × 9
e) 483 × 8	f) 256 × 3	g) 739 × 6	h) 378 × 7
i) 839 × 4	j) 426 × 7	k) 396 × 9	l) 627 × 8
m) 378 × 3	n) 586 × 6	o) 976 × 2	p) 683 × 5

q) $\begin{array}{r} 475 \\ \times\ 4 \\ \hline \end{array}$ r) $\begin{array}{r} 385 \\ \times\ 2 \\ \hline \end{array}$ s) $\begin{array}{r} 472 \\ \times\ 6 \\ \hline \end{array}$ t) $\begin{array}{r} 519 \\ \times\ 8 \\ \hline \end{array}$

u) $\begin{array}{r} 258 \\ \times\ 9 \\ \hline \end{array}$ v) $\begin{array}{r} 697 \\ \times\ 3 \\ \hline \end{array}$ w) $\begin{array}{r} 943 \\ \times\ 7 \\ \hline \end{array}$ x) $\begin{array}{r} 294 \\ \times\ 5 \\ \hline \end{array}$

Answers to Exercise Eight

a) 1 950	b) 1 636	c) 835	d) 4 257	e) 3 864	f) 768
g) 4 434	h) 2 646	i) 3 356	j) 2 982	k) 3 564	l) 5 016
m) 1 134	n) 3 516	o) 1 952	p) 3 415	q) 1 900	r) 770
s) 2 832	t) 4 152	u) 2 322	v) 2 091	w) 6 601	x) 1 470

Example D: $9 \times 2\,408 =$ _____

$$\begin{array}{r} {\scriptstyle 3\ \ 7} \\ 2\,408 \\ \times\ \ 9 \\ \hline 21\,672 \end{array}$$

Step 1: 9×8 ones = 72 ones = 7 tens and 2 ones

Step 2: $9 \times 0 = 0$ tens
0 tens + 7 tens = 7 tens

Step 3: 9×4 hundreds = 36 hundreds = 3 thousands and 6 hundreds

Step 4: 9×2 thousands = 18 thousands
18 thousands + 3 thousands = 21 thousands

Exercise Nine

Find the products. Check your work using the answer key at the end of the exercise.

a) $4\,103 \times 8$

b) $6\,087 \times 4$

c) $3\,280 \times 6$

d) $7\,034 \times 5$

e) $8\,456 \times 2$

f) $4\,758 \times 7$

g) $4\,735 \times 3$

h) $5\,402 \times 9$

i) $5\,394 \times 4$

j) $2\,034 \times 8$

k) $8\,652 \times 5$

l) $6\,392 \times 7$

m) $4\,187 \times 6$

n) $1\,376 \times 9$

o) $3\,297 \times 2$

p) 9 628 × 3

q) 7 689 × 8

r) 5 160 × 3

s) 4 256 × 7

t) 5 491 × 5

u) 8 032 × 9

v) 8 645 × 6

w) 6 453 × 2

x) 8 129 × 4

Answers to Exercise Nine

a) 32 824	b) 24 348	c) 19 680	d) 35 170	e) 16 912	f) 33 306
g) 14 205	h) 48 618	i) 21 576	j) 16 272	k) 43 260	l) 44 744
m) 25 122	n) 12 384	o) 6 594	p) 28 884	q) 61 512	r) 15 480
s) 29 792	t) 27 455	u) 72 288	v) 51 870	w) 12 906	x) 32 516

Topic A: Self-Test

Mark /14 **Aim 11/14**

A. Find the products. **6 marks**

a) 62×4

b) 31×4

c) 423×3

d) 734×2

e) $8\,342 \times 2$

f) $5\,231 \times 3$

B. Multiply these numbers. **4 marks**

a) 44×7

b) 69×8

c) 207×9

d) 184×6

C. Find the products. **4 marks**

a) $2\,834 \times 5$

b) $4\,037 \times 6$

c) $9\,241 \times 8$

d) $3\,652 \times 4$

Answers to Topic A Self-Test

A.

a) 248 b) 124 c) 1 269 d) 1 468 e) 16 684 f) 15 693

B.

a) 308 b) 552 c) 1 863 d) 1 104

C.

a) 14 170 b) 24 222 c) 73 928 d) 14 608

Topic B: Two and Three Digit Multipliers

When the multiplier is more than one digit, you use the same process and get **partial products.** You repeat the steps until you have multiplied by every digit, then add the partial products together.

Example A: $23 \times 24 =$ _____

Part I **Multiply by the ones digit** in the multiplier.
Multiply 3 ones $\times$ 24 using the method you already know.
The first partial product is 72.

$$\begin{array}{r} \not{2}\not{4} \\ \times \quad 23 \\ \hline 72 \end{array}$$

Part II **Multiply by the tens digit** in the multiplier.
First, **put a 0 to hold the ones place in your partial product.**
We are multiplying by a ten, so we hold the ones place.

Step 1: Multiply 2 tens $\times$ 4 ones = 8 tens
Write the 8 tens under the tens in your first partial product. It is very important to keep the columns straight – ones under one, tens under tens.

Step 2: Multiply 2 tens $\times$ 2 tens = 4 **hundreds**
Write the 4 hundreds in your partial product.
The second partial product is 480.

II

$$\begin{array}{r} \not{2}\not{4} \\ \times \quad 23 \\ \hline 72 \\ 48\mathbf{0} \end{array}$$

Part III **Add the partial products together,** being sure to add ones to ones, tens to tens, hundreds to hundreds. The sum is the final product.

- Draw a line under the partial products
- Add
- Check your addition

III

$$\begin{array}{r} {\scriptstyle 1} \\ 24 \\ \times\ 23 \\ \hline 72 \\ 480 \\ \hline 552 \end{array}$$

$24 \times 23 = 552$

Example B: $36 \times 425 =$ _____

Part I Multiply by the **ones digit** in the multiplier. $6 \times 425 = 2\,550$

I

$$\begin{array}{r} {\scriptstyle 1\ 3} \\ 425 \\ \times\ 36 \\ \hline 2\,550 \end{array}$$

Part II Multiply by the **tens digit** in the multiplier.
First put a **0** to hold the ones place in the second partial product.

Step 1: 3 tens $\times$ 5 tens = 15 tens = 1 hundred and 5 tens
Write the 5 tens in the second partial product and carry the 1 hundred. Now you can see why it is best to cross out the numbers you carry as soon as you have added them to the product.

Step 2: 3 tens $\times$ 2 tens = 6 **hundreds**
6 hundreds + 1 hundred (carried) = 7 hundreds
nothing to carry

Step 3: 3 tens $\times$ 4 hundreds = 12 **thousands**

$$
\begin{array}{ll}
 & \overset{1}{} \\
 & 1\ \not{3} \\
\textbf{II} & 425 \\
 & \times\ 36 \\
\hline
 & 2\,550 \\
 & \underline{12\,75\mathbf{0}} \\
\textbf{III} & 15\,300
\end{array}
$$

Part III Add the partial products together.

$36 \times 425 = 15\,300$

Keeping the columns straight with ones under ones, tens under tens, hundreds under hundreds is very important. Working on large-squared graphing paper using one digit per square is often helpful.

tens $\times$ tens = hundreds
tens $\times$ hundreds = thousands

Exercise One

Multiply, being very careful to keep the columns straight when you write your partial products. Check your work using the answer key at the end of the exercise.

a) 84×12

168
840
1 008

b) 73×12

c) 50×42

d) 62×31

e) 61×42

f) 91×53

g) 92×31

h) 91×49

i) 72×48

j) 53×30

k) 41×53

l) 42×94

m) 80×86

n) 31×79

o) 54×40

p) 61×48

q) 60×31

r) 55×73

s) 84×56

t) 53×38

Answers to Exercise One

a) 1 008	b) 876	c) 2 100	d) 1 922	e) 2 562	f) 4 823
g) 2 852	h) 4 459	i) 3 456	j) 1 590	k) 2 173	l) 3 948
m) 6 880	n) 2 449	o) 2 160	p) 2 928	q) 1 860	r) 4 015
s) 4 704	t) 2 014				

Exercise Two

Multiply, being very careful to keep the columns straight when you write your partial products. Check your work using the answer key at the end of the exercise.

a) 26 × 65	b) 73 × 17	c) 57 × 96	d) 83 × 24
e) 49 × 78	f) 58 × 57	g) 73 × 85	h) 48 × 39
i) 93 × 46	j) 86 × 97	k) 51 × 18	l) 56 × 69
m) 26 × 72	n) 92 × 28	o) 75 × 52	p) 78 × 36

q)	87	r)	64	s)	39	t)	49
	× 41		× 86		× 59		× 71

Answers to Exercise Two

a) 1 690	b) 1 241	c) 5 472	d) 1 992	e) 3 822	f) 3 306
g) 6 205	h) 1 872	i) 4 278	j) 8 342	k) 918	l) 3 864
m) 1 872	n) 2 576	o) 3 900	p) 2 808	q) 3 567	r) 5 504
s) 2 301	t) 3 479				

When the multiplier has a zero in the ones place, use this shortcut.

Example A:

$$\begin{array}{r} 48 \\ \times\ 80 \\ \hline \mathbf{3\,840} \end{array}$$

Step 1: 0 ones × 48 = **0**
Place one zero in the product and that will hold the ones place.

Step 2: Multiply by the tens digit and write the product beside the zero.

Example B:

$$\begin{array}{r} 97 \\ \times\ 20 \\ \hline 1\,94\mathbf{0} \end{array}$$

Exercise Three

Find the products. Use the shortcut for multipliers with a zero in them. Check your work using the answer key at the end of the exercise.

a)	76 × 70 = 5 32**0**	b)	52 × 10 =	c)	91 × 40 =	d)	83 × 60 =
e)	49 × 50 =	f)	61 × 30 =	g)	16 × 90 =	h)	36 × 80 =
i)	398 × 10 =	j)	432 × 20 =	k)	863 × 50 =	l)	907 × 30 =
m)	503 × 40 =	n)	452 × 80 =	o)	943 × 70 =	p)	248 × 90 =
q)	6 287 × 40 =	r)	9 025 × 60 =	s)	8 907 × 80 =	t)	300 × 90 =
u)	9 075 × 20 =	v)	3 952 × 30 =	w)	1 528 × 70 =	x)	7 106 × 10 =

Answers to Exercise Three

a) 5 320	b) 520	c) 3 640	d) 4 980	e) 2 450	f) 1 830
g) 1 440	h) 2 880	i) 3 980	j) 8 640	k) 43 150	l) 27 210
m) 20 120	n) 36 160	o) 66 010	p) 22 320	q) 251 480	r) 541 500
s) 712 560	t) 27 000	u) 181 500	v) 118 560	w) 106 960	x) 71 060

How are you doing? Ask your instructor for help if you are not comfortable with multiplying.

Exercise Four

Here is more practice for you. Find the products. Use the shortcut for multipliers with a zero in them. Check your work using the answer key at the end of the exercise.

a) 225 × 59

b) 342 × 80

c) 401 × 94

d) 970 × 52

e) 138 × 21

f) 852 × 10

g) 206 × 37

h) 71 × 86

i) 47 × 38

j) 38 × 36

k) 58 × 90

l) 45 × 19

m)	63 × 20	n)	19 × 84	o)	258 × 95
p)	408 × 86	q)	600 × 61	r)	107 × 21
s)	129 × 37	t)	246 × 92	u)	182 × 54
v)	3 605 × 23	w)	1 268 × 36	x)	8 902 × 75
y)	2 514 × 40	z)	3 004 × 51	aa)	1 408 × 90

Answers to Exercise Four

a) 13 275	b) 27 360	c) 37 694	d) 50 440	e) 2 898
f) 8 520	g) 7 622	h) 6 106	i) 1 786	j) 1 368
k) 5 220	l) 855	m) 1 260	n) 1 596	o) 24 510
p) 35 088	q) 36 600	r) 2 247	s) 4 773	t) 22 632
u) 9 828	v) 82 915	w) 45 648	x) 667 650	y) 100 560
z) 153 204	aa) 126 720			

To multiply by three digit multipliers, use the same method with one more part.

$417 \times 368 =$ _____

$$\begin{array}{r} 417 \\ \times\ 368 \\ \hline 3\,336 \\ 25\,02\mathbf{0} \\ \underline{125\,1\mathbf{00}} \\ 153\,456 \end{array}$$

Part I Multiply by the 8 ones.

Part II Multiply the 6 tens; hold the ones place with **0**.

Part III Multiply by the 3 hundreds.
Put **00** to hold the ones and tens places in the third partial product.

Step 1: 3 hundreds $\times$ 7 ones = 21 hundreds = 2 thousands and 1 hundred
Write the 1 hundred and carry the 2 thousands.

Step 2: 3 hundreds $\times$ 1 ten = 3 thousands
3 thousands + 2 thousands (carried = 5 thousands

Step 3: 3 hundreds $\times$ 4 hundreds = 12 **ten thousands**

Part IV Add the partial products.

Exercise Five

Find the products. Check your work using the answer key at the end of the exercise.

a) 416 × 213

b) 375 × 291

c) 361 × 475

d) 275 × 863

e) 984 × 469

f) 489 × 578

g) 498 × 123

h) 267 × 854

i) 613 × 368

j) 725 × 547

k) 269 × 912

l) 752 × 697

m) 983 × 357

n) 835 × 148

o) 386 × 296

Answers to Exercise Five

a) 88 608	b) 109 125	c) 171 475	d) 237 325	e) 461 496
f) 282 642	g) 61 254	h) 228 018	i) 225 584	j) 396 575
k) 245 328	l) 524 144	m) 350 931	n) 123 580	o) 114 256

Exercise Six

Find the products. Check your work using the answer key at the end of the exercise.

a) $\begin{array}{r} {\scriptstyle 1\ \not{3}\ \not{2}\ \ 6\ 4} \\ 3\,176 \\ \times\ 184 \\ \hline 12\,704 \\ 254\,080 \\ 317\,600 \\ \hline 584\,384 \end{array}$

b) $\begin{array}{r} 2\,090 \\ \times\ 257 \\ \hline \end{array}$

c) $\begin{array}{r} 3\,569 \\ \times\ 524 \\ \hline \end{array}$

d) $\begin{array}{r} 5\,480 \\ \times\ 271 \\ \hline \end{array}$

e) $\begin{array}{r} 9\,274 \\ \times\ 626 \\ \hline \end{array}$

f) $\begin{array}{r} 5\,169 \\ \times\ 145 \\ \hline \end{array}$

g) $\begin{array}{r} 7\,032 \\ \times\ 893 \\ \hline \end{array}$

h) $\begin{array}{r} 5\,261 \\ \times\ 397 \\ \hline \end{array}$

i) $\begin{array}{r} 7\,036 \\ \times\ 123 \\ \hline \end{array}$

j) 8 921 × 232

k) 4 736 × 247

l) 5 793 × 347

m) 2 973 × 341

n) 5 907 × 308

o) 5 361 × 213

Answers to Exercise Six

a) 584 384	b) 537 130	c) 1 870 156	d) 1 485 080	e) 5 805 524
f) 749 505	g) 6 279 576	h) 2 088 617	i) 865 428	j) 2 069 672
k) 1 169 792	l) 2 010 171	m) 1 013 793	n) 1 819 356	o) 1 141 893

You know to hold the ones place with a zero if the multiplier has a zero in the ones place. Use the same skill if the multiplier has a zero in the **tens** place.

927 × 405 = _____

$$\begin{array}{r} 927 \\ \times\ 405 \\ \hline 4\,635 \\ 370\,8\mathbf{00} \\ \hline 375\,435 \end{array}$$

Part I Multiply by the 5 ones.

Part II Multiply by the 0 tens.

- Hold the ones place with a 0.
- $0 \times 927 = 0$

  Place one zero in the tens place in the second partial product.

Part III Multiply by the 4 hundreds. The ones and tens places are already held by zeros. Start this partial product in the hundreds place on the same line.

Part IV Add the partial products.

Exercise Seven

Find the products. Check your work using the answer key at the end of the exercise.

a)
$$\begin{array}{r} {\scriptstyle 2\ 2} \\ 698 \\ \times\ 301 \\ \hline 698 \\ 209\,4\mathbf{0}0 \\ \hline 210\,098 \end{array}$$

b)
$$\begin{array}{r} 923 \\ \times\ 403 \\ \hline \end{array}$$

c)
$$\begin{array}{r} 830 \\ \times\ 108 \\ \hline \end{array}$$

d)	482 × 206	e)	432 × 205	f)	625 × 409
g)	175 × 408	h)	765 × 506	i)	1 576 × 702
j)	432 × 405	k)	625 × 409	l)	175 × 408
m)	5 874 × 309	n)	7 384 × 104	p)	6 538 × 603

Answers to Exercise Seven

a) 210 098	b) 371 969	c) 89 640	d) 99 292	e) 88 560
f) 255 625	g) 71 400	h) 387 090	i) 1 106 352	j) 174 960
k) 255 625	l) 71 400	m) 1 815 066	n) 767 936	o) 3 942 414

Multiplying by 10, 100, and 1 000

Exercise Eight

Do the following questions and see if you can find the pattern. Check your work using the answer key at the end of the exercise.

a) $83 \times 10 = 830$

b) 46×10

c) 97×10

d) 123×10

e) 70×10

f) 129×10

g) $1\,852 \times 10$

h) $29\,871 \times 10$

i) 45×100

j) 26×100

k) 432×100

l) 679×100

m) $2\,482 \times 100$

n) $9\,037 \times 100$

o) $46\,207 \times 100$

p) $97\,512 \times 100$

q) $23 \times 1\,000$

r) $452 \times 1\,000$

s)	207 × 1 000	t)	348 × 1 000	u)	2 118 × 1 000
v)	2 431 × 1 000	w)	23 681 × 1 000	x)	48 203 × 1 000

Answers to Exercise Eight

a) 830	b) 460	c) 970	d) 1 230	e) 700
f) 1 290	g) 18 520	h) 298 710	i) 4 500	j) 2 600
k) 43 200	l) 67 900	m) 248 200	n) 903 700	o) 4 620 700
p) 9 751 200	q) 23 000	r) 452 000	s) 207 000	t) 348 000
u) 2 118 000	v) 2 431 000	w) 23 681 000	x) 48 203 000	

This pattern gives us a very useful shortcut …

When multiplying a number by 10, 100, and 1 000, place as many zeros to the right of the number as there are zeros in the 10, 100, and 1 000.

- To multiply by 10 put one zero after the number.
- To multiply by 100 put two zeros after the number.
- To multiply by 1 000 put three zeros after the number.

Exercise Nine Find the products using the shortcut. Do not rewrite the questions.
Check your work using the answer key at the end of the exercise.

a) $12 \times 10 =$ *120*

b) $10 \times 3\,175 =$ _____

c) $162 \times 10 =$ _____

d) $10 \times 53\,821 =$ _____

e) $10 \times 123 =$ _____

f) $27\,342 \times 10 =$ _____

g) $10 \times 98 =$ _____

h) $1\,134 \times 10 =$ _____

i) $15 \times 100 =$ _____

j) $100 \times 278 =$ _____

k) $9\,134 \times 100 =$ _____

l) $651 \times 100 =$ _____

m) $100 \times 5\,169 =$ _____

n) $100 \times 24\,815 =$ _____

o) $10 \times 905 =$ _____

p) $45\,683 \times 10 =$ _____

q) $1\,000 \times 87 =$ _____

r) $521 \times 1\,000 =$ _____

s) $1\,000 \times 68\,935 =$ _____

t) $1\,000 \times 8\,902 =$ _____

u) $1\,576 \times 1\,000 =$ _____

v) $31\,584 \times 1\,000 =$ _____

w) $1\,000 \times 426 =$ _____

x) $72 \times 1\,000 =$ _____

Answers to Exercise Nine

a) 120	b) 31 750	c) 1 620	d) 538 210	e) 1 230
f) 273 420	g) 980	h) 11 340	i) 1 500	j) 27 800
k) 913 400	l) 65 100	m) 516 900	n) 2 481 500	o) 9 050
p) 456 830	q) 87 000	r) 521 000	s) 68 935 000	t) 8 902 000
u) 1 576 000	v) 31 584 000	w) 426 000	x) 72 000	

Topic B: Self-Test

Mark /12 **Aim 10/12**

A. Multiply these numbers.

a) 47 × 39

b) 58 × 93

c) 48 × 100

d) 982 × 1 000

e) 678 × 39

f) 4 579 × 86

g) 8 703 × 93

h) 7 390 × 85

i) 8 047 × 236

j) 4 238 × 197

k) 8 200 × 444

l) 7 365 × 409

Answers to Topic B Self-Test

A.

a) 1 833 b) 5 394 c) 4 800 d) 982 000 e) 26 442

f) 393 794 g) 809 379 h) 628 150 i) 1 899 092 j) 834 886

k) 3 640 800 l) 3 012 285

Topic C: Estimating Products

Before you practice estimating products, look at the easy multiplication that can be done when the factors end in zeros.

You already know how to quickly multiply by 10, 100, 1 000, etc, using the shortcut.

And you can find the products in questions like these using regular multiplication:

400	500	1 600
× 20	× 200	× 2 000
8 000	100 000	3 200 000

But you can also use the same shortcut:

- Count all the zeros at the **end** of the numbers in both factors.
- Write down that many zeros at the end of the product.
- Multiply the other digits in the usual way and put them before the zeros.

Example A: $30 \times 500 =$ _____

- How many zeros at the end of the factors? **3**
- Write them down. **000**
- Multiply the other digits and put them before the zeros.

  $3 \times 5 = 15$

  $30 \times 500 = 15$ **000**

Example B: $400 \times 3\,000 =$ _____

- How many zeros at the end of the factors? **5**
- **00000**
- $4 \times 3 = 12$
  $400 \times 3\,000 = 1\,2$**00 000**

Exercise One

Find the products using the shortcut. Check your work using the answer key at the end of the exercise.

a) 300 × 20 — *6 **000***

b) 6 000 × 200

c) 210 × 20

d) 800 × 600

e) 400 × 500

f) 6 000 × 90

g) 50 000 × 6 000

h) 80 000 × 30

i) 5 000 × 50

j) 70 × 80

k) 3 000 × 700

l) 50 000 × 900

m) 9 000 × 8 000

n) 60 000 × 90

o) 90 000 × 2 000

p) 600 × 600

q) 40 000 × 800

r) 2 400 × 70

s) 390 × 40

t) 7 200 × 5 000

u) 7 000 × 7 000

v) 61 000 × 400

w) 5 200 × 300

x) 40 × 60

Answers to Exercise One

a) 6 000	b) 1 200 000	c) 4 200	d) 480 000	e) 200 000
f) 540 000	g) 300 000 000	h) 2 400 000	i) 250 000	j) 5 600
k) 2 100 000	l) 45 000 000	m) 72 000 000	n) 5 400 000	o) 180 000 000
p) 360 000	q) 32 000 000	r) 168 000	s) 15 600	t) 36 000 000
u) 49 000 000	v) 24 400 000	w) 1 560 000	x) 2 400	

To find an estimated product, round the factors **before** you multiply.

If a factor has only one digit, do not round it.

6 258	rounds to	6 000
× 3	leave as	× 3
	estimated product is	18 000

491	rounds to	500
× 24	rounds to	× 20
	estimated product is	10 000

Exercise Two

Find an estimated product. Check your work using the answer key at the end of the exercise.

a) $\begin{array}{r} 78 \\ \times\ 34 \\ \hline \end{array}$ $\approx$ $\begin{array}{r} 80 \\ \times\ 30 \\ \hline 2\,400 \end{array}$

b) $\begin{array}{r} 682 \\ \times\ 63 \\ \hline \end{array}$

c) $\begin{array}{r} 448 \\ \times\ 133 \\ \hline \end{array}$

d) $\begin{array}{r} 2\,437 \\ \times\ 33 \\ \hline \end{array}$

e) $\begin{array}{r} 8\,287 \\ \times\ 88 \\ \hline \end{array}$

f) $\begin{array}{r} 9\,713 \\ \times\ 12 \\ \hline \end{array}$

g) $\begin{array}{r} 987 \\ \times\ 346 \\ \hline \end{array}$

h) $\begin{array}{r} 324 \\ \times\ 286 \\ \hline \end{array}$

i) $\begin{array}{r} 4\,338 \\ \times\ 514 \\ \hline \end{array}$

j) $\begin{array}{r} 2\,642 \\ \times\ 397 \\ \hline \end{array}$

k) $\begin{array}{r} 4\,368 \\ \times\ 268 \\ \hline \end{array}$

l) $\begin{array}{r} 9\,048 \\ \times\ 370 \\ \hline \end{array}$

m) $\begin{array}{r} 31\,968 \\ \times\ 272 \\ \hline \end{array}$

n) $\begin{array}{r} 435 \\ \times\ 92 \\ \hline \end{array}$

o) 67 × 21

p) 698 × 75

q) 1 864 × 23

r) 92 167 × 492

s) 45 530 × 581

t) 75 648 × 69

Answers to Exercise Two

a) 80 x 30 = 2 400

b) 700 x 60 = 42 000

c) 400 x 100 = 40 000

d) 2 000 x 30 = 60 000

e) 8 000 x 90 = 720 000

f) 10 000 x 10 = 100 000

g) 1 000 x 300 = 300 000

h) 300 x 300 = 90 000

i) 4 000 x 500 = 2 000 000

j) 3 000 x 400 = 1 200 000

k) 4 000 x 300 = 1 200 000

l) 9 000 x 400 = 3 600 000

m) 30 000 x 300 = 9 000 000

n) 400 x 90 = 36 000

o) 70 x 20 = 1 400

p) 700 x 80 = 56 000

q) 2 000 x 20 = 40 000

r) 90 000 x 500 = 45 000 000

s) 50 000 x 600 = 30 000 000

t) 80 000 x 70 = 5 600 000

Topic C: Self-Test

Mark /18 **Aim 15/18**

A. Multiply these numbers. **6 marks**

a) 600 × 70

b) 9 000 × 30

c) 5 000 × 600

d) 3 000 × 500

e) 400 × 50

f) 8 000 × 1 000

B. Find an estimated product. **12 marks**

a) 87 × 23

b) 268 × 25

c) 9 421 × 75

d) 2 632 × 49

e) 365
× 455

f) 7 264
× 590

Answers to Topic C Self-Test

A.

a) 42 000 b) 270 000 c) 3 000 000 d) 1 500 000 e) 20 000
f) 8 000 000

B.

a) 90 x 20 = 1 800
b) 300 x 30 = 9 000
c) 9 000 x 80 = 720 000
d) 3 000 x 50 = 150 000
e) 400 x 500 = 200 000
f) 7 000 x 600 = 4 200 000

Topic D: Multiplication Problems

Multiplication problems usually give information for **one** unit and ask information for many units. For example, you may be given an **average** distance for one hour and asked for a distance for six hours. You may be given the price for one item and asked the price for 96 items.

Remember that multiplication is **fast addition of equal amounts.** Key words for addition may also point to multiplication.

Key Words That Point to Multiplication

altogether	combined	in all
total	the average is	product
how many?	how much?	each

Exercise One

Do these problems by following the five problem solving steps. Remember to (circle) the information and underline what is being asked. Be sure to write down your estimation **before** you find the actual solution. Check your work using the answer key at the end of the exercise.

a) Maria spent $151 a month to ride to work. How much did it cost her to ride to work for the whole year? (1 year = 12 months)

b) Fred travels 121 km a day on his delivery route. How far does he travel in 5 working days?

c) Manuel buys 340 L of gas a month. In 6 months, how many litres of gas does Manual buy?

d) An apartment building has 16 apartments, each rented for $870 a month. What is the total monthly rental income from this building?

e) A farmer sells potatoes at $53 per 50 kg sack. How much will he get for 75 sacks?

f) Bob is paid $12 per hour. If he worked 39 hours last week and 24 hours this week, how much did he earn for the two weeks? (two operations)

g) It costs $35 260 per working day to run the factory. How much does it cost to run this factory for a month of 23 working days?

h) The train has an average speed of 75 km an hour. How far does this train travel in 14 hours?

i) Lee's sports car averages 18 km per litre. How far can she drive on 12 L of gasoline?

j) Frank bought a used car and paid for it over 15 months. He made 15 monthly payments of $325 each. How much did he pay?

k) Tickets for the rock concert were $54 each. The number of tickets sold was 15 370. How much money was made in ticket sales?

l) Bob is a jogger. He jogs 10 km each day, rain, shine or holidays! How many kilometres does he jog in 1 year? (1 year = 365 days)

m) Bill is painting all the 49 apartments in a building. Each apartment uses 9 L of paint. The paint costs $8 per litre. How much paint will he need to paint all the apartments?

n) If an airplane's average speed is 475 km/h, how far will it travel in 9 hours?

o) Sound travels 320 m per second. How far does it travel in 1 minute?
(1 minute = 60 seconds)

p) Sara wants to carpet her new living room. The room is 7 metres by 6 metres. How much carpet will she need?

Answers to Exercise One

a)	$1 812	b)	605 km	c)	2 040 L	d)	$13 920
e)	$3 975	f)	$756	g)	$810, 980	h)	1 050 km
i)	216 km	j)	$4 875	k)	$829 980	l)	3 650 km
m)	441 L	n)	4 275 km	o)	19 200 m	p)	42 sq m

Topic D: Self-Test

Mark /8 **Aim 6/8**

A. Solve these problems. Show all your work. Give yourself one mark for the correct method and one mark for the correct answer. 8 marks

a) A freight train has 70 cars. Each car can hold 22 680 kilograms of cargo. How much cargo can the train hold in all?

b) The highway distance between Fernie and Edmonton is 621 kilometres. How many kilometres will a bus travel in 68 trips from Fernie to Edmonton?

c) A tanker truck made 275 trips in one year. The truck hauled 23 800 litres each time. How many litres did the truck haul during the year?

d) The college cafeteria hopes to serve 425 people each day. **Estimate** how many meals will be served if the cafeteria is open 175 days.

Answers to Topic D Self-Test

A.

a) 1 587 600 kilograms

b) 42 228 kilometres

c) 6 545 000 litres

d) 400 x 200 = 80 000 meals

Unit 2 Review - Multiplication

You will now practice all the skills you learned in Unit 2. Check your work using the answer key at the end of the review.

A. Find the products.

a) $\begin{array}{r} 81 \\ \times\ 5 \\ \hline \end{array}$

b) $\begin{array}{r} 73 \\ \times\ 3 \\ \hline \end{array}$

c) $\begin{array}{r} 441 \\ \times\ 2 \\ \hline \end{array}$

d) $\begin{array}{r} 512 \\ \times\ 4 \\ \hline \end{array}$

e) $\begin{array}{r} 9\,342 \\ \times\ 2 \\ \hline \end{array}$

f) $\begin{array}{r} 8\,132 \\ \times\ 3 \\ \hline \end{array}$

B. Find the products.

a) $\begin{array}{r} 48 \\ \times\ 7 \\ \hline \end{array}$

b) $\begin{array}{r} 78 \\ \times\ 9 \\ \hline \end{array}$

c) $\begin{array}{r} 892 \\ \times\ 8 \\ \hline \end{array}$

d) $\begin{array}{r} 536 \\ \times\ 6 \\ \hline \end{array}$

e) $\begin{array}{r} 2\,375 \\ \times\ 4 \\ \hline \end{array}$

f) $\begin{array}{r} 5\,649 \\ \times\ 3 \\ \hline \end{array}$

C. Find the products.

a) $\begin{array}{r} 67 \\ \times\ 19 \\ \hline \end{array}$

b) $\begin{array}{r} 581 \\ \times\ 34 \\ \hline \end{array}$

c) $\begin{array}{r} 7\,310 \\ \times\ 46 \\ \hline \end{array}$

d) $\begin{array}{r} 754 \\ \times\ 692 \\ \hline \end{array}$

e) $\begin{array}{r} 2\,735 \\ \times\ 846 \\ \hline \end{array}$

f) $\begin{array}{r} 857 \\ \times\ 308 \\ \hline \end{array}$

g) $\begin{array}{r} 629 \\ \times\ 407 \\ \hline \end{array}$

h) $\begin{array}{r} 2\,805 \\ \times\ 15 \\ \hline \end{array}$

i) $\begin{array}{r} 5\,102 \\ \times\ 743 \\ \hline \end{array}$

D. Find the products. Use the shortcut.

a) $\begin{array}{r} 1\,000 \\ \times\ 82 \\ \hline \end{array}$

b) $\begin{array}{r} 100 \\ \times\ 26 \\ \hline \end{array}$

c) $\begin{array}{r} 6\,263 \\ \times\ 1\,000 \\ \hline \end{array}$

d) $407 \times 100 =$

e) $100 \times 9\,482 =$

f) $3\,614 \times 10 =$

g) $1\,000 \times 1\,795 =$

E. Find the products. Use the shortcut.

a) $\begin{array}{r} 50 \\ \times\ 40 \\ \hline \end{array}$

b) $\begin{array}{r} 600 \\ \times\ 800 \\ \hline \end{array}$

c) $\begin{array}{r} 9\,000 \\ \times\ 500 \\ \hline \end{array}$

F. Find an estimated product.

a) $\begin{array}{r} 68 \\ \times\ 39 \\ \hline \end{array}$

b) $\begin{array}{r} 185 \\ \times\ 94 \\ \hline \end{array}$

c) $\begin{array}{r} 6\,763 \\ \times\ 69 \\ \hline \end{array}$

d) $\begin{array}{r} 853 \\ \times\ 399 \\ \hline \end{array}$

e) $\begin{array}{r} 2\,735 \\ \times\ 846 \\ \hline \end{array}$

f) $\begin{array}{r} 68\,924 \\ \times\ 268 \\ \hline \end{array}$

G. Word Problems.

a) The Yellow River in China is 5 464 kilometres long. How many kilometres will 75 boats cover if they travel the length of the river?

b) Mount Logan in Canada is 5 959 metres high. How many metres would 24 climbers cover if they were able to climb to the top of Mt. Logan?

c) How many pieces of candy are needed to pack 500 boxes, if each box has 8 rows and each row has 15 pieces of candy? (2-step question)

d) The distance between Prince Rupert and Kelowna is 1 409 km. Estimate how many kilometres 42 trucks will travel if each truck makes one trip.

Answers to Unit 2 Review

A.

a) 405 b) 219 c) 882 d) 2 048 e) 18 684 f) 24 396

B.

a) 336 b) 702 c) 7 136 d) 3 216 e) 9 500 f) 16 947

C.

a) 1 273 b) 19 754 c) 336 260 d) 521 768 e) 2 313 810
f) 263 956 g) 256 003 h) 42 075 i) 3 790 786

D.

a) 82 000 b) 2 600 c) 6 263 000 d) 40 700 e) 948 200
f) 36 140 g) 1 795 000

E.

a) 2 000 b) 480 000 c) 4 500 000

F.

a) 70 x 40 = 2 800 b) 200 x 90 = 18 000
c) 7 000 x 70 = 490 000 d) 900 x 400 = 360 000
e) 3 000 x 800 = 2 400 000 f) 70 000 x 300 = 21 000 000

G.

a) 409 800 kilometres
b) 143 016 metres or 286 032 there and back
c) 60 000 pieces of candy
d) 1 000 x 40 = 40 000 kilometres

CONGRATULATIONS!!

Now you have finished Unit 2.

TEST TIME!

Ask your instructor for the Practice Test for this unit.
Once you've done the practice test,
you need to do the unit 2 test.
Again, ask your instructor for this.
Good luck!