6. [Large Number ×,÷]

Skill 6.1 Multiplying a large number by a power of 10.

When the multiplication is displayed in a **horizontal line**:

- Add the same number of zeros at the end of the given number as there are zeros in the power of 10.

When the multiplication is displayed in a **vertical algorithm**:

- Move each digit of the given number as many places to the left as there are zeros in the power of 10.
- Add zeros as place holders in the vacated places.

Q. $376 \times 1000 =$

A. $376 \times 1000 = 376000$ (Add 3 zeros)

$$\begin{array}{r} 3\ 7\ 6 \\ \times\ 1\ 0\ 0\ 0 \\ \hline 3\ 7\ 6\ 0\ 0\ 0 \end{array}$$

(Move 3, 7, 6 three places left; Add 3 zeros at the end of 376)

a) $318 \times 10 =$ 3180

$$\begin{array}{r} 3\ 1\ 8 \\ \times\ \ 1\ 0 \\ \hline 3\ 1\ 8\ 0 \end{array}$$

Add 1 zero

b) $2040 \times 10 =$ ____

$$\begin{array}{r} 2\ 0\ 4\ 0 \\ \times\ \ \ 1\ 0 \\ \hline \ \ \ \ \ 0 \end{array}$$

c) $9080 \times 10 =$ ____

$$\begin{array}{r} 9\ 0\ 8\ 0 \\ \times\ \ \ 1\ 0 \\ \hline \end{array}$$

d) $238 \times 100 =$ ____

$$\begin{array}{r} 2\ 3\ 8 \\ \times\ 1\ 0\ 0 \\ \hline \ \ \ \ 0\ 0 \end{array}$$

Add 2 zeros

e) $7015 \times 100 =$ ____

$$\begin{array}{r} 7\ 0\ 1\ 5 \\ \times\ \ 1\ 0\ 0 \\ \hline \end{array}$$

f) $4619 \times 100 =$ ____

$$\begin{array}{r} 4\ 6\ 1\ 9 \\ \times\ \ 1\ 0\ 0 \\ \hline \end{array}$$

g) $179 \times 1000 =$ ____

$$\begin{array}{r} 1\ 7\ 9 \\ \times\ 1\ 0\ 0\ 0 \\ \hline \end{array}$$

h) $412 \times 1000 =$ ____

$$\begin{array}{r} 4\ 1\ 2 \\ \times\ 1\ 0\ 0\ 0 \\ \hline \end{array}$$

i) $905 \times 1000 =$ ____

$$\begin{array}{r} 9\ 0\ 5 \\ \times\ 1\ 0\ 0\ 0 \\ \hline \end{array}$$

j) $506 \times 1000 =$ ____

$$\begin{array}{r} 5\ 0\ 6 \\ \times\ 1\ 0\ 0\ 0 \\ \hline \end{array}$$

k) $803 \times 1000 =$ ____

$$\begin{array}{r} 8\ 0\ 3 \\ \times\ 1\ 0\ 0\ 0 \\ \hline \end{array}$$

l) $248 \times 1000 =$ ____

$$\begin{array}{r} 2\ 4\ 8 \\ \times\ 1\ 0\ 0\ 0 \\ \hline \end{array}$$

Skill 6.2 Dividing a large number by a power of 10.

- Remove as many zeros from the end of the given number as there are zeros in the power of 10.

  Hint: If the division is written as a fraction, simply cross off respective zeros from the top and bottom of the fraction.

Q. $850\,000 \div 1000 =$

A. $850\,\cancel{000} \div 1\cancel{000} =$

$= \boldsymbol{850}$

OR $850\,000 \div 1000$

$= \dfrac{850\,000}{1000}$ (÷ 1000 / ÷ 1000)

$= \dfrac{850\,\cancel{000}}{1\cancel{000}}$

$= \boldsymbol{850}$

Any division can be written as a fraction.

Simplify by dividing both the numerator and denominator by 1000.

Cross off the respective zeros.

a) $460 \div 10 =$

$= \dfrac{460}{10}$ (÷ 10 / ÷ 10)

$= \dfrac{46\cancel{0}}{1\cancel{0}} = 46$

b) $280 \div 10 =$

$= \dfrac{280}{10}$ (÷ 10 / ÷ 10)

$=$ ..... $=$ ☐

c) $5020 \div 10 =$

$=$ .....

$=$ ..... $=$ ☐

d) $8900 \div 100 =$

$= \dfrac{8900}{100}$ (÷ 100 / ÷ 100)

$= \dfrac{89\cancel{00}}{1\cancel{00}} =$ ☐

e) $1500 \div 100 =$

$=$ .....

$=$ ..... $=$ ☐

f) $37\,000 \div 100 =$

$=$ .....

$=$ ..... $=$ ☐

g) $23\,000 \div 100 =$

$=$ .....

$=$ ..... $=$ ☐

h) $480\,000 \div 100 =$

$=$ .....

$=$ ..... $=$ ☐

i) $200\,500 \div 100 =$

$=$ .....

$=$ ..... $=$ ☐

j) $570\,000 \div 1000 =$

$=$ .....

$=$ ..... $=$ ☐

k) $706\,000 \div 1000 =$

$=$ .....

$=$ ..... $=$ ☐

l) $309\,000 \div 1000 =$

$=$ .....

$=$ ..... $=$ ☐

Skill 6.3 Multiplying a large number by a single digit.

- Multiply the number by the single digit working from right to left.
- If there is a 'carry over': First multiply.
  Then add on the carry over.

Q. $4019 \times 7 =$

A. $4019 \times 7 = \mathbf{28\,133}$

	1	6		
	4	0	1	9
×				7
2	**8**	**1**	**3**	**3**

tens of thousands | thousands | hundreds | tens | units

Units: $7 \times 9 = 63$
63 units = 6 tens and 3 units $\Rightarrow$ 3 units
Carry the 6 tens to the next column.

Tens: $7 \times 1 = 7$, $7 + 6 = 13$
13 tens = 1 hundred and 3 tens $\Rightarrow$ 3 tens
Carry the 1 hundred to the next column.

Hundreds: $7 \times 0 = 0$
$0 + 1 = 1$ $\Rightarrow$ 1 hundred

Thousands: $7 \times 4 = 28$ $\Rightarrow$ 28 thousand

a) $65 \times 6 =$ **390**

	3		
	6	5	
×		6	
3	9	0	Units first!

b) $34 \times 9 =$

	3	4	
×		9	

c) $59 \times 7 =$

	5	9	
×		7	

d) $517 \times 3 =$

		2		
	5	1	7	
×			3	
			1	Units first!

e) $265 \times 4 =$

	2	6	5	
×			4	

f) $440 \times 8 =$

	4	4	0	
×			8	

g) $374 \times 7 =$

		2		
	3	7	4	
×			7	

h) $1043 \times 6 =$

	1	0	4	3	
×				6	

i) $2015 \times 5 =$

	2	0	1	5	
×				5	

j) $3627 \times 2 =$

	3	6	2	7	
×				2	

k) $5214 \times 3 =$

	5	2	1	4	
×				3	

l) $4382 \times 4 =$

	4	3	8	2	
×				4	

Skill 6.4 Dividing a large number by a single digit.

- Divide from left to right across the digits one at a time.
- If any result is less than 1: Cross off the number being divided into.
  'Carry over' this amount to the next column.
  Add on the carry.
  Then try dividing again.

Q. $7168 \div 8 =$

A. $7168 \div 8 = \mathbf{896}$

$$8 \overline{)\,7\,1\,6\,8}$$

Read as: 7168 divided by 8
OR *How many times can 8 be taken from 7168?*
OR *How many 8's go into 7168?*

Divide 8 into 7.
8 does not divide into 7, so 'carry over' the 7 groups of 1000 and make 71 groups of 100.

8 divides into 71 eight times with 7 remainder. Write an 8 above the 1 and carry the remaining 7 groups of 100 to the tens column to make 76 tens.

Divide 8 into 76.
8 divides into 76 nine times and 4 remainder. Write a 9 above the 6 and carry the remaining 4 groups of tens to the units column to make 48 units.

Divide 8 into 48.
8 divides into 48 six times and 0 remainder.
Write a 6 above the 8.

a) $468 \div 3 =$ 156

$$3 \overline{)\,4\,6\,8}$$

b) $356 \div 4 =$

$$4 \overline{)\,3\,5\,6}$$

c) $475 \div 5 =$

$$5 \overline{)\,4\,7\,5}$$

d) $546 \div 6 =$

$$6 \overline{)\,5\,4\,6}$$

e) $296 \div 8 =$

$$8 \overline{)\,2\,9\,6}$$

f) $387 \div 9 =$

$$9 \overline{)\,3\,8\,7}$$

g) $2214 \div 3 =$

$$3 \overline{)\,2\,2\,1\,4}$$

h) $2046 \div 6 =$

$$6 \overline{)\,2\,0\,4\,6}$$

i) $4085 \div 5 =$

$$5 \overline{)\,4\,0\,8\,5}$$

j) $2364 \div 4 =$

$$4 \overline{)\,2\,3\,6\,4}$$

k) $4347 \div 7 =$

$$7 \overline{)\,4\,3\,4\,7}$$

l) $2392 \div 8 =$

$$8 \overline{)\,2\,3\,9\,2}$$

m) $3608 \div 4 =$

$$4 \overline{)\,3\,6\,0\,8}$$

n) $3725 \div 5 =$

$$5 \overline{)\,3\,7\,2\,5}$$

o) $2268 \div 9 =$

$$9 \overline{)\,2\,2\,6\,8}$$

Skill 6.5 Multiplying a large number by a multiple of 10.

- Consider the zeros as making groups of 10's or 100's and place them at the end.
- Then multiply by the remaining digit as though it was a unit.

Q. $554 \times 300 =$

A. $554 \times 300 = \mathbf{166\,200}$

$$\begin{array}{r} {\scriptstyle 1}\,{\scriptstyle 1} \\ 5\,5\,4 \\ \times \quad 3\,0\,0 \\ \hline 1\,6\,6\,2\,0\,0 \end{array}$$

Consider 300 as 3 groups of 100.

Multiply 554 by 3:
$554 \times 3 = 1662$

To show we want groups of 100, place two zeros after 1662.

a) $98 \times 70 =$ 6860

$$\begin{array}{r} {\scriptstyle 5} \\ 9\,8 \\ \times \quad 7\,0 \\ \hline 6\,8\,6\,0 \end{array}$$

b) $75 \times 60 =$

$$\begin{array}{r} {\scriptstyle 3} \\ 7\,5 \\ \times \quad 6\,0 \\ \hline 0\,0 \end{array}$$

c) $619 \times 20 =$

$$\begin{array}{r} 6\,1\,9 \\ \times \quad 2\,0 \\ \hline 0 \end{array}$$

d) $346 \times 50 =$

$$\begin{array}{r} 3\,4\,6 \\ \times \quad 5\,0 \\ \hline \end{array}$$

e) $477 \times 40 =$

$$\begin{array}{r} 4\,7\,7 \\ \times \quad 4\,0 \\ \hline \end{array}$$

f) $537 \times 30 =$

$$\begin{array}{r} 5\,3\,7 \\ \times \quad 3\,0 \\ \hline \end{array}$$

g) $327 \times 400 =$

$$\begin{array}{r} {\scriptstyle 1}\,{\scriptstyle 5} \\ 3\,2\,7 \\ \times \quad 4\,0\,0 \\ \hline 1\,3\,0\,8\,0\,0 \end{array}$$

h) $148 \times 600 =$

$$\begin{array}{r} 1\,4\,8 \\ \times \quad 6\,0\,0 \\ \hline \end{array}$$

i) $563 \times 200 =$

$$\begin{array}{r} 5\,6\,3 \\ \times \quad 2\,0\,0 \\ \hline \end{array}$$

j) $206 \times 500 =$

$$\begin{array}{r} 2\,0\,6 \\ \times \quad 5\,0\,0 \\ \hline \end{array}$$

k) $412 \times 700 =$

$$\begin{array}{r} 4\,1\,2 \\ \times \quad 7\,0\,0 \\ \hline \end{array}$$

l) $3478 \times 200 =$

$$\begin{array}{r} 3\,4\,7\,8 \\ \times \quad 2\,0\,0 \\ \hline \end{array}$$

m) $2500 \times 60 =$

$$\begin{array}{r} 2\,5\,0\,0 \\ \times \quad 6\,0 \\ \hline \end{array}$$

n) $1200 \times 70 =$

$$\begin{array}{r} 1\,2\,0\,0 \\ \times \quad 7\,0 \\ \hline \end{array}$$

o) $1500 \times 80 =$

$$\begin{array}{r} 1\,5\,0\,0 \\ \times \quad 8\,0 \\ \hline \end{array}$$

Skill 6.6 Dividing a large number by a multiple of 10.

- Remove as many zeros from the end of the given number as there are zeros in the multiple of 10.
- Divide by the remaining digit working from left to right.

Q. $2280 \div 60 =$

A. $2280 \div 60 = \frac{228\cancel{0}^{\div 10}}{6\cancel{0}_{\div 10}} = 38$

$$6\overline{)\cancel{2}^{\cancel{2}}\,\cancel{2}^{\cancel{4}}\,8} \quad \text{(3 8)}$$

Divide both numbers by 10, by crossing off the zeros.

Complete the division 228 ÷ 6
6 divides into 22 three times and 4 remainder.
Write a 3 above the 2 and carry the remaining 4 groups of tens to the units column to make 48 units.

6 divides into 48 eight times and 0 remainder.
Write an 8 above the 8.

a) $5600 \div 20 =$

$= \frac{560\cancel{0}^{\div 10}}{2\cancel{0}_{\div 10}} =$ 280

$$2\overline{)5\,\overset{1}{6}\,0} \quad \text{(2 8 0)}$$

b) $4800 \div 30 =$

$=$ $=$ ☐

$$3\overline{)4\,\overset{1}{8}\,0}$$

c) $8160 \div 40 =$

$=$ $=$ ☐

$$4\overline{)8\,1\,6}$$

d) $7350 \div 50 =$

$=$ $=$ ☐

$$5\overline{)\quad\quad}$$

e) $9660 \div 60 =$

$=$ $=$ ☐

$$6\overline{)\quad\quad}$$

f) $5240 \div 40 =$

$=$ $=$ ☐

$$\overline{)\quad\quad}$$

g) $18\,000 \div 400 =$

$=$ $=$ ☐

$$4\overline{)1\,8\,0}$$

h) $22\,000 \div 500 =$

$=$ $=$ ☐

$$5\overline{)\quad\quad}$$

i) $31\,000 \div 200 =$

$=$ $=$ ☐

$$\overline{)\quad\quad}$$

j) $40\,500 \div 300 =$

$=$ $=$ ☐

$$3\overline{)\quad\quad}$$

k) $20\,400 \div 600 =$

$=$ $=$ ☐

$$6\overline{)\quad\quad}$$

l) $98\,700 \div 700 =$

$=$ $=$ ☐

$$\overline{)\quad\quad}$$

Skill 6.7 Multiplying a large number by a two-digit number (1).

- Multiply by the unit digit first, working from right to left.
  Reminder: Put a zero in the units place before you start multiplying by the tens.
- Then multiply by the ten digit, working from right to left.
- Add the results last.

Q. $1426 \times 37 =$

A. $1426 \times 37 = \mathbf{52\,762}$

	1	4	2	6
×			3	7
	9	9	8	2
+ 4	2	7	8	0
5	2	7	6	2

1426 × 7 = 9982

1426 × 30 = 42780

Multiply 1426 by 7.

Then multiply 1426 by 30.
Remember: Put a 0 in the units place.

Add these results.

The question can be thought of as:

	1	4	2	6			1	4	2	6	
×				7	plus	×			3	0	
	9	9	8	2		+	4	2	7	8	0 = 52 762

a) $57 \times 82 =$ 4674

	5	7	
×	8	2	
	1	1	4
+ 4	5	6	0
4	6	7	4

0 as place holder

b) $64 \times 93 =$

	6	4	
×	9	3	
		9	2
			0

c) $35 \times 46 =$

		3	5
×		4	6

d) $715 \times 17 =$

	7	1	5	
×		1	7	
	5	0	0	5
+	7	1	5	0

e) $809 \times 23 =$

	8	0	9
×		2	3
		2	7
			0

f) $648 \times 34 =$

	6	4	8
×		3	4

g) $416 \times 42 =$

	4	1	6
×		4	2

h) $353 \times 56 =$

	3	5	3
×		5	6

i) $207 \times 64 =$

	2	0	7
×		6	4

Skill 6.7 Multiplying a large number by a two-digit number (2).

j) $804 \times 75 =$ ☐

		8	0	4
	×		7	5

k) $532 \times 28 =$ ☐

		5	3	2
	×		2	8

l) $926 \times 45 =$ ☐

		9	2	6
	×		4	5

m) $1602 \times 19 =$ ☐

	1	6	0	2
×			1	9

n) $4086 \times 24 =$ ☐

	4	0	8	6
×			2	4

o) $1903 \times 36 =$ ☐

	1	9	0	3
×			3	6

p) $3015 \times 45 =$ ☐

	3	0	1	5
×			4	5

q) $2038 \times 87 =$ ☐

	2	0	3	8
×			8	7

r) $5217 \times 23 =$ ☐

	5	2	1	7
×			2	3

s) $2009 \times 73 =$ ☐

	2	0	0	9
×			7	3

t) $3014 \times 46 =$ ☐

	3	0	1	4
×			4	6

u) $4268 \times 29 =$ ☐

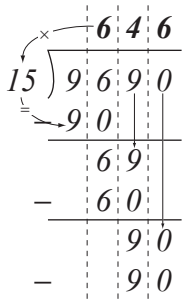
	4	2	6	8
×			2	9

Skill 6.8 Dividing a large number by a two-digit number (1).

- Work from left to right.
- Break down the division into smaller divisions by dividing into only as many digits as you need to get an answer greater than 1.
- It may be difficult, so guess the number of divisions, and multiply your guess to check.
- Subtract your answer from the original number to get the remainder, which must be less than the number you are dividing by.
- Continue in this way by bringing down the next digit to make the next number to divide into.
- Repeat until the result of the subtraction is zero.

Q. $9690 \div 15 =$

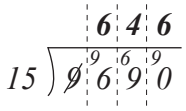
A. $9690 \div 15 = \mathbf{646}$



Start at the left.
9 is too small to divide 15 into, so consider 96.
Divide 96 ÷ 15 = ?
6 is a good guess.
Check by multiplying $6 \times 15 = 90$
Subtract $96 - 90 = 6$
Write 6 above the 6.

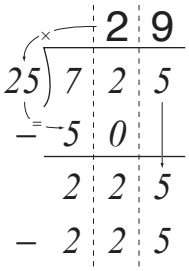
Bring down the 9.
Divide 69 ÷ 15 = ? (Guess 4)
Check by multiplying $4 \times 15 = 60$
Subtract $69 - 60 = 9$
Write 4 above the 9.

Bring down the 0.
Divide 90 ÷ 15 = 6 (No remainder)
Write 6 above the 0.

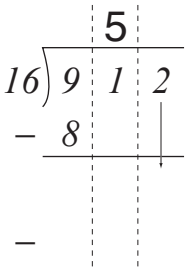


OR Work as a short division.

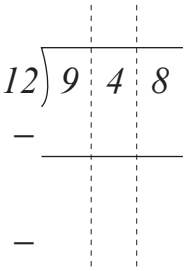
a) $725 \div 25 =$ 29



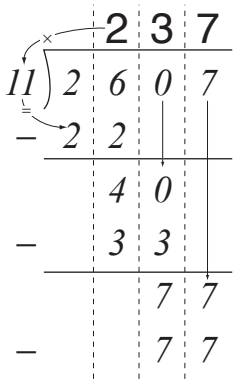
b) $912 \div 16 =$



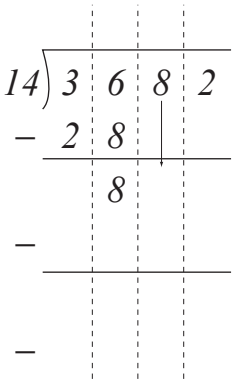
c) $948 \div 12 =$



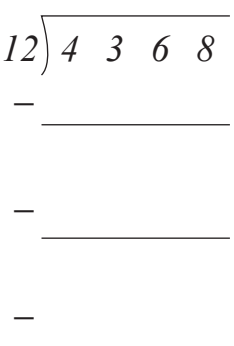
d) $2607 \div 11 =$



e) $3682 \div 14 =$



f) $4368 \div 12 =$



Skill 6.8 Dividing a large number by a two-digit number (2).

g) 5550 ÷ 15 = ☐

15) 5 5 5 0

h) 8085 ÷ 11 = ☐

11) 8 0 8 5

i) 7680 ÷ 12 = ☐

12) 7 6 8 0

j) 7252 ÷ 14 = ☐

14) 7 2 5 2

k) 4224 ÷ 22 = ☐

22) 4 2 2 4

l) 5350 ÷ 25 = ☐

25) 5 3 5 0

m) 3570 ÷ 15 = ☐

15) 3 5 7 0

n) 9030 ÷ 21 = ☐

21) 9 0 3 0

o) 3335 ÷ 23 = ☐

23) 3 3 3 5

p) 36 864 ÷ 12 = ☐

12) 3 6 8 6 4

q) 25 795 ÷ 11 = ☐

11) 2 5 7 9 5

r) 20 650 ÷ 25 = ☐

25) 2 0 6 5 0

Skill 6.9 Multiplying a whole number by a large multiple of 10.

- Consider the zeros as making groups of 10's or 100's and place them at the end.
- Multiply by the unit digit first, working from right to left.
- Then multiply by the ten digit, working from right to left.
- Add the results last.

Q. $703 \times 2500 =$

A. $703 \times 2500 = \mathbf{1\,757\,500}$

$$\begin{array}{r} 7\,0\,3 \\ \times\quad 2\,5\,0\,0 \\ \hline 3\,5\,1\,5 \\ +\;1\,4\,0\,6\,0 \\ \hline 1\,7\,5\,7\,5\,0\,0 \end{array}$$

Consider 2500 as 25 groups of 100.

Work with the 25 first.
Multiply 703 by 5.
Then multiply 703 by 20.
Add these results.

To show we want groups of 100, place two zeros after 17 575.

a) $324 \times 120 =$ **38 880**

$$\begin{array}{r} 3\,2\,4 \\ \times\quad 1\,2\,0 \\ \hline 6\,4\,8 \\ +\;3\,2\,4\,0 \\ \hline 3\,8\,8\,8\,0 \end{array}$$

b) $716 \times 150 =$

$$\begin{array}{r} 7\,1\,6 \\ \times\quad 1\,5\,0 \\ \hline \\ \\ \hline \\ \\ \hline \end{array}$$

c) $172 \times 160 =$

$$\begin{array}{r} 1\,7\,2 \\ \times\quad 1\,6\,0 \\ \hline \\ \\ \hline \\ \\ \hline \end{array}$$

d) $634 \times 240 =$

$$\begin{array}{r} 6\,3\,4 \\ \times\quad 2\,4\,0 \\ \hline \\ \\ \hline \\ \\ \hline \end{array}$$

e) $352 \times 280 =$

$$\begin{array}{r} 3\,5\,2 \\ \times\quad 2\,8\,0 \\ \hline \\ \\ \hline \\ \\ \hline \end{array}$$

f) $785 \times 310 =$

$$\begin{array}{r} 7\,8\,5 \\ \times\quad 3\,1\,0 \\ \hline \\ \\ \hline \\ \\ \hline \end{array}$$

g) $208 \times 1400 =$

$$\begin{array}{r} 2\,0\,8 \\ \times\quad 1\,4\,0\,0 \\ \hline \\ \\ \hline \\ \\ \hline \end{array}$$

h) $509 \times 2300 =$

$$\begin{array}{r} 5\,0\,9 \\ \times\quad 2\,3\,0\,0 \\ \hline \\ \\ \hline \\ \\ \hline \end{array}$$

i) $807 \times 3200 =$

$$\begin{array}{r} 8\,0\,7 \\ \times\quad 3\,2\,0\,0 \\ \hline \\ \\ \hline \\ \\ \hline \end{array}$$

Skill 6.10 Dividing a whole number - answer as a terminating decimal.

- Line up the decimal point in your answer.
- Place a decimal point and more zeros at the end of the whole number to be divided.
- Divide into the whole number and continue until you get an exact division with no remainder.

Hint: When no decimal point is shown it is always placed on the far right of the number.

Q. $3458 \div 8 =$

A. $3458 \div 8 = 432.25$

$$8\overline{)3458.00} = 432.25$$

Start at the left.
Divide 8 into 3458.00

Continue until you get an exact number with no remainder.

a) $1487 \div 2 =$ 743.5

$$2\overline{)1487.0} = 743.5$$

b) $6014 \div 4 =$

$$4\overline{)6014.0} = 1504$$

c) $2564 \div 5 =$

$$5\overline{)2564.0}$$

d) $5945 \div 4=$

$$4\overline{)5945.00}$$

e) $3564 \div 8 =$

$$8\overline{)3564.0}$$

f) $3057 \div 2 =$

$$2\overline{)3057.0}$$

g) $1806 \div 5 =$

$$5\overline{)1806.0}$$

h) $2732 \div 8 =$

$$8\overline{)2732.0}$$

i) $7263 \div 5 =$

$$5\overline{)7263.0}$$

j) $4026 \div 4 =$

$$\overline{)4026.0}$$

k) $7385 \div 2 =$

$$\overline{)7385.}$$

l) $5862 \div 8 =$

$$\overline{)5862.}$$

m) $9305 \div 2 =$

$$\overline{)}$$

n) $2189 \div 4 =$

$$\overline{)}$$

o) $9287 \div 5 =$

$$\overline{)}$$