

3. [Decimal \times, \div]

Skill 3.1 Multiplying a decimal number by a whole number.

MMMaive 11 22 33 44
MMLime 11 22 33 44

- Neglect any decimal points and complete the multiplication from right to left.
- Count the number of decimal places in the question.
- Move the decimal point the same number of places from the right in the answer.

Q. $5.49 \times 6 =$ **A.** 32.94

$\begin{array}{r} 5.49 \\ \times 6 \\ \hline 32.94 \end{array}$	$6 \times 9 = 54$ $6 \times 4 + \text{carry } 5 = 29$ $6 \times 5 + \text{carry } 2 = 32$	carry 5, write 4 carry 2, write 9 write 32
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*2 decimal places in question so
move decimal point 2 places from right*

<p>a) $0.7 \times 4 =$ 2.8</p> $\begin{array}{r} 0.7 \\ \times 4 \\ \hline 2.8 \end{array}$	<p>b) $0.9 \times 8 =$ </p> $\begin{array}{r} 0.9 \\ \times 8 \\ \hline .2 \end{array}$	<p>c) $2.6 \times 7 =$ </p> $\begin{array}{r} 2.6 \\ \times 7 \\ \hline \end{array}$
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<p>d) $4.8 \times 5 =$ </p> $\begin{array}{r} 4.8 \\ \times 5 \\ \hline \end{array}$	<p>e) $3.26 \times 7 =$ </p> $\begin{array}{r} 3.26 \\ \times 7 \\ \hline \end{array}$	<p>f) $2.08 \times 3 =$ </p> $\begin{array}{r} 2.08 \\ \times 3 \\ \hline \end{array}$
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<p>g) $12.23 \times 6 =$ </p> $\begin{array}{r} 12.23 \\ \times 6 \\ \hline \end{array}$	<p>h) $1.507 \times 9 =$ </p> $\begin{array}{r} 1.507 \\ \times 9 \\ \hline \end{array}$	<p>i) $21.37 \times 7 =$ </p> $\begin{array}{r} 21.37 \\ \times 7 \\ \hline \end{array}$
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<p>j) $14.3 \times 8 =$ </p> $\begin{array}{r} 14.3 \\ \times 8 \\ \hline \end{array}$	<p>k) $3.056 \times 9 =$ </p> $\begin{array}{r} 3.056 \\ \times 9 \\ \hline \end{array}$	<p>l) $48.27 \times 3 =$ </p> $\begin{array}{r} 48.27 \\ \times 3 \\ \hline \end{array}$
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Skill 3.2 Multiplying a decimal number by powers and multiples of 10.

To multiply by a power of 10:

- Count the number of zeros in the power of 10.
- Move the decimal point to the right as many places as there are zeros in the power of 10.
- Add zeros as place holders, if necessary.

Example: $4.5 \times 100 = 4.50 \times 100 = 450$

To multiply by a multiple of 10:

- Disregard the 0's in the multiple of 10 and multiply by the remaining digit. (see skill 3.1, page 21)
- Move the decimal point to the right as many places as there are zeros in the multiple of 10.

Q. $0.005 \times 80 =$

A.

0.005	8	$8 \times 5 = 40$	carry 4, write 0
\times	8	$8 \times 0 + \text{carry } 4 = 4$	write 4
\hline	\hline	$8 \times 0 = 0$	write 0
0.040		$8 \times 0 = 0$	write 0

0.005×80
 $= 0.040 \times 10$
 $= 0.4$

1 zero in multiple so
move decimal point 1 place right

a) $6.37 \times 100 =$ 2 zeros, 2 places right
 $= 637$

b) $3.98 \times 10 =$
 $= 39.8$

c) $0.03 \times 10 =$
 $=$

d) $4.29 \times 100 =$
 $=$

e) $100 \times 3.007 =$
 $=$

f) $21.88 \times 100 =$
 $=$

g) $100 \times 0.005 =$
 $=$

h) $0.8 \times 100 =$
 $=$

i) $100 \times 0.12 =$
 $=$

j) $0.039 \times 10 =$
 $=$

k) $0.73 \times 10 =$
 $=$

l) $1000 \times 0.57 =$
 $= 570$

Add zeros as place holders

m) $50 \times 8.6 =$
 $=$

n) $0.0058 \times 40 =$
 $=$

o) $0.64 \times 200 =$
 $=$

p) $30 \times 0.0309 =$
 $=$

q) $0.004 \times 200 =$
 $=$

r) $60 \times 0.704 =$
 $=$

Skill 3.3 Multiplying a decimal number by a negative power of 10 (e.g. 0.1)

- Move the decimal point to the right in the power of 10, as many places as you need to make 1.
Example: In $0.\widehat{01}$ the decimal point must move two places to the right to make 1.
- Then move the decimal point the same number of places to the left in the dividend.
- Add zeros as place holders, if necessary.
Example: $2.4 \times 0.01 = \widehat{00}2.4 \times \widehat{0.01} = 0.024 \times 1 = 0.024$
- If the result is less than 1, write a zero in the units place.
Example: By convention 0.37 rather than .37

Q. $0.01 \times 3.9 =$

A. 0.01×3.9
 $= \widehat{0.01} \times \widehat{03.9}$ *2 places right makes 1 so move decimal point 2 places left*
 $= 1 \times 0.039$
 $= \mathbf{0.039}$ *< 1 so write zero in units place*

a) $\widehat{7.84} \times \widehat{0.1} =$

$= \underline{0.784} \times 1 = \mathbf{0.784}$

b) $\widehat{4.2} \times \widehat{0.1} =$

$= \dots = \mathbf{\quad}$

c) $0.1 \times 68.5 =$

$= \dots = \mathbf{\quad}$

d) $0.01 \times 593.2 =$

$= \dots = \mathbf{\quad}$

e) $484.5 \times 0.01 =$

$= \dots = \mathbf{\quad}$

f) $0.01 \times 223.7 =$

$= \dots = \mathbf{\quad}$

g) $0.001 \times 31.3 =$

$= \widehat{0.001} \times \widehat{0031.3}$
 $= 1 \times 0.0313 = \mathbf{0.0313}$

Use zeros as place holders

h) $0.001 \times 9090.9 =$

$= \dots = \mathbf{\quad}$

i) $0.001 \times 1234.5 =$

$= \dots = \mathbf{\quad}$

j) $0.01 \times 12.8 =$

$= \dots$
 $= \dots = \mathbf{\quad}$

k) $32.5 \times 0.01 =$

$= \dots$
 $= \dots = \mathbf{\quad}$

l) $0.01 \times 13.9 =$

$= \dots$
 $= \dots = \mathbf{\quad}$

m) $530.8 \times 0.001 =$

$= \dots$
 $= \dots = \mathbf{\quad}$

n) $0.01 \times 1.02 =$

$= \dots$
 $= \dots = \mathbf{\quad}$

o) $5.4 \times 0.001 =$

$= \dots$
 $= \dots = \mathbf{\quad}$

Skill 3.4 Multiplying a decimal number by a decimal number.

- Neglect any decimal points and complete the multiplication from right to left.
- Count the number of decimal places in the question.
- Move the decimal point the same number of places from the right in the answer.
- Use zeros as place holders, if necessary.
Example: $0.02 \times 0.3 = 0.006$
- If the result is less than 1, write a zero in the units place.
Example: By convention 0.37 not .37
- Remove any zeros at the end of the decimal number, after the decimal point, if necessary.
- Remove any zeros at the start of the decimal number, up to zero units, if necessary.

Q. $15.4 \times 0.03 =$

A. **0.462**

$$\begin{array}{r}
 \overset{1}{1} \overset{1}{5} . \overset{4}{4} \\
 \times 0 . \overset{0}{0} \overset{3}{3} \\
 \hline
 0 . \overset{4}{4} \overset{6}{6} \overset{2}{2}
 \end{array}$$

$3 \times 4 = 12$ carry 1, write 2
 $3 \times 5 + \text{carry } 1 = 16$ carry 1, write 6
 $3 \times 1 + \text{carry } 1 = 4$ write 4

< 1 so write zero in units place

3 decimal places in question so move decimal point 3 places from right

a) $0.6 \times 0.7 =$

0.42

$$\begin{array}{r}
 \overset{4}{0} . \overset{6}{6} \\
 \times 0 . \overset{7}{7} \\
 \hline
 0 . \overset{4}{4} \overset{2}{2}
 \end{array}$$

2 decimal places

2 places from right

< 1 so write zero in units place

b) $0.8 \times 0.4 =$

$$\begin{array}{r}
 \overset{3}{0} . \overset{8}{8} \\
 \times 0 . \overset{4}{4} \\
 \hline
 2
 \end{array}$$

c) $0.9 \times 0.5 =$

$$\begin{array}{r}
 \overset{4}{0} . \overset{9}{9} \\
 \times 0 . \overset{5}{5} \\
 \hline
 \end{array}$$

d) $3.6 \times 0.6 =$

$$\begin{array}{r}
 3 . \overset{6}{6} \\
 \times 0 . \overset{6}{6} \\
 \hline
 \end{array}$$

e) $0.7 \times 4.58 =$

$$\begin{array}{r}
 4 . \overset{5}{5} \overset{8}{8} \\
 \times 0 . \overset{7}{7} \\
 \hline
 \end{array}$$

f) $0.17 \times 0.08 =$

$$\begin{array}{r}
 0 . \overset{1}{1} \overset{7}{7} \\
 \times 0 . \overset{0}{0} \overset{8}{8} \\
 \hline
 \end{array}$$

g) $3.9 \times 0.09 =$

$$\begin{array}{r}
 3 . \overset{9}{9} \\
 \times 0 . \overset{0}{0} \overset{9}{9} \\
 \hline
 \end{array}$$

h) $0.03 \times 2.98 =$

$$\begin{array}{r}
 2 . \overset{9}{9} \overset{8}{8} \\
 \times 0 . \overset{0}{0} \overset{3}{3} \\
 \hline
 \end{array}$$

i) $32.5 \times 0.09 =$

$$\begin{array}{r}
 32 . \overset{5}{5} \\
 \times 0 . \overset{0}{0} \overset{9}{9} \\
 \hline
 \end{array}$$

j) $2.75 \times 6.7 =$

$$\begin{array}{r}
 2 . \overset{7}{7} \overset{5}{5} \\
 \times 6 . \overset{7}{7} \\
 \hline
 \end{array}$$

k) $9.15 \times 2.3 =$

$$\begin{array}{r}
 9 . \overset{1}{1} \overset{5}{5} \\
 \times 2 . \overset{3}{3} \\
 \hline
 \end{array}$$

l) $12.8 \times 0.43 =$

$$\begin{array}{r}
 12 . \overset{8}{8} \\
 \times 0 . \overset{4}{4} \overset{3}{3} \\
 \hline
 \end{array}$$

Skill 3.5 Dividing a decimal number by a whole number.

- Break down the division into smaller divisions.
- Divide from left to right.
- Line up the decimal point in your answer with the decimal point in the question.

Q. $208.2 \div 6 =$

A. 34.7

$$\begin{array}{r} 34.7 \\ 6 \overline{) 208.2} \end{array}$$

 $2 \div 6 = ?$ carry 2
 $20 \div 6 = 3$ carry 2 write 3
 $28 \div 6 = 4$ carry 4 write 4
 $42 \div 6 = 7$ write 7

Annotations: "÷ from left" points to the 2 in 208.2; "Line up decimal places" points to the decimal point in 34.7.

a) $163.2 \div 8 =$

20.4

b) $76.8 \div 4 =$

c) $46.5 \div 5 =$

$$\begin{array}{r} 20.4 \\ 8 \overline{) 163.2} \end{array}$$

 Annotations: "÷ from left" points to the 1 in 163.2; "Line up decimal places" points to the decimal point in 20.4.

$$\begin{array}{r} 19.2 \\ 4 \overline{) 76.8} \end{array}$$

$$\begin{array}{r} 9.3 \\ 5 \overline{) 46.5} \end{array}$$

d) $140.4 \div 6 =$

e) $145.8 \div 3 =$

f) $130.9 \div 7 =$

$$\begin{array}{r} 23.4 \\ 6 \overline{) 140.4} \end{array}$$

$$\begin{array}{r} 48.6 \\ 3 \overline{) 145.8} \end{array}$$

$$\begin{array}{r} 18.7 \\ 7 \overline{) 130.9} \end{array}$$

g) $31.05 \div 5 =$

h) $79.48 \div 2 =$

i) $96.56 \div 8 =$

$$\begin{array}{r} 6.21 \\ 5 \overline{) 31.05} \end{array}$$

$$\begin{array}{r} 39.74 \\ 2 \overline{) 79.48} \end{array}$$

$$\begin{array}{r} 12.07 \\ 8 \overline{) 96.56} \end{array}$$

j) $104.24 \div 4 =$

k) $153.54 \div 9 =$

l) $794.78 \div 7 =$

$$\begin{array}{r} 26.06 \\ 4 \overline{) 104.24} \end{array}$$

$$\begin{array}{r} 17.06 \\ 9 \overline{) 153.54} \end{array}$$

$$\begin{array}{r} 113.54 \\ 7 \overline{) 794.78} \end{array}$$

Skill 3.6 Dividing a decimal number by a power of 10.

- Move the decimal place to the left as many places as there are zeros in the power of 10.
Example: $30\widehat{7}2 \div 100 = 30.72$
- Add zeros as place holders, if necessary.
Example: $4.5 \div 100 = 0\widehat{0}4.5 \div 100 = 0.045$
- If the result is less than 1, write a zero in the units place.
Example: By convention 0.37 not .37

Q. $0.97 \div 10 =$

A. $0.97 \div 10$ *1 zero, 1 place left*
 $= \widehat{0}.97 \div 10$
 $= \mathbf{0.097}$

< 1 so write zero in units place

a) $6.7 \div 100 =$

2 zeros, 2 places left

$= \widehat{00}6.7 \div 100 = \mathbf{0.067}$

Add zeros as place holders

b) $230.6 \div 10 =$

$= \dots\dots\dots = \boxed{}$

c) $15.3 \div 10 =$

$= \dots\dots\dots = \boxed{}$

d) $3.35 \div 10 =$

$= \dots\dots\dots = \boxed{}$

e) $800.9 \div 100 =$

$= \dots\dots\dots = \boxed{}$

f) $32.4 \div 100 =$

$= \dots\dots\dots = \boxed{}$

g) $0.36 \div 10 =$

$= \widehat{00}0.36 \div 10 = \boxed{}$

Add zeros as place holders

h) $0.08 \div 10 =$

$= \dots\dots\dots = \boxed{}$

i) $65.3 \div 100 =$

$= \dots\dots\dots = \boxed{}$

j) $49.2 \div 100 =$

$= \dots\dots\dots = \boxed{}$

k) $6.8 \div 100 =$

$= \dots\dots\dots = \boxed{}$

l) $0.74 \div 100 =$

$= \dots\dots\dots = \boxed{}$

m) $2972.5 \div 1000 =$

$= \dots\dots\dots = \boxed{}$

n) $33.1 \div 1000 =$

$= \dots\dots\dots = \boxed{}$

o) $0.5 \div 1000 =$

$= \dots\dots\dots = \boxed{}$

Skill 3.7 Dividing a decimal number by a negative power of 10 (e.g. 0.1).

- Move the decimal point to the right in the power of 10, as many places as you need to make 1.
Example: In $0.\widehat{0}\widehat{1}$ the decimal point must move two places to the right to make 1.
- Move the decimal point the same number of places to the right in the dividend.
Example: $4.\widehat{5}\widehat{2} \div 0.\widehat{0}\widehat{1} = 452 \div 1 = 452$
- Add zeros as place holders, if necessary.
Example: $4.5 \div 0.01 = 4.\widehat{5}\widehat{0} \div 0.\widehat{0}\widehat{1} = 450$

Q. $0.85 \div 0.01 =$

A. $0.85 \div 0.01$
 $= 0.\widehat{8}\widehat{5} \div 0.\widehat{0}\widehat{1}$ — 2 places right makes 1
 $= 85$ — so 2 places right

a) $5.\widehat{6} \div 0.\widehat{1} =$ — 1 place right makes 1
 $= 56 \div 1 =$

b) $3.03 \div 0.1 =$

c) $2.4 \div 0.1 =$

d) $0.058 \div 0.1 =$

e) $42.7 \div 0.1 =$

f) $0.38 \div 0.1 =$

g) $0.76 \div 0.01 =$

h) $0.09 \div 0.01 =$

i) $65.3 \div 0.01 =$

j) $0.005 \div 0.01 =$

k) $0.89 \div 0.01 =$

l) $7.153 \div 0.001 =$

m) $1.2 \div 0.01 =$ — Add zeros as place holders
 $= 1.\widehat{2}\widehat{0} \div 0.\widehat{0}\widehat{1}$ — 2 places right makes 1
 $= 120 \div 1 =$

n) $23.2 \div 0.01 =$

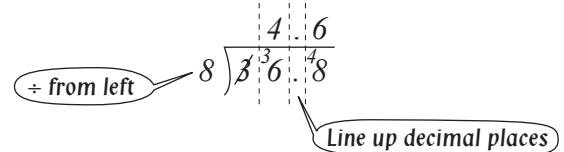
o) $3.58 \div 0.001 =$

Skill 3.8 Dividing a decimal number by a decimal number.

- Move the decimal point to the right in the divisor, as many places as you need to make a whole number.
- Then move the decimal point the same number of places to the right in the dividend.
Example: $4.5\overline{3} \div 0.0\overline{2} = 453.0 \div 2 = 226.5$
- Add zeros as place holders, if necessary.
Example: $3.6 \div 0.06 = 3.\overline{60} \div 0.\overline{06} = 360 \div 6 = 60$ (see also example above.)
- Break down the division into smaller divisions.
- Divide from left to right.
- Line up the decimal point in your answer with the decimal point in the question.

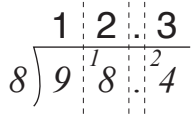
Q. $3.68 \div 0.8 =$

A. $3.\overline{68} \div 0.\overline{8}$
 $= 36.8 \div 8$
 $= 4.6$



1 place right makes a whole number

a) $9.\overline{84} \div 0.\overline{8} =$ so 1 place right
 $= 98.4 \div 8 =$ 12.3



b) $0.6 \div 0.2 =$
 $=$ $=$

c) $2.8 \div 0.4 =$
 $=$ $=$

d) $0.03 \div 0.003 =$
 $=$ $=$

e) $4.68 \div 0.4 =$
 $=$ $=$

f) $8.61 \div 0.7 =$
 $=$ $=$

g) $35.6 \div 3.56 =$
 $=$ $=$

h) $5.68 \div 0.8 =$
 $=$ $=$

i) $13.35 \div 0.5 =$
 $=$ $=$

j) $3.675 \div 0.15 =$
 $=$ $=$

k) $37.8 \div 1.2 =$
 $=$ $=$

l) $1.75 \div 1.4 =$
 $=$ $=$

Skill 3.9 Dividing a whole number by a decimal number.

- Move the decimal point to the right in the divisor, as many places as you need to make a whole number.
- Then move the decimal point the same number of places to the right in the dividend.
Example: $45 \div 0.02 = 45.\widehat{00} \div 0.\widehat{02} = 4500 \div 2 = 2250$
- Add zeros as place holders, if necessary.
Example: $36 \div 0.6 = 36.\widehat{0} \div 0.\widehat{6} = 360 \div 6 = 60$ (see also example above)
- Break down the division into smaller divisions.
- Divide from left to right.
- Line up the decimal point in your answer with the decimal point in the question.

Q. $60 \div 0.2 =$

A. $60 \div 0.2$
 $= 60.\widehat{0} \div 0.\widehat{2}$
 $= 600 \div 2$
 $= 300$

$\begin{array}{r} 300 \\ 2 \overline{)600} \end{array}$

2 places right make a whole number

a) $9 \div 0.03 =$

$= 9.\widehat{00} \div 0.\widehat{03} =$ 300

Add zeros as place holders

$\begin{array}{r} 300 \\ 3 \overline{)900} \end{array}$

b) $7 \div 0.02 =$

$=$

$\begin{array}{r} \\ 2 \overline{) } \end{array}$

c) $80 \div 0.4 =$

$=$

$\begin{array}{r} \\ \overline{) } \end{array}$

d) $27 \div 0.9 =$

$=$

$\begin{array}{r} \\ \overline{) } \end{array}$

e) $18 \div 0.04 =$

$=$

$\begin{array}{r} \\ 4 \overline{) } \end{array}$

f) $32 \div 0.8 =$

$=$

$\begin{array}{r} \\ \overline{) } \end{array}$

g) $45 \div 0.05 =$

$=$

$\begin{array}{r} \\ \overline{) } \end{array}$

h) $50 \div 0.25 =$

$=$

$\begin{array}{r} \\ 25 \overline{) } \end{array}$

i) $60 \div 0.12 =$

$=$

$\begin{array}{r} \\ 12 \overline{) } \end{array}$

j) $30 \div 0.15 =$

$=$

$\begin{array}{r} \\ 15 \overline{) } \end{array}$

k) $96 \div 0.8 =$

$=$

$\begin{array}{r} \\ 8 \overline{) } \end{array}$

l) $14 \div 0.5 =$

$=$

$\begin{array}{r} \\ 5 \overline{) } \end{array}$