

3. [Decimal \times, \div]

Skill 3.1 Multiplying a decimal number by a whole number.

MM5.2 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 3 4 4

- Ignore 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**

$$\begin{array}{r} 2 \quad 5 \\ 5.49 \\ \times \quad 6 \\ \hline 32.94 \end{array}$$

$6 \times 9 = 54$

carry 5, write 4

$6 \times 4 + \text{carry } 5 = 29$

carry 2, write 9

$6 \times 5 + \text{carry } 2 = 32$

write 32

2 decimal places in question so
move decimal point 2 places from right

a) $0.7 \times 4 =$

2.8

$$\begin{array}{r} 2 \\ 0.7 \\ \times \quad 4 \\ \hline 2.8 \end{array}$$

b) $0.9 \times 8 =$

$$\begin{array}{r} 7 \\ 0.9 \\ \times \quad 8 \\ \hline .2 \end{array}$$

c) $2.6 \times 7 =$

$$\begin{array}{r} 4 \\ 2.6 \\ \times \quad 7 \\ \hline \end{array}$$

d) $4.8 \times 5 =$

$$\begin{array}{r} 4.8 \\ \times \quad 5 \\ \hline \end{array}$$

e) $3.26 \times 7 =$

$$\begin{array}{r} 3.26 \\ \times \quad 7 \\ \hline \end{array}$$

f) $2.08 \times 3 =$

$$\begin{array}{r} 2.08 \\ \times \quad 3 \\ \hline \end{array}$$

g) $12.23 \times 6 =$

$$\begin{array}{r} 12.23 \\ \times \quad 6 \\ \hline \end{array}$$

h) $1.507 \times 9 =$

$$\begin{array}{r} 1.507 \\ \times \quad 9 \\ \hline \end{array}$$

i) $21.37 \times 7 =$

$$\begin{array}{r} 21.37 \\ \times \quad 7 \\ \hline \end{array}$$

j) $14.3 \times 8 =$

$$\begin{array}{r} 14.3 \\ \times \quad 8 \\ \hline \end{array}$$

k) $3.056 \times 9 =$

$$\begin{array}{r} 3.056 \\ \times \quad 9 \\ \hline \end{array}$$

l) $48.27 \times 3 =$

$$\begin{array}{r} 48.27 \\ \times \quad 3 \\ \hline \end{array}$$

Multiplying 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: $4.5 \times 100 = 4.5\overline{00} \times 100 = 450$

Multiplying 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.	$\begin{array}{r} 0.\overset{4}{00}5 \\ \times \quad 8 \\ \hline 0.\overset{4}{0}4\overset{0}{0} \end{array}$	$8 \times 5 = 40$ $8 \times 0 + \text{carry } 4 = 4$ $8 \times 0 = 0$ $8 \times 0 = 0$	carry 4, write 0 write 4 write 0 write 0
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0.005×80
 $= 0.\overset{4}{0}4\overset{0}{0} \times 10$
 $= 0.4$

*1 zero in multiple so
move decimal point 1 place right*

a) $6.37 \times 100 =$ *2 zeros, 2 places right*
 $= \overline{637}.$ $=$ 637

b) $3.98 \times 10 =$
 $= \overline{39.8}$ $=$

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) $1000 \times 0.57 =$
 $= \overline{0.57}$ $=$ 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)

MM5.2 11 2 2 3 3 4 4
MM6.1 11 2 2 3 3 4 4

- Move the decimal point to the right in the power of 10, as many places as you need to make 1.

Example: In 0.01 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: $2.4 \times 0.01 = 002.4 \times 0.01 = 0.024 \times 1 = 0.024$

- 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

$= 0.01 \times 03.9$

$= 1 \times 0.039$

$= 0.039$

2 places right makes 1 so
move decimal point 2 places left

< 1 so write zero in units place

a) $7.84 \times 0.1 =$

$= 0.784 \times 1 =$

b) $4.2 \times 0.1 =$

$=$ $=$

c) $0.1 \times 68.5 =$

$=$ $=$

d) $0.01 \times 593.2 =$

$=$ $=$

e) $484.5 \times 0.01 =$

$=$ $=$

f) $0.01 \times 223.7 =$

$=$ $=$

g) $0.001 \times 31.3 =$

$= 0.001 \times 0031.3$

$= 1 \times 0.0313 =$

Use zeros as place holders

h) $0.001 \times 9090.9 =$

$=$ $=$

i) $0.001 \times 1234.5 =$

$=$ $=$

j) $0.01 \times 12.8 =$

$=$ $=$

k) $32.5 \times 0.01 =$

$=$ $=$

l) $0.01 \times 13.9 =$

$=$ $=$

m) $530.8 \times 0.001 =$

$=$ $=$

n) $0.01 \times 1.02 =$

$=$ $=$

o) $5.4 \times 0.001 =$

$=$ $=$

Skill 3.4 Multiplying a decimal number by a decimal number.

MM5.2 11 22 33 44
MM6.1 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.
- 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**

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

$3 \times 4 = 12$ 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

b) $0.8 \times 0.4 =$

c) $0.9 \times 0.5 =$

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

2 decimal places

2 places from right

< 1 so write zero in units place

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

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

d) $3.6 \times 0.6 =$

e) $0.7 \times 4.58 =$

f) $0.17 \times 0.08 =$

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

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

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

g) $3.9 \times 0.09 =$

h) $0.03 \times 2.98 =$

i) $32.5 \times 0.09 =$

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

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

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

j) $2.75 \times 6.7 =$

k) $9.15 \times 2.3 =$

l) $12.8 \times 0.43 =$

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

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

$$\begin{array}{r} 1 2 . 8 \\ \times 0 . 4 3 \\ \hline \end{array}$$

Skill 3.5 Dividing a decimal number by a whole number.

MM5.2 1 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 3 4 4

- 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

÷ from left (pointing to the 2 in 208.2)
Line up decimal places (pointing to the decimal point in 34.7)

a) $163.2 \div 8 =$

20.4

b) $76.8 \div 4 =$

c) $46.5 \div 5 =$

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

÷ from left (pointing to the 1 in 163.2)
Line up decimal places (pointing to the decimal point in 20.4)

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

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

d) $140.4 \div 6 =$

e) $145.8 \div 3 =$

f) $130.9 \div 7 =$

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

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

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

g) $31.05 \div 5 =$

h) $79.48 \div 2 =$

i) $96.56 \div 8 =$

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

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

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

j) $104.24 \div 4 =$

k) $153.54 \div 9 =$

l) $794.78 \div 7 =$

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

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

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

m) $201.12 \div 8 =$

n) $391.26 \div 6 =$

o) $150.625 \div 5 =$

$$\begin{array}{r} \\ \hline \end{array}$$

$$\begin{array}{r} \\ \hline \end{array}$$

$$\begin{array}{r} \\ \hline \end{array}$$

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

MM5.2 1 1 2 2 3 4 4
MM6.1 1 1 2 2 3 3 4 4

- 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*
 $= \widehat{00}6.7 \div 100 =$ **0.067**
Add zeros as place holders

b) $230.6 \div 10 =$
 $=$

c) $15.3 \div 10 =$
 $=$

d) $3.35 \div 10 =$
 $=$

e) $800.9 \div 100 =$
 $=$

f) $32.4 \div 100 =$
 $=$

g) $0.36 \div 10 =$
 $= \widehat{0}0.36 \div 10 =$
Add zeros as place holders

h) $0.08 \div 10 =$
 $=$

i) $65.3 \div 100 =$
 $=$

j) $49.2 \div 100 =$
 $=$

k) $6.8 \div 100 =$
 $=$

l) $0.74 \div 100 =$
 $=$

m) $2972.5 \div 1000 =$
 $=$

n) $33.1 \div 1000 =$
 $=$

o) $0.5 \div 1000 =$
 $=$

p) $0.015 \div 10 =$
 $=$

q) $0.6 \div 100 =$
 $=$

r) $1.02 \div 100 =$
 $=$

s) $3.25 \div 1000 =$
 $=$

t) $42.6 \div 1000 =$
 $=$

u) $0.23 \div 100 =$
 $=$

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

MM5.2 1 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 3 4 4

- Move the decimal point to the right in the power of 10, as many places as you need to make 1.

Example: In 0.01 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: $4.52 \div 0.01 = 452 \div 1 = 452$

- Add zeros as place holders, if necessary.

Example: $4.5 \div 0.01 = 4.50 \div 0.01 = 450 \div 1 = 450$

Q. $0.85 \div 0.01 =$

A. $0.85 \div 0.01$

$= 0.85 \div 0.01$ *2 places right makes 1*

$= 85 \div 1$ *so 2 places right*

$= 85$

a) $5.6 \div 0.1 =$

$= 56 \div 1 = 56$ *1 place right makes 1*

b) $3.03 \div 0.1 =$

$= \dots = \dots$

c) $2.4 \div 0.1 =$

$= \dots = \dots$

d) $0.058 \div 0.1 =$

$= \dots = \dots$

e) $42.7 \div 0.1 =$

$= \dots = \dots$

f) $0.38 \div 0.1 =$

$= \dots = \dots$

g) $0.76 \div 0.01 =$

$= \dots = \dots$

h) $0.09 \div 0.01 =$

$= \dots = \dots$

i) $65.3 \div 0.01 =$

$= \dots = \dots$

j) $0.005 \div 0.01 =$

$= \dots = \dots$

k) $0.89 \div 0.01 =$

$= \dots = \dots$

l) $7.153 \div 0.001 =$

$= \dots = \dots$

m) $0.048 \div 0.1 =$

$= \dots = \dots$

n) $12.4 \div 0.1 =$

$= \dots = \dots$

o) $0.75 \div 0.01 =$

$= \dots = \dots$

p) $1.2 \div 0.01 =$

$= 1.20 \div 0.01$ *Add zeros as place holders*
 $= 120 \div 1 = 120$ *2 places right*

q) $23.2 \div 0.01 =$

$= \dots = \dots$

r) $3.58 \div 0.001 =$

$= \dots = \dots$

s) $0.4 \div 0.01 =$

$= \dots = \dots$

t) $0.03 \div 0.001 =$

$= \dots = \dots$

u) $8.04 \div 0.001 =$

$= \dots = \dots$

Skill 3.8 Dividing a decimal number by a decimal number.

MM5.2 1 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 4

- Move the decimal point to the right in the divisor, as many places as you need to make it 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: $3.6 \div 0.06 = 3.6\overline{0} \div 0.0\overline{6} = 360 \div 6 = 60$ (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. $3.68 \div 0.8 =$

A. $3.6\overline{8} \div 0.8$
 $= 36.8 \div 8$
 $= 4.6$

1 place right makes a whole number

a) $9.84 \div 0.8 =$
 $= 98.4 \div 8 =$ 12.3

b) $0.6 \div 0.2 =$
 $=$ 3

c) $2.8 \div 0.4 =$
 $=$ 7

d) $0.03 \div 0.003 =$
 $=$ 10

e) $4.68 \div 0.4 =$
 $=$ 11.7

f) $8.61 \div 0.7 =$
 $=$ 12.3

g) $35.6 \div 3.56 =$
 $=$ 10

h) $5.68 \div 0.8 =$
 $=$ 7.1

i) $13.35 \div 0.5 =$
 $=$ 26.7

j) $2.4 \div 0.06 =$
 $=$ 40

k) $0.4 \div 0.004 =$
 $=$ 100

l) $0.2 \div 0.25 =$
 $=$ 0.8

m) $3.675 \div 0.15 =$
 $=$ 24.5

n) $37.8 \div 1.2 =$
 $=$ 31.5

o) $1.75 \div 1.4 =$
 $=$ 1.25

Skill 3.9 Dividing a whole number by a decimal number.

MM5.2 1 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 3 4 4

- 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. $60 \div 0.2$
 $= 60.\widehat{0} \div 0.\widehat{2}$ *1 place right makes a whole number*
 $= 600 \div 2$ *Add zeros as place holders*
 $= 300$

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

÷ from left

2 places right make a whole number

a) $9 \div 0.03 =$

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

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

Add zeros as place holders

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) $18 \div 0.04 =$

$=$

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

f) $32 \div 0.8 =$

$=$

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

g) $45 \div 0.05 =$

$=$

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

h) $50 \div 0.25 =$

$=$

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

i) $60 \div 0.12 =$

$=$

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

j) $30 \div 0.15 =$

$=$

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

k) $96 \div 0.8 =$

$=$

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

l) $14 \div 0.5 =$

$=$

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

