

6. [Large Number \times, \div]

Skill 6.1 Multiplying a large number by a single digit without carry over, using columns.

MMYellow 1 1 22 33 44
MMRed 11 22 33 44

- Keep the units, tens, hundreds and thousands in their own columns.
- Multiply the digits in each column, working from right to left.

Q.
$$\begin{array}{r} 312 \\ \times 3 \\ \hline \end{array}$$

A.
$$\begin{array}{r} \text{hundreds} \quad \text{tens} \quad \text{units} \\ 312 \\ \times 3 \\ \hline 936 \end{array}$$
 Units first!

Units:
 $3 \times 2 = 6 \Rightarrow 6$ units

Tens:
 $3 \times 1 = 3 \Rightarrow 3$ tens

Hundreds:
 $3 \times 3 = 9 \Rightarrow 9$ hundreds

a)
$$\begin{array}{r} 97 \\ \times 1 \\ \hline \end{array}$$
 Units first!

b)
$$\begin{array}{r} 22 \\ \times 4 \\ \hline \end{array}$$

c)
$$\begin{array}{r} 23 \\ \times 3 \\ \hline \end{array}$$

d)
$$\begin{array}{r} 68 \\ \times 1 \\ \hline \end{array}$$

e)
$$\begin{array}{r} 32 \\ \times 3 \\ \hline \end{array}$$

f)
$$\begin{array}{r} 41 \\ \times 2 \\ \hline \end{array}$$

g)
$$\begin{array}{r} 43 \\ \times 2 \\ \hline \end{array}$$

h)
$$\begin{array}{r} 32 \\ \times 2 \\ \hline \end{array}$$

i)
$$\begin{array}{r} 123 \\ \times 3 \\ \hline \end{array}$$
 Units first!

j)
$$\begin{array}{r} 332 \\ \times 2 \\ \hline \end{array}$$

k)
$$\begin{array}{r} 808 \\ \times 1 \\ \hline \end{array}$$

l)
$$\begin{array}{r} 112 \\ \times 3 \\ \hline \end{array}$$

m)
$$\begin{array}{r} 340 \\ \times 2 \\ \hline \end{array}$$

n)
$$\begin{array}{r} 131 \\ \times 3 \\ \hline \end{array}$$

o)
$$\begin{array}{r} 413 \\ \times 2 \\ \hline \end{array}$$

p)
$$\begin{array}{r} 322 \\ \times 3 \\ \hline \end{array}$$

Skill 6.2 Multiplying a large number by a single digit with carry over, using columns.

- Keep the units, tens, hundreds and thousands in their own columns.
- Multiply the digits in each column working from right to left.
- If there is a 'carry over': First multiply. Then add on the carry over.

Q.

$$\begin{array}{r} 119 \\ \times 8 \\ \hline \end{array}$$

A.

| | | | |
|--|----------|------|-------|
| | hundreds | tens | units |
| | 1 | 7 | |
| | 1 | 1 | 9 |
| | × | | 8 |
| | <hr/> | | |
| | 9 | 5 | 2 |

Units first!

Units:
 $8 \times 9 = 72$
 $72 \text{ units} = 7 \text{ tens and } 2 \text{ units} \Rightarrow 2 \text{ units}$
 Carry over the 7 tens to the tens column.

Tens:
 $8 \times 1 = 8$
 $8 + 7 \text{ (carry over)} = 15$
 $15 \text{ tens} = 1 \text{ hundred and } 5 \text{ tens} \Rightarrow 5 \text{ tens}$
 Carry over the 1 hundred to the hundreds column.

Hundreds:
 $8 \times 1 = 8$
 $8 + 1 \text{ (carry over)} = 9 \Rightarrow 9 \text{ hundreds}$

a)

$$\begin{array}{r} 80 \\ \times 5 \\ \hline 400 \end{array}$$

Units first!

b)

$$\begin{array}{r} 90 \\ \times 4 \\ \hline \end{array}$$

c)

$$\begin{array}{r} 94 \\ \times 2 \\ \hline \end{array}$$

d)

$$\begin{array}{r} 15 \\ \times 3 \\ \hline \end{array}$$

e)

$$\begin{array}{r} 26 \\ \times 3 \\ \hline \end{array}$$

f)

$$\begin{array}{r} 23 \\ \times 7 \\ \hline \end{array}$$

g)

$$\begin{array}{r} 43 \\ \times 5 \\ \hline \end{array}$$

h)

$$\begin{array}{r} 82 \\ \times 6 \\ \hline \end{array}$$

i)

$$\begin{array}{r} 164 \\ \times 2 \\ \hline 328 \end{array}$$

Units first!

j)

$$\begin{array}{r} 207 \\ \times 5 \\ \hline \end{array}$$

k)

$$\begin{array}{r} 109 \\ \times 7 \\ \hline \end{array}$$

l)

$$\begin{array}{r} 208 \\ \times 4 \\ \hline \end{array}$$

m)

$$\begin{array}{r} 140 \\ \times 6 \\ \hline \end{array}$$

n)

$$\begin{array}{r} 167 \\ \times 3 \\ \hline \end{array}$$

o)

$$\begin{array}{r} 410 \\ \times 8 \\ \hline \end{array}$$

p)

$$\begin{array}{r} 422 \\ \times 5 \\ \hline \end{array}$$

- Keep the units, tens, hundreds and thousands in their own columns.
- Work from right to left.
- First multiply by the unit. Then multiply by the ten.
- Do the addition last.

Q.

$$\begin{array}{r} 85 \\ \times 14 \\ \hline \\ \hline \end{array}$$

A.

$$\begin{array}{r} \text{thousands} \quad \text{hundreds} \quad \text{tens} \quad \text{units} \\ 85 \\ \times 14 \\ \hline 340 \\ \hline 85 \\ \times 10 \\ \hline 850 \\ \hline 1190 \end{array}$$

First multiply 85 by the 4 units.

Units:

$4 \times 5 = 20$

20 units = 2 tens and 0 units \Rightarrow 0 units
Carry over the 2 tens to the tens column.

Tens:

$4 \times 8 = 32$

$32 + 2 \text{ (carry over)} = 34$

34 tens = 3 hundreds and 4 tens \Rightarrow 4 tens

Hundreds:

\Rightarrow 3 hundreds

Then multiply 85 by the 1 ten.

Units:

Write 0 as a place holder for the ten.

\Rightarrow 0 units

Tens:

$1 \times 5 = 5$

\Rightarrow 5 tens

Hundreds:

$1 \times 8 = 8$

\Rightarrow 8 hundreds

Add these results: $340 + 850 = 1190$

a)

$$\begin{array}{r} 34 \\ \times 21 \\ \hline 1 34 \\ 680 \\ \hline 714 \end{array}$$

Use zero as a place holder

b)

$$\begin{array}{r} 15 \\ \times 32 \\ \hline 30 \\ \hline \end{array}$$

Use zero as a place holder

c)

$$\begin{array}{r} 24 \\ \times 43 \\ \hline \\ \hline \end{array}$$

d)

$$\begin{array}{r} 71 \\ \times 62 \\ \hline \\ \hline \end{array}$$

e)

$$\begin{array}{r} 55 \\ \times 45 \\ \hline \\ \hline \end{array}$$

f)

$$\begin{array}{r} 82 \\ \times 73 \\ \hline \\ \hline \end{array}$$

g)

$$\begin{array}{r} 46 \\ \times 38 \\ \hline \\ \hline \end{array}$$

h)

$$\begin{array}{r} 33 \\ \times 96 \\ \hline \\ \hline \end{array}$$

Skill 6.4 Dividing a large number by a single digit, without carry over.

- Divide from left to right across the digits, one at a time.

Q.

$$\begin{array}{r} \boxed{} \\ 2 \overline{) 486} \end{array}$$

A.

$$\begin{array}{r} \boxed{243} \\ 2 \overline{) 486} \end{array}$$

(hundreds first!)

hundreds tens units

Hundreds:

$$4 \div 2 = 2 \Rightarrow 2 \text{ hundreds}$$

Tens:

$$8 \div 2 = 4 \Rightarrow 4 \text{ tens}$$

Units:

$$6 \div 2 = 3 \Rightarrow 3 \text{ units}$$

Read as: "486 divided by 2"
OR How many 2's go into 486?
OR 486 divides by 2 how many times?

Consider: $486 \div 2 = 243$
 $2 \times 243 = 486$

a)

$$\begin{array}{r} \boxed{200} \\ 3 \overline{) 600} \end{array}$$

(hundreds first!)

b)

$$\begin{array}{r} \boxed{} \\ 2 \overline{) 800} \end{array}$$

c)

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

d)

$$\begin{array}{r} \boxed{} \\ 7 \overline{) 770} \end{array}$$

e)

$$\begin{array}{r} \boxed{} \\ 4 \overline{) 408} \end{array}$$

f)

$$\begin{array}{r} \boxed{} \\ 3 \overline{) 306} \end{array}$$

g)

$$\begin{array}{r} \boxed{} \\ 2 \overline{) 284} \end{array}$$

h)

$$\begin{array}{r} \boxed{} \\ 3 \overline{) 369} \end{array}$$

i)

$$\begin{array}{r} \boxed{} \\ 3 \overline{) 9000} \end{array}$$

(thousands first!)

j)

$$\begin{array}{r} \boxed{} \\ 2 \overline{) 2860} \end{array}$$

k)

$$\begin{array}{r} \boxed{} \\ 2 \overline{) 8864} \end{array}$$

l)

$$\begin{array}{r} \boxed{} \\ 4 \overline{) 4080} \end{array}$$

Skill 6.5 Dividing a large number by a single digit, with carry over - no remainder.

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

Q.

$$\begin{array}{r} \boxed{} \\ 4 \overline{) 128} \end{array}$$

A.

$$\begin{array}{r} \boxed{32} \\ 4 \overline{) 128} \\ \underline{12} \\ 8 \\ \underline{8} \\ 0 \end{array}$$

hundreds first!

hundreds tens units

Hundreds:

$$1 \div 4 = ?$$

The result is < 1.

Break down the 1 hundred into 10 tens and carry them to the tens column.

Tens:

$$2 + 10 \text{ (carry over)} = 12$$

$$12 \div 4 = 3 \quad \Rightarrow 3 \text{ tens}$$

Units:

$$8 \div 4 = 2 \quad \Rightarrow 2 \text{ units}$$

Read as: "128 divided by 4"
OR How many 4's go into 128?
OR 128 divides by 4 how many times?

Consider: $128 \div 4 = 32$
 $4 \times 32 = 128$

a)

$$\begin{array}{r} \boxed{103} \\ 5 \overline{) 515} \\ \underline{5} \\ 1 \\ \underline{10} \\ 5 \\ \underline{5} \\ 0 \end{array}$$

hundreds first!

b)

$$\begin{array}{r} \boxed{} \\ 2 \overline{) 324} \\ \underline{2} \\ 1 \\ \underline{2} \\ 2 \\ \underline{2} \\ 0 \end{array}$$

hundreds first!

c)

$$\begin{array}{r} \boxed{} \\ 3 \overline{) 453} \\ \underline{3} \\ 1 \\ \underline{3} \\ 2 \\ \underline{2} \\ 0 \end{array}$$

d)

$$\begin{array}{r} \boxed{} \\ 7 \overline{) 392} \\ \underline{2} \\ 1 \\ \underline{7} \\ 2 \\ \underline{2} \\ 0 \end{array}$$

e)

$$\begin{array}{r} \boxed{} \\ 4 \overline{) 312} \\ \underline{2} \\ 1 \\ \underline{4} \\ 2 \\ \underline{2} \\ 0 \end{array}$$

f)

$$\begin{array}{r} \boxed{} \\ 8 \overline{) 592} \\ \underline{4} \\ 1 \\ \underline{8} \\ 2 \\ \underline{2} \\ 0 \end{array}$$

g)

$$\begin{array}{r} \boxed{} \\ 6 \overline{) 204} \\ \underline{1} \\ 4 \\ \underline{12} \\ 4 \\ \underline{4} \\ 0 \end{array}$$

h)

$$\begin{array}{r} \boxed{} \\ 9 \overline{) 369} \\ \underline{2} \\ 6 \\ \underline{8} \\ 9 \\ \underline{9} \\ 0 \end{array}$$

i)

$$\begin{array}{r} \boxed{} \\ 5 \overline{) 5150} \\ \underline{5} \\ 1 \\ \underline{5} \\ 5 \\ \underline{5} \\ 0 \end{array}$$

thousands first!

j)

$$\begin{array}{r} \boxed{} \\ 3 \overline{) 4125} \\ \underline{3} \\ 1 \\ \underline{3} \\ 2 \\ \underline{6} \\ 5 \\ \underline{5} \\ 0 \end{array}$$

k)

$$\begin{array}{r} \boxed{} \\ 2 \overline{) 1734} \\ \underline{1} \\ 7 \\ \underline{4} \\ 3 \\ \underline{6} \\ 4 \\ \underline{4} \\ 0 \end{array}$$

l)

$$\begin{array}{r} \boxed{} \\ 4 \overline{) 1060} \\ \underline{1} \\ 0 \\ \underline{4} \\ 6 \\ \underline{8} \\ 0 \end{array}$$