12. [Place Value]

Skill 12.1 Understanding the place value of a digit in a number (1).

- Compare the position of the digit to the position of the decimal point.
  Hint: There is a decimal point which is not written, at the end of any whole number.

Place value	thousands	hundreds	tens	units	tenths	hundredths	thousandths
	1	0	2	5 .	7	6	3

Q. In the number 5893 which of the digits 5, 8, 9 or 3 lies in the hundreds column?

A. ***8***

The digit three places to the left of the decimal point is in the hundreds place. So 8 is in the hundreds column.

a) Name the place of the underlined digit in the number 79<u>8</u>. [Hint: Is it units, tens or hundreds?]

b) Name the place of the underlined digit in the number 2<u>8</u>4. [Hint: Is it units, tens or hundreds?]

c) Name the place of the underlined digit in the number <u>4</u>97. [Hint: Is it units, tens or hundreds?]

d) Name the place of the underlined digit in the number <u>9</u>25. [Hint: Is it units, tens or hundreds?]

e) In the number 210 which of the digits 2, 1 or 0 lies in the tens column?

f) In the number 3472 which of the digits 3, 4, 7 or 2 lies in the hundreds column?

g) In the number 2006 which of the digits 2, 0 or 6 lies in the thousands column?

h) In the number 2301 which of the digits 2, 3, 0 or 1 lies in the units column?

i) In the number 3447 which of the digits 3, 4 or 7 lies in the thousands column?

j) In the number 564.2 which of the digits 5, 6, 4 or 2 lies in the units column?

k) In the number 7210 which of the digits 7, 2, 1 or 0 lies in the hundreds column?

l) In the number 15.26 which of the digits 1, 5, 2 or 6 lies in the hundredths column?

Skill 12.1 Understanding the place value of a digit in a number (2).

m) In the number 5491 which of the digits 5, 4, 9 or 1 lies in the tens column?

n) In the number 45.73 which of the digits 4, 5, 7 or 3 lies in the tenths column?

o) In the number 42 006 which of the digits 4, 2, 0 or 6 lies in the thousands column?

p) In the number 21.80 which of the digits 2, 1, 8 or 0 lies in the units column?

q) In the number 1.025 which of the digits 1, 0, 2 or 5 lies in the hundredths column?

r) In the number 78.92 which of the digits 7, 8, 9 or 2 lies in the tenths column?

s) Which digit in 6578 is in the same place as the 1 in 415?

t) Which digit in 4087 is in the same place as the 1 in 165?

u) Which digit in 12 376 is in the same place as the 4 in 348?

v) Which digit in 38.25 is in the same place as the 4 in 1.47?

w) Which digit in 5937 is in the same place as the 2 in 208?

x) Which digit in 456.2 is in the same place as the 6 in 63.79?

y) Which digit in 109.2 is in the same place as the 6 in 0.61?

z) Which digit in 3.457 is in the same place as the 2 in 41.32?

Skill 12.2 Finding the value of a digit in a number.

- Compare the position of the digit to that of the decimal point.
  Hint: There is a decimal point which is not written, at the end of any whole number.

Place value	thousands	hundreds	tens	units	tenths	hundredths	thousandths
Value	2000	600	70	5	$\frac{8}{10}$	$\frac{3}{100}$	$\frac{4}{1000}$
	2	***6***	***7***	***5*** .	***8***	***3***	***4***

Decimal point

Q. In which number does the digit 3 have a greater value?
A) 97 300
B) 13 900

A. ***B***

Check the position of the digit 3.
In 97 300 the 3 is in the hundreds place.
In 13 900 the 3 is in the thousands place.
So 3 has greater value in 13 900.

a) What is the value of the digit 5 in the number 4567?

500

b) What is the value of the digit 7 in the number 271?

c) What is the value of the digit 6 in the number 39.6?

d) What is the value of the digit 3 in the number 1.032?

e) In which number does the digit 8 have a smaller value?
A) 987
B) 823

f) In which number does the digit 3 have a greater value?
A) 6713
B) 439

g) In which number does the digit 5 have a greater value?
A) 529
B) 3657

h) In which number does the digit 4 have a smaller value?
A) 420
B) 6247

i) In which number does the digit 7 have a greater value?
A) 14 700
B) 27 400

j) In which number does the digit 3 have a smaller value?
A) 820.37
B) 4.138

Skill 12.3 Comparing whole numbers.

- Compare the size of the digits in the same place, one at a time.
- Work from left to right across each number.

Q. Which number is greater?
1346 or 1364?

A. ***1364***

Thousands:
Both numbers have the digit 1 in the thousands place.

Hundreds:
Both numbers have the digit 3 in the hundreds place.

Tens:
In the tens place 6 is greater than 4.
So 1364 is greater than 1346.

a) 535 > 553
True or false? false

b) 364 < 463
True or false?

c) 677 < 766
True or false?

d) 221 > 212
True or false?

e) 4014 > 4104
True or false?

f) 5646 < 6546
True or false?

g) 59 054 < 59 504
True or false?

h) 32 323 > 32 332
True or false?

i) Which number is smaller?
232 or 223

j) Which number is smaller?
125 or 152

k) Which number is greater?
788 or 778

l) Which number is smaller?
7557 or 7575

m) Which number is greater?
2113 or 2131

n) Which number is smaller?
7437 or 7374

o) Which number is smaller?
13 094 or 13 904

p) Which number is greater?
40 454 or 40 554

Skill 12.4 Ordering whole numbers.

- Compare the size of the digits in the same place, one at a time.
- Work from left to right across each number.

Q. Place in order from largest to smallest:
300, 298, 308, 302, 309

A. ***309, 308, 302, 300, 298***

Hundreds:
300 is larger than 200.

Tens:
All four numbers starting with 3 have zero in the tens place.

Units:
The four numbers starting with 3 have the digits 0, 8, 2 and 9 in the units place. Ordering from largest to smallest gives 9, 8, 2, and 0.

So far in order we have 309, 308, 302, 300. Then place 298.

a) Place in order from largest to smallest:
25, 75, 22, 72, 57

75, 72, 57, 25, 22

b) Place in order from smallest to largest:
78, 87, 83, 37, 77, 38

c) Place in order from largest to smallest:
12, 42, 24, 14, 22, 44

d) Place in order from smallest to largest:
46, 54, 34, 55, 45, 35

e) Place in order from largest to smallest:
768, 786, 776, 787, 777

f) Place in order from smallest to largest:
456, 546, 465, 564, 556

g) Place in order from largest to smallest:
3001, 3020, 3030, 2300

h) Place in order from smallest to largest:
1011, 1101, 1001, 1111

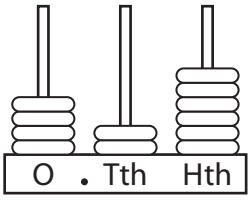
i) Place in order from largest to smallest:
9015, 9501, 9105, 9510

j) Place in order from smallest to largest:
4606, 4066, 6046, 4640

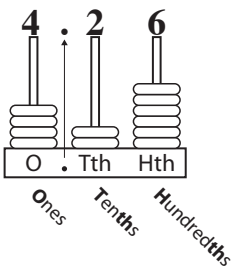
Skill 12.5 Writing decimal numbers illustrated by an abacus showing place values.

- Count the discs in each column.
- Put the decimal place in position.
- Write the digits in the appropriate places to form a number.

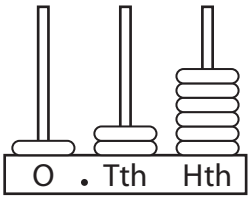
Q. Write the decimal number.



A. ***4.26***

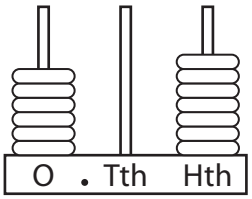


a) Write the decimal number.

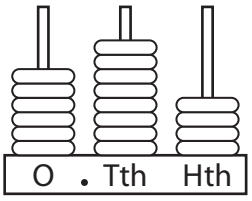


1.26

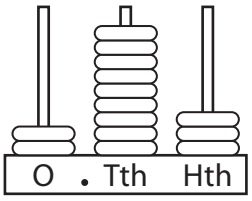
b) Write the decimal number.



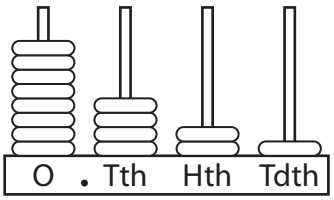
c) Write the decimal number.



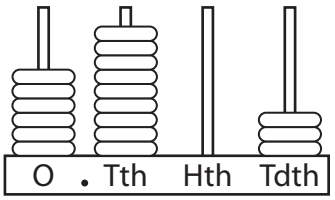
d) Write the decimal number.



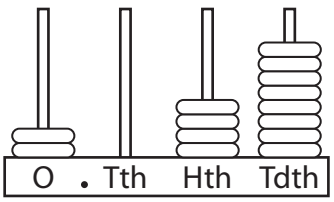
e) Write the decimal number.



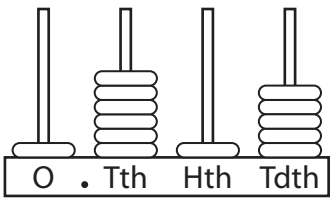
f) Write the decimal number.



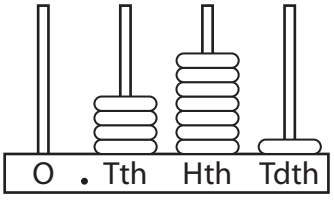
g) Write the decimal number.



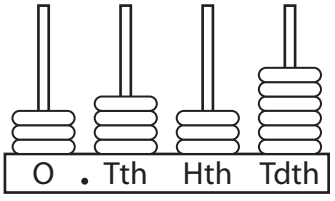
h) Write the decimal number.



i) Write the decimal number.



j) Write the decimal number.



Skill 12.6 Comparing decimal numbers.

- Line up the decimal numbers at their decimal points.
- Compare digits in their same place values, starting from the left.

Q. Which number is greater?
4.30 or 4.03

A. ***4.30***

Units:
They are both 4.

Tenths:
3 is greater than 0. OR $3 > 0$

Therefore 4.30 is greater than 4.03

Q. $3.6 < 3.07$
True or false?

A. ***false***

Remember '<' means 'less than'.
Units:
They are both 3.

Tenths:
6 is greater than 0. OR $6 > 0$

Therefore 3.6 is not less than 3.07 and the statement is false.

a) Which number is greater?
6.38 or 6.3
6.38

b) Which number is smaller?
15.4 or 15.42

c) Which number is greater?
2.2 or 2.22

d) Which number is smaller?
13.88 or 13.78

e) Which number is greater?
12.23 or 12.32

f) Which number is smaller?
1.7 or 1.07

g) Which number is smaller?
13.094 or 13.9

h) Which number is greater?
0.859 or 0.895

i) $4.2 > 4.22$
True or false?

j) $1.5 < 1.05$
True or false?

k) $389.9 < 400$
True or false?

l) $24.3 > 24.33$
True or false?

m) $3109.24 < 3109.42$
True or false?

n) $0.606 > 0.66$
True or false?

Skill 12.7 Ordering decimal numbers.

- Line up the decimal numbers at their decimal points.
- Compare digits in their same place values, starting from the left.

Q. Place in order from largest to smallest:
9.8, 8.9, 8.8, 9, 9.9

A. ***9.9, 9.8, 9, 8.9, 8.8***

Units:
9 is larger than 8.

Tenths:
When the number is whole like the 9 then think of it as 9.0
The numbers starting with 9 have 8, 0 and 9 in the tenths place. Ordering from largest to smallest, gives 9, 8, 0.
So far in order we have 9.9, 9.8, 9, then place 8.9 and 8.8

a) Place in order from smallest to largest:
3.5, 3.3, 5.5, 5.3, 3

3, 3.3, 3.5, 5.3, 5.5

b) Place in order from largest to smallest:
1.2, 2.2, 1.1, 2.1, 2.01

c) Place in order from smallest to largest:
6.7, 7.7, 6.6, 6, 7.6

d) Place in order from largest to smallest:
4.9, 9.4, 9, 4.4, 9.9

e) Place in order from largest to smallest:
42.0, 40.2, 42.4, 40.4, 44.2

f) Place in order from smallest to largest:
5.55, 5.05, 5.5, 5, 0.55

g) Place in order from smallest to largest:
3.41, 4, 3.43, 3.04, 4.13

h) Place in order from largest to smallest:
2.63, 3.62, 6.32, 3.6, 2.62

i) Place in order from largest to smallest:
6.8, 8.06, 6.08, 8, 8.6

j) Place in order from smallest to largest:
7.44, 4.74, 7.47, 4.77, 7.77

Skill 12.8 Rounding whole numbers to a given place.

- If the digit to the right of the place is
  - 0, 1, 2, 3 or 4 - round down
    - keep the digit in the requested place unchanged.
  - 5, 6, 7, 8 or 9 - round up
    - add 1 to the digit in the requested place.
- Keep the number of digits in the answer the same as in the question by using zeros to fill the vacated spaces.

ROUNDING RULE
< 5 Round down
≥ 5 Round up

Q. Round 448 to the nearest ten.

A. ***450***

The digit to the right of the tens place is 8 so round up.
Add 1 to the 4 in the tens place.
Use a zero in the units place.

a) Round 57 to the nearest ten. 60

b) Round 72 to the nearest ten.

c) Round 366 to the nearest ten.

d) Round 691 to the nearest ten.

e) Round 804 to the nearest ten.

f) Round 3149 to the nearest ten.

g) Round 772 to the nearest hundred.

h) Round 209 to the nearest hundred.

i) Round 455 to the nearest hundred.

j) Round 2481 to the nearest hundred.

k) Round 2315 to the nearest hundred.

l) Round 5482 to the nearest hundred.

m) Round 1782 to the nearest hundred.

n) Round 4543 to the nearest hundred.

Skill 12.9 Rounding decimal numbers to the nearest whole number.

- If the digit to the right of the decimal point is
  - 0, 1, 2, 3 or 4 - round down
    - keep the digit in the units place unchanged.
  - 5, 6, 7, 8 or 9 - round up
    - add 1 to the digit in the units place.
- Leave off all digits after the decimal point and the decimal point.

ROUNDING RULE
< 5 Round down
≥ 5 Round up

Q. Round 18.2 to the nearest whole number.

A. ***18***

The digit to the right of the decimal point is 2.
Round down by keeping the 8 in the units place unchanged.

a) Round 3.8 to the nearest whole number.

3.8 — *8 ≥ 5 round up by adding 1 to 3*

4

b) Round 9.6 to the nearest whole number.

c) Round 4.2 to the nearest whole number.

d) Round 6.1 to the nearest whole number.

e) Round 15.7 to the nearest whole number.

f) Round 14.5 to the nearest whole number.

g) Round 13.4 to the nearest whole number.

h) Round 11.3 to the nearest whole number.

i) Round 72.8 to the nearest whole number.

j) Round 41.23 to the nearest whole number.

k) Round 30.51 to the nearest whole number.

l) Round 29.56 to the nearest whole number.

m) Round 59.5 to the nearest whole number.

n) Round 6.09 to the nearest whole number.

Skill 12.10 Estimating outcomes by rounding to the nearest 10 or 100.

- If the digit to the right of the requested place is
  - 0, 1, 2, 3 or 4 - round down
    - keep the digit in the requested place unchanged.
  - 5, 6, 7, 8 or 9 - round up
    - add 1 to the digit in the requested place.
- Keep the number of digits in the answer the same as in the question by using zeros to fill the vacated spaces.

ROUNDING RULE

< 5 Round down
≥ 5 Round up

≈ approximately equals

Q. Estimate the difference between 418 and 103 by rounding to the nearest ten before subtracting.

A. $418 - 103$
$\approx 420 - 100$
$= \mathbf{320}$

Round 418 up to 420 and 103 down to 100. Subtract these answers to estimate the difference.

a) Estimate the product of 28 and 53 by rounding to the nearest ten before multiplying.

28×53

$\approx 30 \times 50 = 1500$

b) Estimate the sum of 71 and 29 by rounding to the nearest ten before adding.

$\approx$ ..... $=$ .....

c) Estimate the sum of 123 and 49 by rounding to the nearest ten before adding.

$\approx$ ..... $=$ .....

d) Estimate the sum of 48 and 31 by rounding to the nearest ten before adding.

$\approx$ ..... $=$ .....

e) Estimate the difference between 888 and 214 by rounding to the nearest hundred before subtracting.

$\approx$ ..... $=$ .....

f) Estimate the difference between 452 and 249 by rounding to the nearest ten before subtracting.

$\approx$ ..... $=$ .....

g) Estimate the product of 38 and 64 by rounding to the nearest ten before multiplying.

$\approx$ ..... $=$ .....

h) Estimate the product of 36 and 29 by rounding to the nearest ten before multiplying.

$\approx$ ..... $=$ .....

Skill 12.11 Rounding decimal numbers to a given place.

- If the digit to the right of the place is
  - 0, 1, 2, 3 or 4 - round down
    - keep the digit in the requested place unchanged.
  - 5, 6, 7, 8 or 9 - round up
    - add 1 to the digit in the requested place.
- Keep the number of digits in the answer the same as in the question by using zeros to fill the vacated spaces.

ROUNDING RULE
< 5 Round down
≥ 5 Round up

Q. Round 34.21 to the nearest tenth.

A. ***34.2***

34.2$\underline{1}$
The digit to the right of the tenths is 1.
1 < 5 so round down.
Keep the 2 in the tenths place unchanged.

a) Round 3.89 to the nearest tenth.

3.8$\underline{9}$ — *9 ≥ 5 round up by adding 1 to 8*

3.9

b) Round 4.51 to the nearest tenth.

c) Round 6.34 to the nearest tenth.

d) Round 27.85 to the nearest tenth.

e) Round 15.76 to the nearest tenth.

f) Round 45.08 to the nearest tenth.

g) Round 7.99 to the nearest tenth.

h) Round 1.03 to the nearest tenth.

i) Round 3.786 to the nearest hundredth.

j) Round 9.109 to the nearest hundredth.

k) Round 7.254 to the nearest hundredth.

l) Round 2.581 to the nearest hundredth.

m) Round 3.046 to the nearest hundredth.

n) Round 8.965 to the nearest hundredth.

Skill 12.12 Estimating outcomes by rounding decimals to whole numbers.

- If the digit to the right of the decimal point is
  - 0, 1, 2, 3 or 4 - round down
    - keep the digit in the units place unchanged.
  - 5, 6, 7, 8 or 9 - round up
    - add 1 to the digit in the units place.
- Leave off all digits after the decimal point.

ROUNDING RULE

< 5 Round down
≥ 5 Round up

≈ approximately equals

Q. Estimate the total cost by rounding to the nearest dollar:
$15.25 + $3.10 + $4.80 + $6.95

A. *$15.25 + $3.10 + $4.80 + $6.95*
≈ *$15 + $3 + $5 + $7*
= ***$30***

Round each dollar value, then add to estimate the total cost.

a) Estimate the sum of 5.4 and 8.7 by rounding to the nearest whole number before adding.

5.4 + 8.7

≈ *5 + 9* = 14

b) Estimate the difference between 9.3 and 6.8 by rounding to the nearest whole number before subtracting.

≈ =

c) Estimate the difference between 22.8 and 12.9 by rounding to the nearest whole number before subtracting.

≈ =

d) Estimate the sum of 7.6 and 6.2 by rounding to the nearest whole number before adding.

≈ =

e) Estimate the perimeter of a rectangular yard with a length of 4.7 m and a width of 8.2 m by rounding to the nearest metre.

≈ = m

f) Estimate the difference between 6.7 and 2.03 by rounding to the nearest whole number before subtracting.

≈ =

g) Estimate the total cost by rounding to the nearest dollar:
$10.30 + $5.15 + $8.95 + $6.25

≈ = $

h) Estimate the total cost by rounding to the nearest dollar:
$24.95 + $9.85 + $3.15 + $12.35

≈ = $