Place Value

1. The Place Value Chart

					7	4	0	3	9	8	1	5	5	6	.	3	0	5

(Headers from left to right: TRILLION (hundred, ten, one), BILLION (hundred, ten, one), MILLION (hundred, ten, one), THOUSAND (hundred, ten, one), hundred, ten, one, . , tenths, hundredths, thousandths)

2. Powers of Ten

The place value chart uses words to indicate the different values in the different places. Mathematicians love shortcuts, so they have devised a simple method for writing large and small multiples of ten. They are called the Powers of Ten and they use exponents for their shortcuts.
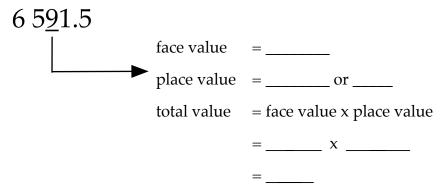
Words	Number	Power of Ten
one hundred trillion	100 000 000 000 000	10^{14}
ten trillion	10 000 000 000 000	10^{13}
one trillion	1 000 000 000 000	10^{12}
one hundred billion	100 000 000 000	___
ten billion	10 000 000 000	10^{10}
one billion	1 000 000 000	10^{9}
one hundred million	100 000 000	___
ten million	10 000 000	10^{7}
one million	1 000 000	10^{6}
one hundred thousand	100 000	10^{5}
ten thousand	10 000	10^{4}
one thousand	1000	10^{3}
one hundred	100	10^{2}
ten	10	10^{1} or ___
one	1	10^{0}
one tenth	0.1	$\frac{1}{10}$
one hundredth	0.01	$\frac{1}{10^{2}}$
one thousandth	0.001	$\frac{1}{10^{3}}$

3. <u>Face Value, Place Value, and Total Value</u>

The face value is the actual _____ from 0 - 9.

The place value is the _____ the digit holds on the place value chart.

The total value is the _____ value x the _____ value.

6 5<u>9</u>1.5

face value   = _____

place value   = _____ or _____

total value   = face value x place value

              = _____ x _____

              = _____

4. <u>Reading the Decimal and a Note about Commas</u>

We use the word _____ when reading and writing the decimal

e.g. 14.37 is written as _____

It used to be common practice to use commas in a large number --> 24,358.
Now, commas are used to distinguish between two separate numbers.
We do not use commas in large numbers. We leave a space --> 24 358.

5. <u>Standard Form vs. Expanded Form</u>

4<u>2</u>9.35   =   400 + 20 + 9 + 0.3 + 0.05

or (4 x 100) + (2 x 10) + (9 x 1) + (3 x 0.1) + (5 x 0.01)

or $(4 \times 10^2) + (2 \times 10) + 9 + (3 \times \frac{1}{10}) + (5 \times \frac{1}{10^2})$*

Standard Form   Expanded Form

*this is the proper way to expand in grade eight!

<u>Write the following standard forms into expanded forms:</u>

a. 0.5 = "five tenths" = _____

b. 4.02 = "four and two hundredths" = _____

c. 500.2 = "five hundred and two tenths" = _____

d. 0.385 = "three hundred eighty five thousandths"

       = _____

6. A Handy Reference Guide to Writing Numbers into Words

one
two

three
four

five
six

seven
eight

nine
ten

---

eleven
twelve

thirteen
fourteen

fifteen
sixteen

seventeen
eighteen

nineteen
twenty

---

thirty

forty

fifty

sixty

seventy

eighty

ninety

one hundred

---

one thousand

twenty thousand

two hundred thousand

one million
forty million
six hundred million

one billion
seventy billion
nine hundred billion

---

one tenth

nine tenths

five hundredths

seventy five hundredths

eight thousandths

twelve thousandths

twenty four thousandths

five hundred eighty five thousandths