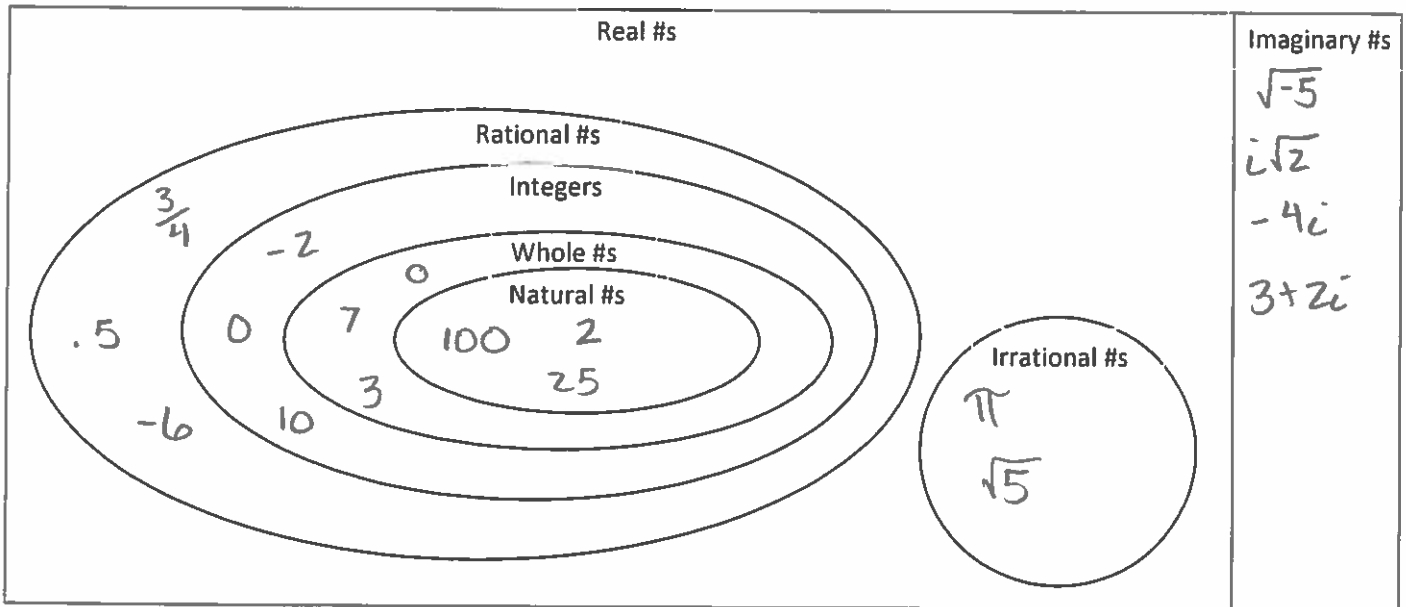# Classifying Numbers and Basic Algebra Practice

Classifying #s: Every number that we will use in Algebra 2 can be classified by at least one of the following types of numbers. Many numbers will be classified using several types.

	Definition:	Examples:
Natural #s	Counting numbers	1, 2, 3 . . .
Whole #s	natural numbers and zero	0, 1, 2 . . .
Integers	whole numbers and negatives	. . . -2, -1, 0, 1, 2 . . .
Rational #s	integers, fractions, repeating decimals	$4, \frac{1}{2}, .\overline{33}, .75$
Irrational #s	non-repeating decimals, square roots	$\pi, e, \sqrt{2}$
Real #s	↖ see above ↗	
Imaginary #s	non-real numbers, square roots of negative numbers	$3i, i\sqrt{3}, 2-4i$ $\sqrt{-7}$

Real #s

Rational #s

Integers

Whole #s

Natural #s

$\frac{3}{4}$

-2

0

7

100   2

.5   0

25

3

-6   10

Irrational #s

π

$\sqrt{5}$

Imaginary #s

$\sqrt{-5}$

$i\sqrt{2}$

$-4i$

$3+2i$

Example 1... Classify each number (list all categories it falls in).

a. 13

Natural
whole
Integer
Rational
Real

b. ½

Rational
Real

c. -4

Integer
Rational
Real

d. –0.3333

Rational
Real

e. π

Irrational
Real

f. 2*i*

Imaginary

Vocabulary:

The ___opposite___, or additive inverse, of any number "a" is: ___$-a$___ (change signs).

The ___reciprocal___, or multiplicative inverse, of any number "a" is: ___$\frac{1}{a}$___ (flip fraction).

Example 2... Find the opposite and reciprocal of each number.

a. $4\frac{1}{5}$

Opp: $-4\frac{1}{5}$

Recip: $\frac{5}{21}$

$4\frac{1}{5} = \frac{21}{5}$

b. -0.002

Opp: 0.002

Recip: $-\frac{1000}{2} = -500$

$-.002 = -\frac{2}{1000}$

c. $-\frac{4}{9}$

Opp: $\frac{4}{9}$

Recip: $-\frac{9}{4}$

Example 3... Evaluate the expressions.

a. $(x-18)^2 - 4x$; $x = 6$

$(6-18)^2 - 4(6)$

$(-12)^2 - 4(6)$

$144 - 24$

120

b. $k^2 - (3k - 5n) + 4n$; $k = -1$ and $n = -2$

$(-1)^2 - (3(-1) - 5(-2)) + 4(-2)$

$1 - (-3 + 10) - 8$

$1 - 7 - 8$

$-6 - 8 = -14$

c. The expression -0.3y + 61 models the percent of eligible voters who voted in presidential elections from 1960 to 2000 (where y represents the number of years after 1960). Find the approximate number of voters who voted in 1988.   y = 28 (1988 - 1960)

$-.3(28) + 61$

$-8.4 + 61 = 52.6\%$ of voters

Example 4... Simplify the expression.

a. $4 + (2 + 1)^2$

$4 + (3)^2$

$4 + 9$

13

b. $4 + 3[4 - 2(6 - 3)] \div 2$

$4 + 3[4 - 2(3)] \div 2$

$4 + 3[4 - 6] \div 2$

$4 + 3[-2] \div 2$

$4 - 6 \div 2$

$4 - 3 = 1$

c. $2h - 3k + 7(2h - 3k)$

$2h - 3k + 14h - 21k$

$16h - 24k$

d. $5x^2 - 3x + x^2$

$6x^2 - 3x$

Example 5... Solve each equation.

a. $2(y - 4) + 6 = 70$

$2y - 8 + 6 = 70$

$2y - 2 = 70$
$ +2 \quad +2$

$\dfrac{2y}{2} = \dfrac{72}{2}$

$y = 36$

b. $6(t - 2) = 2(9 - 2t)$

$6t - 12 = 18 - 4t$
$^{+4t} \qquad ^{+4t}$

$10t - 12 = 18$
$^{+12} \qquad ^{+12}$

$\dfrac{10t}{10} = \dfrac{30}{10}$

$t = 3$

Example 6... Solve each formula for the indicated variable.

a. $A = (\frac{1}{2} bh)$; h

$\dfrac{2A}{b} = \dfrac{bh}{b}$

$h = \dfrac{2A}{b}$

b. $\dfrac{S}{2\pi h} = \dfrac{2\pi rh}{2\pi h}$; r

$r = \dfrac{S}{2\pi h}$