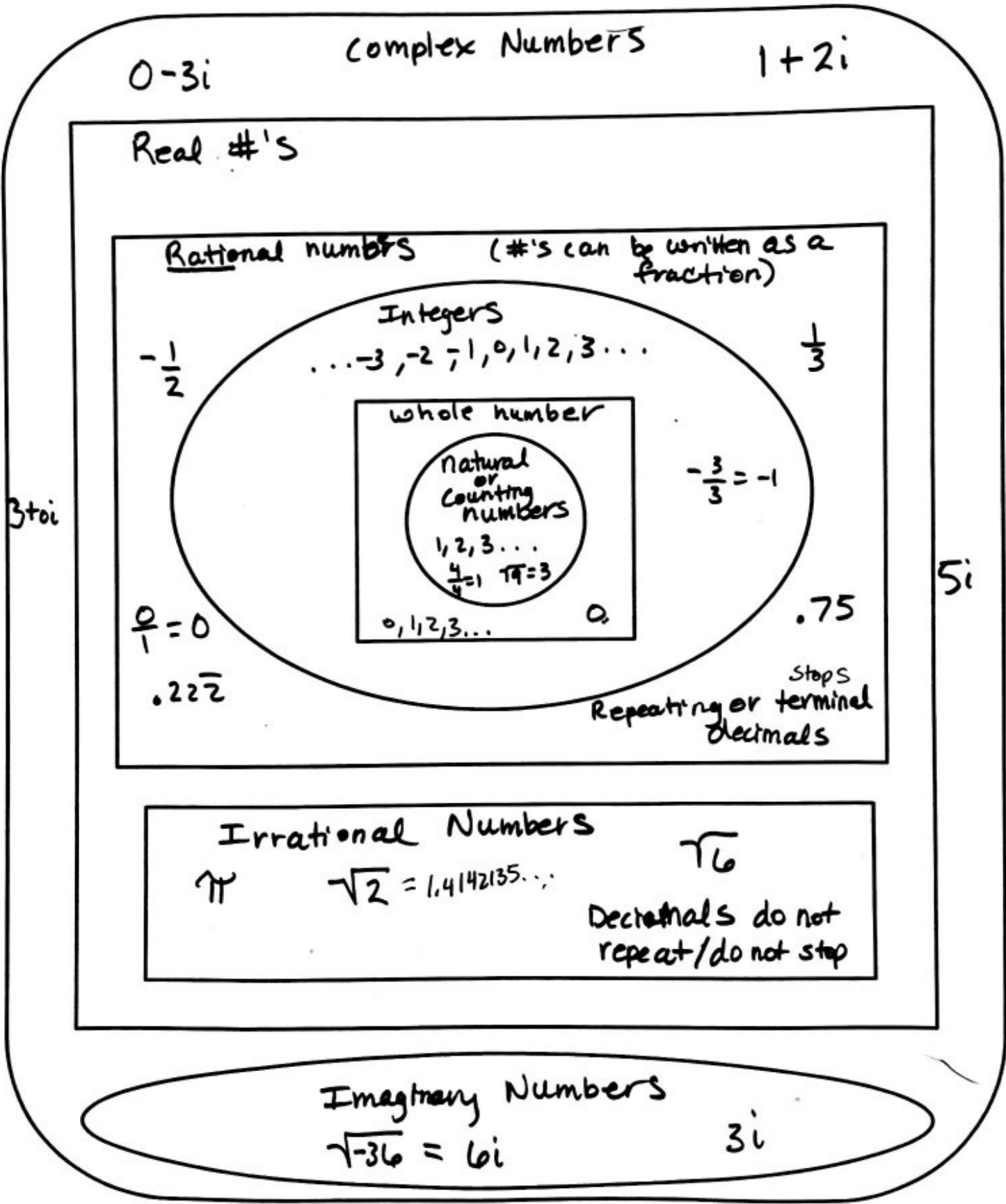


2.1 Number Theory



Irrational Numbers

π

$\sqrt{2} = 1.4142135 \dots$

$\sqrt{6}$

Decimals do not repeat / do not stop

Imaginary Numbers

$\sqrt{-36} = 6i$

$3i$

$$3x^2 + 4x + 2y + 7 - 7z$$

2.1 Adding, Subtracting, and Multiplying Polynomials Notes

Monomial: An expression that is a number, a variable, or numbers and variables multiplied together. Monomials only have variables with whole number exponents and never have variables in the denominator of a fraction or variables under roots.

Monomials: $5b$, $\frac{xyz}{8}$, $-w$, 23 , x^2 , $\frac{1}{3}x^3y^4$

Not Monomials: $\frac{1}{x^4}$, \sqrt{x} , a^{-1} , $z^{\frac{1}{5}}$

variable under root → Fraction in exponent
 variable in denominator → negative exponent

Constant: A monomial that contains no variables, like 23 or -1.

Coefficient: The numerical part of a monomial (the number being multiplied by the variables.)

coefficient ← $3x^2$

Polynomial: A monomial or several monomials joined by + or - signs.

Terms: The monomials that make up a polynomial. Terms are separated by + or - signs.

5 terms

$$5xy + 2a + 7b + 4y + 10$$

Like Terms: Terms whose variables and exponents are exactly the same.

Binomial: A polynomial with two unlike terms.

Trinomial: A polynomial with three unlike terms.

Adding and Subtracting Polynomials

To add or subtract polynomials, combine like terms. Add or subtract the coefficients. The variables and exponents do not change. **Remember to subtract everything inside the parentheses after a minus sign.** Subtract means "add the opposite," so change the minus sign to a plus sign and then change the signs of all the terms inside the parentheses.

Examples: Simplify each expression.

a) $(5n^2 - 2) + (7 + 3n^2)$

$$2n^2 + 5$$

b) $(4x^2 - 3x + 1) + (-2x^2 + 5x - 6)$

$$2x^2 + 2x - 5$$

c) $(2w^2 + 3w) + (2w^2 + w)$

$$-2w^2 + 2w$$

d) $(-6x^2 - 3x + 2) + (4x^2 + x + 3)$

$$-2x^2 - 2x - 1$$

i) $(6m^2 + 5m) + (4m^2 + 2m) + (3m^2 - 7m)$

$$5m^2$$

j) $(-2k + 5) + (k^2 - 3k) + (4k^2 + 8)$

$$5k^2 - 5k - 3$$

Multiplying Polynomials

#change exponents

To multiply two polynomials, distribute each term of one polynomial to each term of the other polynomial. Then combine any like terms. When you are multiplying two binomials, this is sometimes called the **FOIL Method** because you multiply **F** the *first* terms, **O** the *outside* terms, **I** the *inside* terms, and **L** the *last* terms.

Examples: Multiply.

a) $-4x^2(7x^2y + 3xy - 11)$
 $-7x^3y^2 - 3x^2y^2 + 11xy$

c) $(3x+1)(3x-2)$

e) $(2x-3)^2$ rewrite it
 $(2x-3)(2x-3)$
 $4x^2 - 6x - 6x + 9$
 $4x^2 - 12x + 9$

g) $(2x-3)(5x^2-6x+7)$
 $10x^3 - 12x^2 + 14x$
 $+ \quad -15x^2 + 18x - 21$
 $10x^3 - 27x^2 + 32x - 21$

b) $(m+3)(m-8)$

$$m^2 - 8m + 3m - 24 = m^2 - 5m - 24$$

d) $(2u^2-1)(-5u^2+4)$
 $-10u^4 + 8u^2 + 5u^2 - 4$
 $-10u^4 + 13u^2 - 4$

f) $(n+3)(n-3)$

$$n^2 - 3n + 3n - 9$$
$$n^2 - 9$$

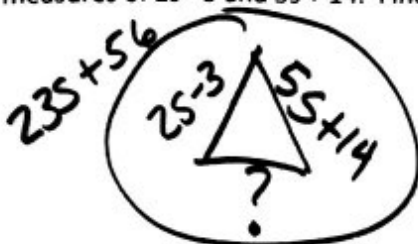
h) $(4x^2+7x-3)(x^2-2x+8)$
 $4x^4 - 8x^3 + 32x^2$
 $7x^3 - 14x^2 + 56x$
 $-3x^2 + 6x - 24$

$$4x^4 - x^3 + 15x^2 + 62x - 24$$

Perimeter

Perimeter = sum of all the sides

The measure of the perimeter of a triangle is $23s + 56$. It is known that two of the sides of the triangle have measures of $2s - 3$ and $5s + 14$. Find the length of the third side.



$$23s + 56 + (2s - 3) + (5s + 14)$$
$$16s + 45$$