

Concepts on Test #4 – Math 311 Spring 2012

Integer Addition

Same Signs

Add numbers (ignore signs) & Keep common sign

Different Signs

Subtract Big # – Small # & Keep sign of Big #

Real Number Addition

Rules of Integer Addition Used on

Fractions

Decimals

Ex 1: Add a) $-594 + -783$ b) $-\frac{1}{5} + -\frac{5}{7}$ c) $-0.154 + -9.84$

Ex 2: Add a) $-57 + 192$ b) $1\frac{2}{5} + -5\frac{1}{3}$ c) $4.2 + -1.97$

Integer Subtraction

Change Subtraction to Addition

Copy 1st # and add the opposite of the 2nd #

Real Number Subtraction

Rules of Integer Subtraction Used on

Fractions

Decimals

Ex 3: Subtract a) $-278 - 312$ b) $\frac{7}{8} - 1\frac{5}{12}$ c) $-14.87 - (-209.6)$

Multiply/Divide Integers & Real Numbers

$+\bullet+=+$ or $+\div+=+$

$-\bullet-=+$ or $-\div-=+$

$+\bullet=-$ or $+\div=-$

$-\bullet+=-$ or $-\div+=-$

Apply to Integers, Fractions & Decimals

Ex 4: Divide a) $-27 \div 5$ b) $-2\frac{1}{3} \div -3$ c) $5.1 \div -0.3$

Solving Algebraic Equations Using Multiplication Property

Involving Whole Numbers

Involving Fractions

Involving Decimals

Involving Integers

Involving Real Numbers

Ex 5: Solve a) $-5x = -175$ b) $-\frac{2}{3}x = 1\frac{7}{15}$ c) $0.02x = 2.7$

Solving Algebraic Equations Using the Addition Property

Involving Whole Numbers

Involving Fractions

Involving Decimals

Involving Integers

Involving Real Numbers

Ex 6: Solve a) $x + 54 = -112$ b) $x + -\frac{5}{7} = 2\frac{6}{35}$ c) $x - 0.5 = 1.75$

Solving Algebraic Equations Using BOTH Addition & Multiplication Property

Involving Whole Numbers

Involving Fractions

Involving Decimals

Involving Integers

Involving Real Numbers

Ex 7: Solve a) $2x + 19 = 215$ b) $1\frac{1}{2}x - 1 = \frac{2}{3}$ c) $0.5x + -1.28 = -5.8$

Ex 8: Check your solution to Ex 7 c): $0.5x + -1.28 = -5.8$

Check your solution to Ex 6 b): $x + -\frac{5}{7} = 2\frac{6}{35}$

Order of Operations

PEMDAS

Parentheses – (), [], {}, |, √, fraction bar

Exponents

Multiply & Divide in left to right order

Add & Subtract in left to right order

Ex 9: Simplify a) $\sqrt{16+9} \div 5 \cdot (-2) + 1$ b) $(2 - 5)^3 \div 3 - 6$

c) $\frac{-|14 - 15| + |20 \div -5 \cdot 4|}{15 \div [(5 - 6) \cdot 3] + 5}$

Properties of the Real Numbers

Commutative Property of Addition

This is how we add $5 + 2$ and get the same answer as $2 + 5$

Commutative Property of Multiplication

This is how we multiply $7 \cdot 8$ and get the same answer as $8 \cdot 7$

Associative Property of Addition

This is how we add $(2 + 5) + 8$ as opposed to $2 + (5 + 8)$ and still get the same answer

Associative Property of Multiplication

This is how we multiply $(2 \cdot 5) \cdot 8$ as opposed to $2 \cdot (5 \cdot 8)$ and still get the same answer

Distributive Property

Multiplication Distributes over Addition $2(x + 3) = 2 \cdot x + 2 \cdot 3$

Multiplication Property of Zero

Zero times anything is Zero

Division by Zero

Anything divided by zero is undefined

Zero divided by Anything

Zero divided by anything is zero

Inverse Property of Addition

This is how we achieve zero to make something go away in moving around equal sign $-2 + 2 = 0$

Inverse Property of Multiplication

This is how we achieve one to make a remove a numeric coefficient in an equation $5 \cdot 1/5 = 1$

Identity Property of Addition

This is how we make magic happen after using the addition property of equality $0 + 4 = 4$

Identity Property of Multiplication

This is how we make magic happen after using the multiplication property of equality $1 \cdot x = x$

- Ex 10:** Name the property
- a) $7x + 3 + 3x = 7x + 3x + 3$ b) $2 \cdot 3x = (2 \cdot 3)x$
c) $(7 + 3)x = 7x + 3x$ d) $a \lceil 0$
e) $0x = 0$ f) $5 + -5 = 0$

Expressions vs Equations

Simplify vs Solve

Simplify an algebraic expression

Solve an algebraic equation

Find a value that makes a truth value of “true” when each expression is evaluated

- Ex 11:** Which can be solved? a) $2x - 5$ or b) $2x - 5 = 1$

Evaluation of an Algebraic Expression

Put in values for variable(s)

Follow order of operations to get to a single number

Ex 12: Evaluate each of the following when $x = 2$, $y = -3$ & $z = -1$

- a) $x \div z + (y + z)$ b) $\frac{x}{z} + \frac{y}{z}$ (use fractions to simplify)

Simplifying Algebraic Expressions

Distinguishing like terms

Combining like terms

Applying addition/subtraction of whole #'s, integers, fractions, decimals & real #'s

- Ex 13:** Simplify
- a) $2x + 5x$ b) $\frac{2}{3}x + 5\frac{1}{3} + 2\frac{1}{3}x - \frac{1}{3}$
c) $2(0.25x + 1) - 0.75x - 0.2$ d) $5 - 2(x + 3) - 5x$

Types of Polynomials

Monomial

Binomial

Trinomial

- Ex 20:** Give an example of a: a) monomial b) binomial c) polynomial

Degrees of Terms & Polynomials

Degree of a Term – Sum of all exponents in a term

Constant Degree is Zero

Used to Order a Polynomial – Highest to lowest degree to order

Degree of Polynomial – Degree of highest degree term

Ex 17: What are the degrees of the terms in your answer to Ex 16 c)?

Ex. 18: Give the ordered polynomial for $5x^2 - 7 + 2x$

Ex 19: What is the degree of the polynomial $x^2 - 5x^3 + 2$?

Adding & Subtracting Polynomials

Combining like terms

Columns

Ex 14: Add/Subtract a) $(2x^2 + 3x - 5) + (3x - 5 + 2x^2)$

b) $(5x^2 - 7 + 2x) - (x^2 - 5x^3 + 2)$

Multiplying a Monomial x Monomial

Product Rule for Exponents

Copy like base & add exponents

Apply Commutative & Associative Property

Application of product rule

Ex 15: Multiply/Simplify a) $x^2 \cdot x^5$ b) $(2x^2y)(3x^3y^2)$ c) $(\frac{1}{2}xy)(\frac{2}{3}x^2y^3)$

Multiplying a Monomial x Polynomial

Distributive Property

Apply Monomial x Monomial

Ex 16: Multiply/Simplify a) $5(x + 5)$ b) $2x(x^2 + 2x - 5)$

c) $3x^2y(2x^2 - 3y + 2xy - 5)$