Indiana Mathematics Content Connectors

Grade 7

Number Sense NS

1 **Show on a number line that a number and its opposite have a sum of 0 (are additive inverses). Find and interpret sums of rational numbers in real-world contexts.** 7.NS.1

- a Use a number line to identify additive inverses. (E) 7.NS.1A
- b Add positive and negative integers between -100 and 100. (E) 7.NS.1B

2 **Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.** 7.NS.2

- a Use the distance between two integer numbers on a number line to explain absolute value and its relationship to distance. 7.NS.2A

3 **Use the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. (E)** 7.NS.3

- a Use the distributive property to multiply integers. (E) 7.NS.3A

4 **Explain that if p and q are integers, then –(p/q) = (–p)/q = p/(–q) for all nonzero integers. (E)** 7.NS.4

- a Divide positive and negative nonzero integers. (E) 7.NS.4A

5 **Find the prime factorization of whole numbers and write the results using exponents.** 7.NS.5

- a Find the prime factorization of whole numbers limited to four prime factors. Write the prime factorization of whole numbers as a multiplication equation with or without exponents. 7.NS.5A

6 **Apply the inverse relationship between squaring and finding the square root of a perfect square whole number. Find square roots of perfect square whole numbers.** 7.NS.6

- a Find square roots of perfect square whole numbers (limit to perfect squares less than or equal to 144). (E) 7.NS.6A

7 **Compute fluently with rational numbers using an algorithmic approach. (E)** 7.NS.7

Add, subtract, multiply, and divide integers; decimals to the hundredths, and common fractions. (E) 7.NS.7A

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Ratios and Proportional Reasoning RP

1 Identify the unit rate or constant of proportionality in tables, graphs, equations, and verbal descriptions of proportional relationships. 7.RP.1

- a Identify the unit rate or constant of proportionality of a line from a table, graph, or equation. (E) 7.RP.1A

2 Use proportional relationships to solve ratio and percent problems with multiple operations (e.g., simple interest, tax, markups, markdowns, gratuities, conversions within and across measurement systems, and percent increase and decrease). (E) 7.RP.2

- a Use proportions to solve percent problems with multiple operations (markups, markdowns, tax, gratuities). (E) 7.RP.2A

3 Represent real-world and other mathematical situations that involve proportional relationships. Write equations and draw graphs to represent these proportional relationships. Apply the definition of unit rate to y = mx. (E) 7.RP.3

- a Generate a graph or a written equation in the form of y = mx that represents a given proportional relationship. 7.RP.3A

Algebra and Functions AF

1 Apply the properties of operations (e.g., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions, including situations that involve factoring out a common number (e.g., given 2x - 10, create an equivalent expression 2(x - 5)). Justify each step in the process. (E) 7.AF.1

- a Apply the distributive and associative properties to create equivalent linear expressions. 7.AF.1A

2 Solve real-world problems with rational numbers by using one or two operations. (E) 7.AF.2

- a Solve one-step real-world problems with positive integers, decimals to the hundredths, and common fractions. (E) 7.AF.2A

3 Solve equations of the form px + q = r and p(x + q) = r fluently, where p, q, and r are specific rational numbers. Represent real-world problems using equations of these forms and solve such problems. (E) 7.AF.3

- a Solve equations of the form px + q = r and p(x + q) = r, where p, q, and r are integers. (E) 7.AF.3A

4 Solve inequalities of the form px + q (> or ≥) r or px + q (< or ≤) r, where p, q, and r are specific rational numbers. Represent real-world problems using inequalities of these forms and solve such problems. Graph the solution set of the inequality and interpret it in the context of the problem. 7.AF.4

- a Solve inequalities of the form px + q (> or ≥) r or px + q (< or ≤) r, where p, q, and r are specific integers. Graph solutions on a number line. (E) 7.AF.4A

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)efine slope as vertical change for each unit of horizontal change, and apply that a onstant rate of change or constant slope describes a linear function. Identify and

describe situations with constant or varying rates of change. 7.AF.5

a Define slope as vertical change for each unit of horizontal change. Identify simple situations as having a constant or varying rate of change. 7.AF.5A

6 **Graph a line given its slope and a point on the line. Find the slope of a line given its graph. (E)** 7.AF.6

a Find the slope of a line given its graph. (E) 7.AF.6A

Geometry and Measurement GM

1 **Solve real-world and other mathematical problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing. Create a scale drawing by using proportional reasoning.** 7.GM.1

a Given a triangle or rectangle with all whole number side lengths provided, identify a similar figure when given the scale factor. 7.GM.1A

2 **Understand the formulas for area and circumference of a circle and use them to solve real-world and other mathematical problems; give an informal derivation of the relationship between circumference and area of a circle.** 7.GM.2

a Calculate the area and/or circumference of a circle given the formulas. Use pi as approximately 3.14. (E) 7.GM.2A

3 **Solve real-world and other mathematical problems involving volume of cylinders and three-dimensional objects composed of right rectangular prisms. (E)** 7.GM.3

a In real-world and mathematical situations, find the volume of cylinders when given the formula V = pi(r^2)(h) for volume, a model, and all required measurements. 7.GM.3A

Data Analysis, Statistics, and Probability DSP

1 **Understand that statistics can be used to gain information about a population by examining a sample of the population. Understand that conclusions and generalizations about a population from a sample are valid only if the sample is representative of that population and that random sampling tends to produce representative samples and support valid inferences. (E)** 7.DSP.1

a Determine if a given sample is representative of a population. 7.DSP.1A

2 **Find, use, and interpret measures of central tendency (mean and median) and measures of spread (range, interquartile range, and mean absolute deviation) for numerical data from random samples to draw comparative inferences about two populations. (E)** 7.DSP.2

a Find and use mean, median, range, and interquartile range for numerical data from random samples to draw comparative inferences about two populations. 7.DSP.2A

3 **Make observations about the degree of visual overlap of two numerical data distributions represented in line plots or box plots. Describe how data, particularly outliers, added to a data set may affect the mean and/or median.** 7.DSP.3

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a Compare the distribution of two data sets given a graph. Identify clear outliers of a data set. 7.DSP.3A

4 **Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Understand that a probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. Understand that a probability of 1 indicates an event certain to occur and a probability of 0 indicates an event impossible to occur. Identify probabilities of events as impossible, unlikely, equally likely, likely, or certain. (E)** 7.DSP.4

a Identify the probability of events as being certain (equal to one), very likely (closer to one), neither unlikely nor likely (around half), unlikely (closer to zero), or impossible (equal to zero). 7.DSP.4A

5 **Develop probability models that include the sample space and probabilities of outcomes to represent simple events with equally likely outcomes. Predict the approximate relative frequency of the event based on the model. Compare probabilities from the model to observed frequencies, evaluate the level of agreement, and explain possible sources of discrepancy. (E)** 7.DSP.5

a Determine the probability of a simple event. 7.DSP.5A

b Compare the probability of a simple event with the simulated probability of a simple event. 7.DSP.5B