**7th Grade Review**

Unit 1 – The Number System

Integer Rules

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| Addition | pos + pos = add, keep posneg + neg = add, keep negpos + neg = subtract, keep the sign of whoever there is “more of” | 3 + 6 = 9-2 + (-8) = -103 + (-7) = -4-3 + 7 = 4 |
| Subtraction | Keep Change ChangeFollow addition rules | -4 – 8 = -4 + (-8) = -12-9 – (-2) = -9 + 2 = -73 – 11 = 3 + (-11) = -85 – (-1) = 5 + 1 = 6 |
| Multiplication | Same Signs = PosDifferent Signs = Neg | 7 × 8 = 56-3 × -4 = 12-9 × 10 = -907 × -6 = -42 |
| Division | Same Signs = PosDifferent Signs = Neg | 9/3 = 3-10/-2 = 512/-3 = -4-15/5 = -3 |
| Change | Positive change is increasing (up!)Negative change is decreasing (down!) |

Fraction Rules

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| Addition | Find a Common Denominator (the LCM). Multiply the numerator by the same number to get the common denominator. Add the numerators and KEEP the denominators | $$\frac{2}{3}+\frac{1}{5}$$Common denominator = 15$$\frac{10}{15}+\frac{3}{15}=\frac{13}{15}$$ |
| Subtraction | Find a Common Denominator (the LCM). Multiply the numerator by the same number to get the common denominator. Subtract the numerators and KEEP the denominators | $$\frac{2}{3}-\frac{1}{5}$$Common denominator = 15$$\frac{10}{15}-\frac{3}{15}=\frac{7}{15}$$ |
| Multiplication | Multiply the numerators and multiply the denominators | $$\frac{2}{3}×\frac{1}{5}= \frac{2}{15}$$ |
| Division | Keep Change FlipChange division to multiplication and do the reciprocal of the second fraction | $$\frac{2}{3}÷\frac{1}{5}$$$$\frac{2}{3}×\frac{5}{1}=\frac{10}{3}$$ |

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| Fraction 🡪 Decimal | Divide the numerator by the denominator.Numerator in the box! | $$\frac{3}{5}$$Means 5|3.00 |

Unit 2 – Unit Rate, Proportional Relationships

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| Unit Rate/Cost | Out of 1 Divide!!$$ goes in the box!Find the unit rate on a graph by looking at x = 1 |
| k = y/xy = kx | To write the equation, determine k, the constant of proportionality |
| Proportional Relationships | k is constant (ratios are equal), and it creates a straight line through the origin on a graph |

Percents

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| Percent | A fraction – part/whole | Change to a decimal by moving the decimal point 2 places to the left (dividing by 100) |
| Percent of a number | Change the percent to a decimal and multiply by the whole  | 25% of 200200 × .25 = 50 |
| Percent Change (increase or decrease) | $$\frac{amount of change (subtract)}{original}$$ | Price changed from $20 to $25$\frac{25-20}{20}= \frac{5}{20}= \frac{25}{100}=25\%$ increase |
| Tax, Tip, Markup | All an increase (+) to the original amount | Multiply the percent by the total and then add it to the total to find the retail price |
| Interest, Commission | A percent of the principal or total sales | Multiply the percent by the principal or sales, add if it asks for new balance or includes salary |
| Sale, Discount, Markdown | All a decrease (-) to the original amount | Multiply the percent by the total and then subtract it from the original to find the retail price |

Unit 3 – Algebra

Translating Expressions

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| Addition | more than, increased by, sum |
| Subtraction\*reverse the order it’s read | \*less than, \*fewer than, decreased by, difference, subtracted from |
| Multiplication | product, times, twice (2x) |
| Division | quotient, split, half(÷2) |

Expressions – NO EQUAL SIGN!

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| Distribute | Multiply the number on the outside by all terms inside the parentheses. Watch your negatives! | 3(2x + 9) 🡪 6x + 27-2(4x – 2) 🡪 -8x + 4 |
| Factor “Undistribute” | Find the GCF of both terms and take it outside of the parentheses, divide by the GCF to get the terms inside the parentheses. Distribute to check! | 2x – 10 🡪 2(x – 5) |
| Simplifying Expressions | Combine Like Terms – they must have the same exact variable or no variable. Box and circle including the sign in front of the term | 3x + 8 – 10 – 7x 🡪-4x - 2 |
| Adding and Subtracting Polynomials | If addition – combine like termsIf subtraction – Keep Change Change Everything in the 2nd parentheses and then combine like terms | (2x + 9) + (-4x – 3) 🡪 -2x + 6(5x – 10) – (3x – 11) 🡪 (5x – 10) **+** (**-**3x **+** 11) 🡪2x + 1 |

Equations – EQUAL SIGN!

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| Use the inverse operations to solve.Step 1 – undo the +/-Step 2 – undo the ×/÷ |
| 3x + 10 = 22 - 10 = - 10 3x = 12 3 3 x = 4 | x + 4 = 132 - 4 = - 4(2) x = 9(2) 2 x = 18  |

Inequalities

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| Inequality SymbolsRead left to right | < less than, > greater than≤ less than or equal to≥ greater than or equal to |
| Graphing | <, > open circle≤, ≥ closed circle |
| Solving – use the inverse operations EXACTLY like solving equations | 2x – 8 < 12 + 8 + 8 2x < 20 2 2 x < 10 |
| Special Rule!! When multiplying or dividing BY a negative number, you must FLIP the inequality symbol to keep it true | -3x + 3 ≥ 15 - 3 - 3 -3x ≥ 12 -3 -3 x **≤** -4 |

Unit 4 – Geometry

Scales

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| A scale is a ratio of two different measurements | 1in:50ft |
| Solve for the actual measurement or the drawing measurement by setting up a proportion! | $$\frac{1 in}{50ft}=\frac{3in}{xft}$$x = 150 ft |

Circles

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| Circumference C = πd or C = 2πr | d = 4, C = π(4), C = 4πr = 5, C = 2π(5), C = 10π |
| Area A = πr2 must have radius!Cut the diameter in half first | r = 6, A = π(6)2, A = 36πd = 10, **r = 5**, A = $π$(5)2, A = 25π |
| Use the π key in the calculator and round to the given place value |

Area

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| Square A = s2 | Plug the given values into the variables and solve algebraically |
| Rectangle A = lw |
| Parallelogram A = bh |
| Triangle A = ½bh |
| Trapezoid A = ½(b1 + b2)h |

Unit 5 – Statistics

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| Random – an equal chance of being chosen | Biased – does not accurately reflect the population |
| Dot Plots | Plots each data value on a number line |
| Box PlotDescribe the spread of the dataBox is most important! | Plots five key values of the data on a number line:Least, Greatest, Median, Lower Quartile, Upper Quartile |
| Measures of CenterDescribes the center or middle of the data | Mean – averageMedian – middle value in the data (L 🡪 G)Mode – most occurring number |
| Measures of Spread (Variability)Describes how the data is spread out | Range – difference of the highest and lowest value in the dataInterquartile Range (IQR) – difference of the UQ and LQMean Absolute Deviation (M.A.D) – find the average, find the difference of the average and each data value, find the average of the differences |
| Predicting with SamplesSet up a Proportion! | 3 out of 10 students are in band. How many out of 50 students are expected to be in band?$$\frac{3}{10}= \frac{x}{50}$$X = 15 |

Probability

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| Probability – the chance of an event happening (fraction, decimal, percent) | $$\frac{the total number of times an event occurs}{total number of outcomes}$$ |
| Theoretical Probability | What should happen based on the number of outcomes  |
| Experimental Probability | What happened based on the experiment  |
| Making Predictions with Probability – set up a proportion! | Number of times expected to roll a 2 on a number cube out of 30 trials$$\frac{1}{6}= \frac{x}{30}$$x = 5 |
| Counting Principle (Multiplication Rule) When solving for the total number of outcomes for a compound event, multiply the number of outcomes for each event | Rolling 2 number cubes: 6 × 6 = 36Flipping 3 coins: 2 × 2 × 2 = 83 choices of pants, 4 choices of shirts: 3 × 4 = 12 |