**7th Grade Review**

Unit 1 – The Number System

Integer Rules

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| Addition | pos + pos = add, keep pos  neg + neg = add, keep neg  pos + neg = subtract, keep the sign of whoever there is “more of” | 3 + 6 = 9  -2 + (-8) = -10  3 + (-7) = -4  -3 + 7 = 4 |
| Subtraction | Keep Change Change  Follow addition rules | -4 – 8 = -4 + (-8) = -12  -9 – (-2) = -9 + 2 = -7  3 – 11 = 3 + (-11) = -8  5 – (-1) = 5 + 1 = 6 |
| Multiplication | Same Signs = Pos  Different Signs = Neg | 7 × 8 = 56  -3 × -4 = 12  -9 × 10 = -90  7 × -6 = -42 |
| Division | Same Signs = Pos  Different Signs = Neg | 9/3 = 3  -10/-2 = 5  12/-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 | Common denominator = 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 | Common denominator = 15 |
| Multiplication | Multiply the numerators and multiply the denominators |  |
| Division | Keep Change Flip  Change division to multiplication and do the reciprocal of the second fraction |  |

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| Fraction 🡪 Decimal | Divide the numerator by the denominator.  Numerator in the box! | 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/x  y = 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 200  200 × .25 = 50 |
| Percent Change (increase or decrease) |  | Price changed from $20 to $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 terms  If 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 = 13  2  - 4 = - 4  (2) x = 9(2)  2  x = 18 |

Inequalities

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| Inequality Symbols  Read 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! | x = 150 ft |

Circles

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| Circumference C = πd or C = 2πr | d = 4, C = π(4), C = 4π  r = 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 = 36π  d = 10, **r = 5**, A = (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 Plot  Describe the spread of the data  Box is most important! | Plots five key values of the data on a number line:  Least, Greatest, Median,  Lower Quartile, Upper Quartile |
| Measures of Center  Describes the center or middle of the data | Mean – average  Median – 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 data  Interquartile Range (IQR) – difference of the UQ and LQ  Mean 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 Samples  Set up a Proportion! | 3 out of 10 students are in band. How many out of 50 students are expected to be in band?  X = 15 |

Probability

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| Probability – the chance of an event happening (fraction, decimal, percent) |  |
| 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  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 = 36  Flipping 3 coins: 2 × 2 × 2 = 8  3 choices of pants, 4 choices of shirts: 3 × 4 = 12 |