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**Expressions and Equations Study Guide**

***Two-Step Equations: Solve for the variable and check your answer. # 1-6***

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| 1. 2n – 3 = 15   +3 +3  2n = 18  ÷2 ÷2  **n = 9** | 1. – 7 = 28   + 7 +7  = 35  4 x = 35 x 4  **X = 140** | 1. -13a + 32 = 84   **A = -4** |
| 1. -8k + 15 = 71   **K = -7** | 1. -2(4x -7) + 5x = 17   Distribute: -8x + 14 + 5x = 17  Combine like terms: -3x + 14 = 17  - 14 -14  -3x = 3  ÷(-3) ÷(-3)  x = -1 | 6. Ted, Laura, and Sam went on a bird watching trip to a national park. If Ted identified a *total of 6* birds, Laura identified *2 times the number of birds Ted* did, and Sam identified *4 fewer birds than Laura*, how many birds did Sam identify?  Ted = 6  Laura = 2(ted) = 2(6) = 12  Sam = Laura – 4 = 12 – 4 = 8 |
| 7. Translate the sentence into an expression*: ten more than the quotient of a number and 4*  + 10 | 8. Translate the sentence into an expression: *4 less than the product 7 and a number*  7p - 4 | 9. Jeremy works on computers and charges $14 per hour plus a one-time service fee of $5. If Jeremy worked on a computer for 2 ½ hours, how much should he charge the customer?  Write an expression: 14h + 5  Plug in 2 ½ or 2.5 per hour (h)  14(2.5) + 5 = 40  *He should charge the customer $40* |

***Combining Like Terms: Simplify the expression by combining like terms. Use Distributive Property if needed to help simplify.***

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| 1. 7x + 20x + 7x – 9x   7 + 20 + 7 – 9  27 + 7 – 9  34 – 9  25  Answer = 25x | 1. -4(3x + 6y) + 12x + 4y   Distribute: -12x – 24y + 12x + 4y  -12x + 12x – 24y + 4y  0x – 24 y + 4y  Answer: -20y |
| 1. – (x – 8y) – (x + 9y)   Distribute: (hint- when you see a negative sign outside the parentheses, change everything inside to its opposite!  -x + 8y – x – 9y  -1x – 1x + 8y – 9y  (KCO!!) -1x + -1x + 8y + (-9y)  Answer: -2x – 1y | 1. 5x – 3 + 2xy + 31x – 18xy   – 3x2 + 5x + 31x + 2xy – 18xy  – 3x2 + 36x + 2xy – 18xy  Answer: – 3x2 + 38x -16xy |

***Factoring: Find the GCF for the expression. Remember factoring is like doing the distributive property backwards. Remember: you can factor a number, a variable, or a number and variable!***

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| --- | --- |
| 1. 3a – 3b   3( a-b)  Use distributive property to check your answer! | 1. 4 x – 2z   2 (2x – z)  Use distributive property to check your answer! |
| 1. 6m – 2mn   2m(3m – n)  Use distributive property to check your answer! | 1. 7ab – 3a   a(7b – 3)  Use distributive property to check your answer! |

***Inequalities: Solve for the unknown and graph answer for #18-20.***

***Remember: If you divide or multiply by a NEGATIVE, you must flip your sign!!***

***Line under means closed circle, No line means open circle!***

|  |  |
| --- | --- |
| 1. 3x + 1 ≤ 10   -1 -1  3x ≤ 9  ÷3 ÷3    **x ≤ 3** | Graph problem #18:  Closed circle at 3 and graph to the left  http://www.mathematic.ws/wp-content/uploads/2009/04/number-line.png |
| 1. 4x + 7 ≤ 15   **x ≤ 2** | Graph problem #19:  Closed circle at 2 and graph to the left  http://www.mathematic.ws/wp-content/uploads/2009/04/number-line.png |
| 1. 6y + 7 < -11   **y < -3** | Graph problem #20:  Open circle at -3 graph to the right  http://www.mathematic.ws/wp-content/uploads/2009/04/number-line.png |
| 1. What is the first step in solving for *x* in the equation below:   7x – 5 = 37  Add 5 to both sides of the equation to eliminate the constant | 1. Asia’s age is 4 years less than three times his younger sister’s age. Write an equation that represents *a*, Asia’s age in terms of *s*, his sister’s age.   3s – 4 = a |
| 1. Which is one value of *x* that makes this inequality true?   x > 6   1. **-9** c. 8 2. -8 d. 9 | 1. Calvin had 93 video games to give away at an auction. At the end of the day, he had 9 games left. Which equation could be used to find g, the number of games he gave away? 2. g + 93 = 9 c. 9g = 93 3. 93 – g = 9 d. 9 ÷ g = 93 |
| 1. Simplify the expression:   ( 4 + 2 + 4x -7 ) – ( - 2 – x – 2 )  Distribute the Negative.  ( 4 + 2 + 4x -7 ) + ( + 2 + x + 2 )  Combine Like Terms:  ( 4 + 2 + 4x -7 ) + ( + 2 + x + 2 )  3 + 4 + 5x - 5 | Identify the property:   1. (-7 + 8) + 6 = -7 + (8 +6) Associative Property 2. 23 + 0 = 23 Identity Property |