

### Geometry Honors – Algebra Review Packet

#### Evaluating Expressions

PEMDAS

|                                  |  |  |               |
|----------------------------------|--|--|---------------|
| 1. $250 \div [5(3 \cdot 7 + 4)]$ | <i>2</i>                                       | 6. $12 \div \left(-\frac{1}{3}\right)$               | <i>-36</i>    |
| 2. $-46 - (-81)$                 | <i>35</i>                                      | 7. $50.16 - (-73.54)$                                | <i>123.70</i> |
| 3. $-3^2$                        | <i>-9</i>                                      | 8. $\frac{1}{2} \cdot 26 - 3^2$                      | <i>4</i>      |
| 4. $(-3)^2$                      | <i>9</i>                                       | 9. $\frac{2 \cdot 4^2 - 8 + 2}{(5+2) \cdot 2}$       | <i>2</i>      |
| 5. $\frac{2}{5} + \frac{5}{7}$   | <i><del>2</del> <math>\frac{39}{35}</math></i> | 10. Evaluate: $3x - y^3$ ; when $x = 2$ and $y = -3$ | <i>33</i>     |

#### Solving linear equations in 1 variable

Isolate the variable by moving the variable to one side of the equation and constants to the other, and then eliminate the coefficient.

|                    |           |   |           |
|--------------------|-----------|---|-----------|
| 1. $15 + b = 23$   | <i>8</i>  | 5. $p - 1 = 5p + 3p - 8$                | <i>1</i>  |
| 2. $-15 + n = -9$  | <i>6</i>  | 6. $-18 - 6k = 6(1 + 3k)$               | <i>-1</i> |
| 3. $2(n + 5) = -2$ | <i>-6</i> | 7. $-(1 + 7x) - 6(-7 - x) = 36$         | <i>5</i>  |
| 4. $7(9 + k) = 84$ | <i>3</i>  | 8. $-5(1 - 5x) + 5(-8x - 2) = -4x - 8x$ | <i>-5</i> |

#### Solving Proportions (fraction = fraction)

Cross multiply and then solve. If one side is not a fraction, treat it like it is over 1.

|                                   |                                  |                                    |                                  |
|-----------------------------------|----------------------------------|------------------------------------|----------------------------------|
| 1. $\frac{7}{5} = \frac{x}{3}$    | <i><math>\frac{21}{5}</math></i> | 4. $\frac{n-6}{n-7} = \frac{9}{2}$ | <i><math>\frac{51}{7}</math></i> |
| 2. $\frac{4}{3} = \frac{8}{x}$    | <i>6</i>                         | 5. $\frac{5}{r-9} = \frac{8}{r+5}$ | <i><math>\frac{97}{3}</math></i> |
| 3. $\frac{x-3}{x} = \frac{9}{10}$ | <i>30</i>                        |                                    |                                  |

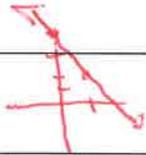
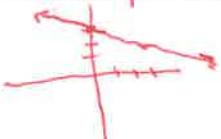
**Solving absolute value equations in 1 variable**

Isolate the absolute value. Create 2 equations by setting the contents of the absolute value equal to the positive and the negative value from the other side of the equation.

|                    |           |                     |          |
|--------------------|-----------|---------------------|----------|
| 1. $ 6m  = 42$     | $7, -7$   | 4. $4 n+8  = 56$    | $6, -22$ |
| 2. $ -3p  = 15$    | $-5, 5$   | 5. $-10 v+2  = -70$ | $-9, 5$  |
| 3. $ 7m  + 3 = 73$ | $10, -10$ |                     |          |

**Solving linear equations in 2 variables**

There are an infinite number of ordered pairs (points) that solve a 2 variable equation. Graphing the line will identify all the ordered pairs. If the x,y pair is on the line, it's a solution. If you plug in an x,y pair and it works, it's a solution.

|                                   |   |   |   |
|-----------------------------------|---|---|---|
| 1. Graph: $y = \frac{1}{4}x + 2$  |  | 3. Graph: $2x + y = 4$  |  |
| 2. Graph: $y = -\frac{1}{3}x + 3$ |  | 4. Determine which ordered pairs solve the equation: $y = 3x - 2$ | $(-5, -17)$ $(4, 8)$ $(0, -2)$ $(-1, -1)$ $(-1, -5)$                                |

**Solving a system of linear equations**

Two methods: 1) substitution: solve 1 equation for 1 variable and substitute the resulting expression into the second equation, and 2) elimination: line up each variable and constant, then multiply (if needed to attain matching coefficients) and add/subtract the equations to eliminate a variable.

|                                     |           |  |            |
|-------------------------------------|-----------|--|------------|
| 1. $2x - 3y = -1$<br>$y = x - 1$    | $(4, 3)$  | 5. $4x + 8y = 20$<br>$-4x + 2y = -30$  | $(7, -1)$  |
| 2. $y = -3x + 5$<br>$5x - 4y = -3$  | $(1, 2)$  | 6. $-3x + 7y = -16$<br>$-9x + 5y = 16$ | $(-4, -4)$ |
| 3. $-5x + y = -3$<br>$3x - 8y = 24$ | $(0, -3)$ | 7. $5x + 4y = -30$<br>$3x - 9y = -18$  | $(-6, 0)$  |
| 4. $6x + 6y = -6$<br>$5x + y = -13$ | $(-3, 2)$ | 8. $-14 = -20y - 7x$<br>$10y + 4 = 2x$ | $(2, 0)$   |

**Writing algebraic expressions**

Convert words to algebra based on key terms

|   |           |  |             |
|---|-----------|--|-------------|
| 1. Four times a number decreased by twelve          | $4x - 12$ | 3. Seven less than twice a number        | $2x - 7$    |
| 2. Three more than the product of five and a number | $5x + 3$  | 4. Two times the sum of a number and ten | $2(x + 10)$ |

### Literal Equations

Algebraically manipulate the equation to solve for the indicated variable.

|   |  |
|---|--|
| 1. $2d - 3f = 9$ , for $f$ $f = \frac{2d}{3} - 3$     | 3. $9wr = 81$ , for $w$ $w = \frac{9}{r}$          |
| 2. $P = (g - 9)180$ , for $g$ $\frac{P}{180} - 9 = g$ | 4. $ax + t = 10$ , for $x$ $x = \frac{-t + 10}{a}$ |

### Slope

$$\text{slope} = \frac{\text{rise}}{\text{run}} \quad m = \frac{y_2 - y_1}{x_2 - x_1}$$

|   |  |
|---|--|
| 1. (3, 5) and (-3, 1) $\frac{4}{6} = \frac{2}{3}$ | 2. (1, -3) and (-1, -2) $-\frac{1}{2}$ |
|---|--|

### Polynomial Multiplication

Polynomial distribution, FOIL

|   |   |
|---|---|
| 1. $6v(2v + 3)$ $12v^2 + 18v$           | 5. $(7k - 3)(k^2 - 2k + 7)$ $7k^3 - 17k^2 + 55k - 21$ |
| 2. $7(-5v - 8)$ $-35v - 56$             | 6. $(x - 5)(x + 5)$ $x^2 - 25$                        |
| 3. $(x - 3)(6x - 2)$ $6x^2 - 20x + 6$   | 7. $(n + 3)^2$ $n^2 + 6n + 9$                         |
| 4. $(3m - 1)(8m + 7)$ $24m^2 + 13m - 7$ |   |

### Factoring Quadratic Expressions

Break the quadratic expression back into the polynomials that were multiplied to produce it

|  |   |
|--|---|
| 1. $b^2 + 8b + 7$ $(b + 7)(b + 1)$     | 5. $3p^2 - 2p - 5$ $(p + 1)(3p - 5)$      |
| 2. $n^2 + 4n - 12$ $(n + 6)(n - 2)$    | 6. $15n^2 - 27n - 6$ $3(5n + 1)(n - 2)$   |
| 3. $5n^2 + 10n + 20$ $5(n^2 + 2n + 4)$ | 7. $-6a^2 - 25a - 25$ $-(3a + 5)(2a + 5)$ |
| 4. $2k^2 + 22k + 60$ $2(k + 6)(k + 5)$ | 8. $4m^2 - 25$ $(2m + 5)(2m - 5)$         |

### Solving Quadratic Equations

Three methods: 1) graph the quadratic and identify where it crosses the x-axis, 2) set equation equal to zero, then factor the equation and set each factor equal to zero, and then solve each (inc. completing the square method), 3) quadratic equation

|                                     |   |
|-------------------------------------|---|
| 1. $(k+1)(k-5)=0$ $k = -1, 5$       | 4. $3r^2 - 16r - 7 = 5$ $r = -\frac{2}{3}, 6$             |
| 2. $n^2 + 7n + 15 = 5$ $n = -5, -2$ | 5. $6b^2 - 13b + 3 = -3$ $b = -\frac{3}{2}, -\frac{2}{3}$ |
| 3. $7r^2 - 14r = -7$ $r = 1$        | 6. $7x^2 + 2x = 0$ $x = -\frac{2}{7}, 0$                  |

### Simplifying Radicals

Factor the greatest perfect square or factor tree.

|   |   |
|---|---|
| 1. $\sqrt{64}$ $8$                          | 10. $2\sqrt{10} \cdot -4\sqrt{2}$ $-16\sqrt{5}$   |
| 2. $\sqrt{18}$ $3\sqrt{2}$                  | 11. $2\sqrt{3} \cdot \sqrt{5}$ $2\sqrt{15}$   |
| 3. $\sqrt{108}$ $6\sqrt{3}$                 | 12. $\sqrt{7} \cdot \sqrt{7}$ $7$   |
| 4. $\sqrt{150}$ $5\sqrt{6}$                 | 13. $\frac{\sqrt{15}}{\sqrt{12}}$ $\frac{\sqrt{5}}{2}$  |
| 5. $\sqrt{400}$ $20$                        | 14. $\frac{4\sqrt{2}}{3\sqrt{5}}$ $\frac{4\sqrt{10}}{15}$   |
| 6. $-3\sqrt{112}$ $-12\sqrt{7}$             | 15. $\frac{3\sqrt{12}}{\sqrt{20}}$ $\frac{3\sqrt{3}}{5}$ $\frac{6\sqrt{3}}{2\sqrt{5}} = \frac{3\sqrt{3}}{\sqrt{5}}$ |
| 7. $7\sqrt{375}$ $35\sqrt{15}$              | 16. $\frac{\sqrt{9}-\sqrt{15}}{\sqrt{3}}$ $\sqrt{3}-\sqrt{5}$   |
| 8. $\sqrt{10} \cdot \sqrt{6}$ $2\sqrt{15}$  | 17. $\frac{3+3\sqrt{15}}{3}$ $1+\sqrt{15}$  |
| 9. $\sqrt{15} \cdot \sqrt{24}$ $6\sqrt{10}$ | 18. $\frac{12-\sqrt{18}}{3}$ $4-\sqrt{2}$   |

### Word Problems

Write the word problem in algebraic terms and solve

|  |           |
|--|-----------|
| 1. Six more than three times a number is thirty-three. Find the number.                                      | $9$       |
| 2. The sum of four more than a number and twice that same number is nineteen. Find the number.               | $5$       |
| 3. Two numbers total 90. The first number is ten more than seven times the second number. Find both numbers. | $10 + 80$ |
| 4. Two consecutive odd numbers total fifty-two. Find both numbers.   | $25 + 27$ |