

Parkway South High School Summer Homework

(For students entering Algebra I)

Welcome to Algebra I!

Please print your summer homework packet from the Parkway South High Math Website. To access your online summer homework packet, please visit www.pshwired.net.

- Click on "Find it Fast" at the top
- Select "Department Websites".
- Click on "Math".

The complete set of worksheets is available for you to print. Answers to the homework problems are on the website so you can check your answers.

The Summer Homework provides a review of necessary skills for your success in Algebra I. Shortly after school begins, you will be tested on your comprehension of the topics in this packet. This test will count as a grade. Teachers will go over the answers in class the first week of school, but **no direct instruction will occur on these concepts as they are a review of Math 8.**

If your student is struggling with the concepts contained in this packet, we recommend accessing the following websites:

- www.kahnacademy.org
- www.purplemath.com
- www.coolmath.com

Algebra I students will need to bring a scientific calculator (one with an exponent key and square root key) with them to every class next year. We recommend a TI 30XIIS, TI-34 Multiview or a TI-36 calculator (\$12-\$20). Cell phone calculators are NOT to be used in class. **It is important that your student knows how to do the following on their calculator prior to coming to school:**

- Add, Subtract, Multiply and Divide
- Convert fractions to decimals
- Square a number
- Square root a number

An additional packet of calculator practice problems has been placed on the website as well. Feel free to print that so your student may practice their skills prior to the start of the school year. The packet has instructions for a TI-30X IIS, but most other scientific calculators will have similar buttons.

Have an enjoyable summer!!! Remember to work on the packet gradually during your vacation.

You should be proud of your accomplishments and talents in mathematics. The Algebra I teachers are looking forward to working with you this fall.

Sincerely,

Parkway South High School
Algebra I Teachers

Evaluating Algebraic Expressions

1. Substitute the given values for the variables in the expression
2. Evaluate the expression using the order of operations
 - Parentheses/Brackets (inside to outside)
 - Exponents
 - Multiplication/Division (left to right)
 - Addition/Subtraction (left to right)

ex: $9x^2 - 4(y + 3z)$
for $x = -3, y = 2, z = 5$

$$9(-3)^2 - 4(2 + 3 \cdot 5)$$

$$9(-3)^2 - 4(2 + 15)$$

$$9(-3)^2 - 4 \cdot 17$$

$$9 \cdot 9 - 4 \cdot 17$$

$$81 - 4 \cdot 17$$

$$81 - 68 = \boxed{13}$$

The Distributive Property

1. Multiply the number outside the parentheses by each term in the parentheses.
2. Keep the addition/subtraction sign between each term.

ex: $5(8x - 3)$

$$5(8x - 3)$$

$$5(8x) - 5(3)$$

$$\boxed{40x - 15}$$

Simplifying Algebraic Expressions

1. Clear any parentheses using the Distributive Property
2. Add or subtract like terms (use the sign in front of each term to determine whether to add or subtract)

ex: $2(3x - 4) - 12x + 9$

$$2(3x - 4) - 12x + 9$$

$$6x - 8 - 12x + 9$$

$$\boxed{-6x + 1}$$

Evaluate each expression for $a = 9$, $b = -3$, $c = -2$, $d = 7$. Show your work.

1. $a - cd$	2. $2b^3 + c^2$	3. $\frac{a + d - c}{b}$	4. $(a - b)^2 + d(a + c)$
5. $4c - (b - a)$	6. $\frac{a}{b} - 5a$	7. $2bc + d(12 - 5)$	8. $b + 0.5[8 - (2c + a)]$

Simplify each expression using the Distributive Property.

9. $5(2g - 8)$	10. $7(y + 3)$	11. $-3(4w - 3)$	12. $(6r + 3)^2$
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Simplify each expression, showing all work.

13. $8(x + 1) - 12x$	14. $6w - 7 + 12w - 3z$	15. $9n - 8 + 3(2n - 11)$	16. $3(7x + 4y) - 2(2x + y)$
17. $(15 + 8d)(-5) - 24d + d$	18. $9(b - 1) - c + 3b + c$	19. $20f - 4(5f + 4) + 16$	20. $8(h - 4) - h - (h + 7)$

Solving One-Step Equations

1. Cancel out the number on the same side of the equal sign as the variable using inverse operations (addition/subtraction; multiplication/division)
2. Be sure to do the same thing to both sides of the equation!

ex: $-18 = 6j$

$$\frac{-18}{6} = \frac{6j}{6}$$

$$-3 = j \rightarrow \boxed{j = -3}$$

Solving Two-Step Equations

1. Undo operations one at a time with inverse operations, using the order of operations in reverse (i.e. undo addition/subtraction before multiplication/division)
2. Be sure to always do the same thing to both sides of the equation!

ex: $\frac{a}{7} - 12 = -9$

$$\frac{a}{7} - 12 = -9$$
$$+ 12 \quad + 12$$

$$\frac{a}{7} = 3$$
$$\times 7 \quad \times 7$$

$$\boxed{a = 21}$$

Solving Multi-Step Equations

1. Clear any parentheses using the Distributive Property
2. Combine like terms on each side of the equal sign
3. Get the variable terms on the same side of the equation by adding/subtracting a variable term to/from both sides of the equation to cancel it out on one side
4. The equation is now a two-step equation, so finish solving it as described above

ex: $5(2x - 1) = 3x + 4x - 1$

$$10x - 5 = 3x + 4x - 1$$

$$10x - 5 = 7x - 1$$
$$- 7x \quad - 7x$$

$$3x - 5 = -1$$
$$+ 5 \quad + 5$$

$$3x = 4$$
$$\div 3 \quad \div 3$$

$$\boxed{x = \frac{4}{3}}$$

Solve each equation, showing all work.

21. $f - 64 = -23$	22. $-7 = 2d$	23. $\frac{b}{-12} = -6$	24. $13 = m + 21$
25. $5x - 3 = -28$	26. $\frac{w + 8}{-3} = -9$	27. $-8 + \frac{h}{4} = 13$	28. $22 = 6y + 7$
29. $8x - 4 = 3x + 1$	30. $-2(5d - 8) = 20$	31. $7r + 21 = 49r$	32. $-9g - 3 = -3(3g + 2)$
33. $5(3x - 2) = 5(4x + 1)$	34. $3d - 4 + d = 8d - (-12)$	35. $f - 6 = -2f + 3(f - 2)$	36. $-2(y - 1) = 4y - (y + 2)$

Slope & Rate of Change

Finding the Slope Given Two Points: Use the coordinates from the points in the slope formula:

$$\text{Slope } (m) = \frac{y_2 - y_1}{x_2 - x_1}$$

ex: $(4, -2), (-3, 8)$
 $x_1 \quad y_1 \quad x_2 \quad y_2$

$$m = \frac{8 - (-2)}{-3 - 4} = \frac{10}{-7} = \boxed{-\frac{10}{7}}$$

Finding the Rate of Change From a Table: Determine the amount the dependent variable (y) is changing and the amount the independent variable (x) is changing.

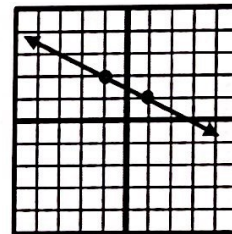
$$\text{Rate of Change} = \frac{\text{change in } y}{\text{change in } x}$$

ex:

		+2	+2	+2	
x	# months	3	5	7	9
y	Cost (\$)	80	130	180	230
		+50	+50	+50	

$$m = \frac{50}{2} = \boxed{25 \text{ dollars/month}}$$

Finding the Slope From a Graph: Choose 2 points on the graph. Find the vertical change (rise) and horizontal change (run) between the 2 points and write it as a fraction $\frac{\text{rise}}{\text{run}}$. (Up is positive, down is negative, right is positive, and left is negative).



rise = +1
run = -2

$$m = \frac{1}{-2} = \boxed{-\frac{1}{2}}$$

Graphing Linear Equations

Slope-Intercept Form: $y = mx + b$
 ↑ slope ↑ y-intercept

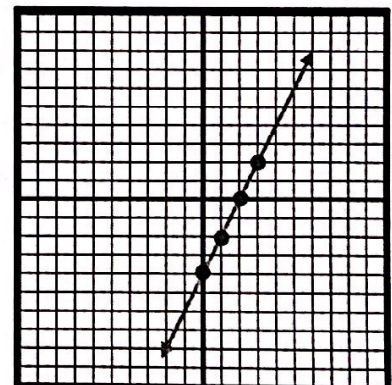
ex: $y = 2x - 4$

y-intercept: -4

slope: $2 = \frac{2}{1}$ ← rise
 ← run

How To Graph:

1. Make a point on the y-axis at the y-intercept.
2. Use the slope to determine where to make the next point. The numerator tells you the rise (how far up/down) and the denominator tells you the run (how far right/left) to make the next point.
3. Repeat to make more points and then connect the points with a line.



Find the slope of the line that passes through the points. Show your work.

61. $(-5, 3), (2, 1)$	62. $(8, 4), (11, 6)$	63. $(9, 3), (9, -1)$	64. $(-4, -2), (-6, 4)$
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Find the rate of change. Show your work.

65.	Number of Hours	3	6	9	12
	Distance (in miles)	135	270	405	540

66.	Number of Weeks	1	3	5	7
	Pounds	173	169	165	161

Find the slope of the line.

67.		68.		69.	
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Graph the line.

70. $y = -x - 3$		71. $y = \frac{1}{3}x + 2$		72. $y = -3x - 1$	
73. $y = -\frac{3}{2}x - 2$		74. $y = 2x + 1$		75. $y = \frac{1}{4}x$	

Evaluate each expression for $a = 9$, $b = -3$, $c = -2$, $d = 7$. Show your work.

1. $a - cd$ 23	2. $2b^3 + c^2$ -50	3. $\frac{a+d-c}{b}$ -6	4. $(a-b)^2 + d(a+c)$ 193
5. $4c - (b - a)$ 4	6. $\frac{a}{b} - 5a$ -48	7. $2bc + d(12 - 5)$ 61	8. $b + 0.5[8 - (2c + a)]$ -1.5

Simplify each expression using the Distributive Property.

9. $5(2g - 8)$ $10g - 40$	10. $7(y + 3)$ $7y + 21$	11. $-3(4w - 3)$ $-12w + 9$	12. $(6r + 3)^2$ $12r + 6$
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Simplify each expression, showing all work.

13. $8(x + 1) - 12x$ $-4x + 8$	14. $6w - 7 + 12w - 3z$ $18w - 3z - 7$	15. $9n - 8 + 3(2n - 11)$ $15n - 41$	16. $3(7x + 4y) - 2(2x + y)$ $17x + 10y$
17. $(15 + 8d)(-5) - 24d + d$ $-63d - 75$	18. $9(b - 1) - c + 3b + c$ $12b - 9$	19. $20f - 4(5f + 4) + 16$ 0	20. $8(h - 4) - h - (h + 7)$ $6h - 39$

Solve each equation, showing all work.

21. $f - 64 = -23$ $f = 41$	22. $-7 = 2d$ $d = -7/2 = -3.5$	23. $\frac{b}{-12} = -6$ $b = 72$	24. $13 = m + 21$ $m = -8$
25. $5x - 3 = -28$ $x = -5$	26. $\frac{w + 8}{-3} = -9$ $w = 19$	27. $-8 + \frac{h}{4} = 13$ $h = 84$	28. $22 = 6y + 7$ $y = 5/2 = 2.5$
29. $8x - 4 = 3x + 1$ $x = 1$	30. $-2(5d - 8) = 20$ $x = -2/5 = -0.4$	31. $7r + 21 = 49r$ $r = 1/2 = 0.5$	32. $-9g - 3 = -3(3g + 2)$ no solution
33. $5(3x - 2) = 5(4x + 1)$ $x = -3$	34. $3d - 4 + d = 8d - (-12)$ $d = -4$	35. $f - 6 = -2f + 3(f - 2)$ all real numbers	36. $-2(y - 1) = 4y - (y + 2)$ $y = 4/5 = 0.8$

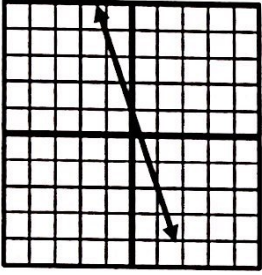
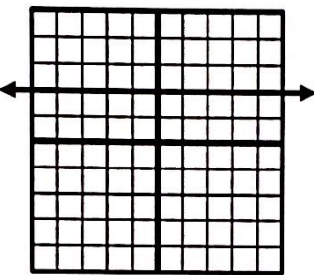
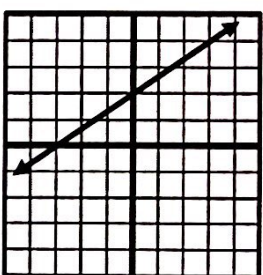
Find the slope of the line that passes through the points. Show your work.

61. $(-5, 3), (2, 1)$ $m = -\frac{2}{7}$	62. $(8, 4), (11, 6)$ $m = \frac{2}{3}$	63. $(9, 3), (9, -1)$ $m = \text{undefined}$	64. $(-4, -2), (-6, 4)$ $m = -3$
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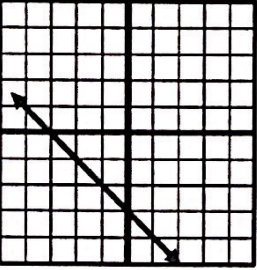
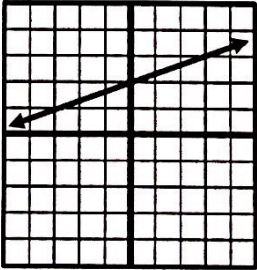
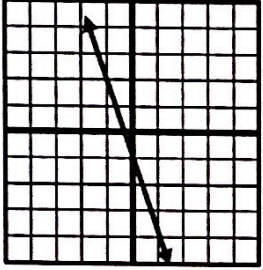
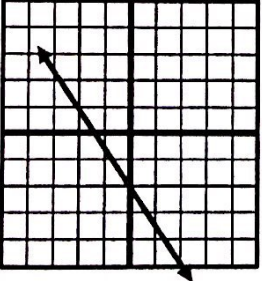
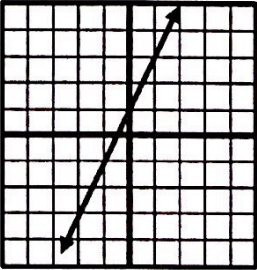
Find the rate of change. Show your work.

65. <table border="1"> <tr> <td>Number of Hours</td> <td>3</td> <td>6</td> <td>9</td> <td>12</td> </tr> <tr> <td>Distance (in miles)</td> <td>135</td> <td>270</td> <td>405</td> <td>540</td> </tr> </table> 45 miles per hour	Number of Hours	3	6	9	12	Distance (in miles)	135	270	405	540	66. <table border="1"> <tr> <td>Number of Weeks</td> <td>1</td> <td>3</td> <td>5</td> <td>7</td> </tr> <tr> <td>Pounds</td> <td>173</td> <td>169</td> <td>165</td> <td>161</td> </tr> </table> -2 pounds per week	Number of Weeks	1	3	5	7	Pounds	173	169	165	161
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Distance (in miles)	135	270	405	540																	
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Pounds	173	169	165	161																	

Find the slope of the line.

67.  $m = -3$	68.  $m = 0$	69.  $m = \frac{2}{3}$
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Graph the line.

70. $y = -x - 3$ 	71. $y = \frac{1}{3}x + 2$ 	72. $y = -3x - 1$ 
73. $y = -\frac{3}{2}x - 2$ 	74. $y = 2x + 1$ 	75. $y = \frac{1}{4}x$ 