

## **Geometry – Summer Math Packet**

### **Kids' Information Page**

*We're so proud of you for taking the time to work on math over the summer!*

Here are some helpful hints for success:

- ☺ Find a quiet work space where you can get organized and stay focused.
  
- ☺ It's ok to struggle, it allows you to self-monitor what you do and do not know.
  
- ☺ If you don't know how to do something, use past notes, phschool.com, Khan Academy, etc. to watch tutorials or practice examples.

If you still don't know how to do something, make note of it on the answer sheet, so you know to ask questions when you come back to school.

- ☺ Remember to persevere (Mathematical Practice #1)! Don't just give up after one attempt.
  
- ☺ Complete all of the problems in the packet. Use loose leaf paper if you need more space to show your work.
  
- ☺ Remember to do a little work each week. **DO NOT** wait until the week before school starts to complete your packet!
  
- ☺ The packet should be returned to your math teacher during the first week of school.

## Have fun & we'll see you in August!

1. What's the slope of the line in each of the following?

a. a line that runs through the points  $(-4, 2)$  and  $(-7, 9)$  \_\_\_\_\_

b. a line that runs through the points  $(-2, -1)$  and  $(0, 8)$  \_\_\_\_\_

c. a horizontal line that runs through the point  $(4, -8)$  \_\_\_\_\_

d. a line parallel to the line whose equation is  $y = 2x - 3$  \_\_\_\_\_

e. a line parallel to the line whose equation is  $5y - 7x = 10$  \_\_\_\_\_

f. a line that's perpendicular to the line whose equation is  $y = -\frac{2}{3}x + 1$  \_\_\_\_\_

g. a line that's perpendicular to the line whose equation is  $-2x + 8y = 11$  \_\_\_\_\_

2. Are the lines that would be created by the solutions to the following two equations parallel, perpendicular, or neither? Explain your answer.

$$2x + 5y = 10$$

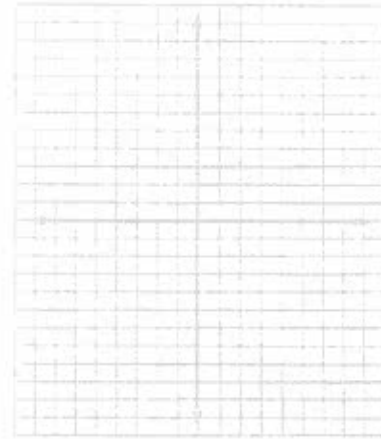
$$-5x + 2y = -6$$

3a. What's the equation of a line (in slope-intercept form) that runs through the points  $(4, 5)$  and  $(-2, 7)$ ? \_\_\_\_\_

3b. What's the equation of a line (in slope-intercept form) that's parallel to the line  $y = 3x - 1$  and runs through the point  $(2, 4)$ ? \_\_\_\_\_

3c. What's the equation of a line (in point-slope form) that's perpendicular to the line  $y = 4x + 2$  and runs through the point  $(-7, -9)$ ? \_\_\_\_\_

4. a) Graph the following line and label it 'A':  $5x - 3y = -5$   
b) On the same coordinate plane, graph  $x = -4$  and label it 'B'  
c) Where is their point of intersection? \_\_\_\_\_  
d) Show a test to demonstrate your understanding of the solution.



5. Solve for the  $x$ - and  $y$ - intercepts of the following line:  $3x - 10y = 12$

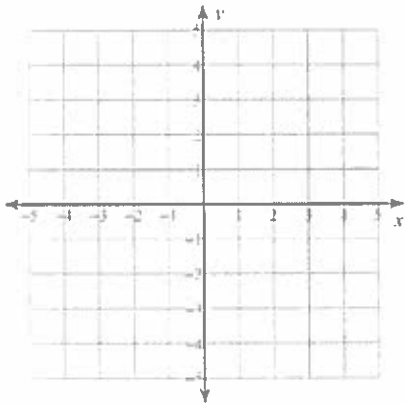
$x$ -intercept: \_\_\_\_\_

$y$ -intercept: \_\_\_\_\_

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Solve each system by graphing. Show a check to verify your solution.

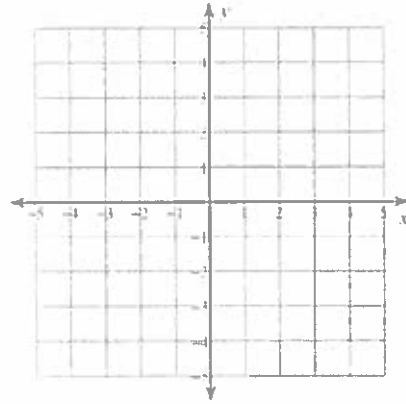
6.  $y = 3x - 4$   
 $y = -\frac{1}{2}x + 3$



Solution: \_\_\_\_\_

Check:

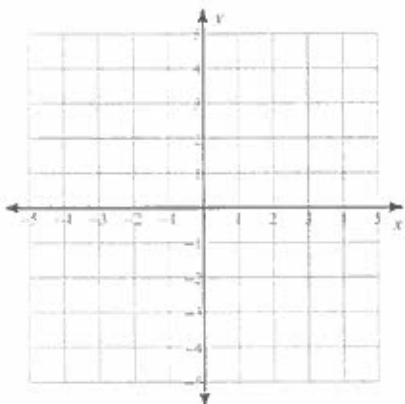
7.  $y = -1$   
 $y = -\frac{5}{2}x + 4$



Solution: \_\_\_\_\_

Check:

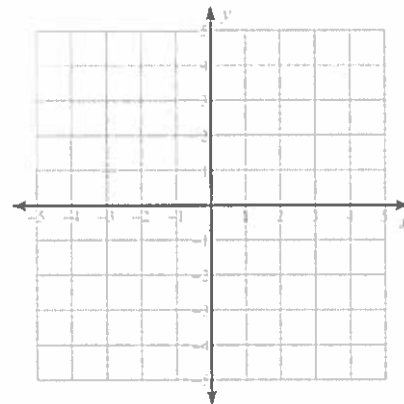
8.  $y = -2x + 2$   
 $y = -2x - 2$



Solution: \_\_\_\_\_

Check:

9.  $y = \frac{1}{3}x - 3$   
 $y = -x + 1$



Solution: \_\_\_\_\_

Check:

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Solve each system using elimination. Show a check to verify your solution.

10.  $-4x - 2y = -12$   
 $4x + 8y = -24$

Solution: \_\_\_\_\_

11.  $x - y = 11$   
 $2x + y = 19$

Solution: \_\_\_\_\_

12.  $-2x - 9y = -25$   
 $-4x - 9y = -23$

Solution: \_\_\_\_\_

13.  $-4x + 9y = 9$   
 $x - 3y = -6$

Solution: \_\_\_\_\_

14.  $5x + 4y = -30$   
 $3x - 9y = -18$

Solution: \_\_\_\_\_

15.  $2x + 8y = 6$   
 $-5x - 20y = -15$

Solution: \_\_\_\_\_

Solve each system using substitution. Show a check to verify your solution.

16.  $y = 6x - 11$   
 $2x + 3y = 7$

Solution: \_\_\_\_\_

17.  $2x - 3y = -1$   
 $y = x - 1$

Solution: \_\_\_\_\_

18.  $7x + 2y = 13$   
 $x = 2y + 11$

Solution: \_\_\_\_\_

19.  $x = y - 3$   
 $-3x + 3y = 4$

Solution: \_\_\_\_\_

20.  $-3x - 4y = 2$   
 $x + y = -1$

Solution: \_\_\_\_\_

21.  $-x + y = 1$   
 $-5x + y = 13$

Solution: \_\_\_\_\_

Answer each word problem by defining two variables, setting up a system, and solving the system using any method you prefer.

22. Find the value of two numbers if their sum is 39 and their difference is 73.

23. Brenda's school is selling tickets to a spring musical. On the first day of ticket sales the school sold 3 senior citizen tickets and 9 child tickets for a total of \$75. The school took in \$67 on the second day by selling 8 senior citizen tickets and 5 child tickets. What is the price each of one senior citizen ticket and one child ticket?

24. Matt and Ming are selling fruit for a school fundraiser. Customers can buy small boxes of oranges and large boxes of oranges. Matt sold 3 small boxes of oranges and 14 large boxes of oranges for a total of \$203. Ming sold 11 small boxes of oranges and 11 large boxes of oranges for a total of \$220. Find the cost each of one small box of oranges and one large box of oranges.

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Factor by grouping.

25. $8r^3 - 64r^2 + r - 8$	26. $12p^3 - 21p^2 + 28p - 49$
27. $12x^3 + 2x^2 - 30x - 5$	28. $21k^3 - 84k^2 + 15k - 60$ <i>Hint: What is the first type of factoring for which you should always look?</i>
29. $4v^3 - 12v^2 - 5v + 15$	30. $28v^3 + 16v^2 - 21v - 12$
31. $4xy - x - 24y + 6$	32. $12x^2u + 3x^2v + 28yu + 7yv$
33. $40ac^2 + 25ak^2 + 32bc^2 + 20bk^2$	



Solve by factoring. Leave all answers in fractional form.

34.  $n^2 + 7n + 10 = 0$

35.  $n^2 - 10n + 24 = 0$

36.  $n^2 + 3n - 18 = 0$

37.  $7x^2 + 2x = 0$

38.  $6n^2 - 18n - 24 = 0$

*Hint: Again, what is the first type of factoring to consider?*

39.  $n^2 + 8n = -15$

*Hint: Set everything equal to 'zero' first!*

40.  $3r^2 - 16r - 12 = 0$

41.  $6b^2 - 13b + 6 = 0$

42.  $10b^2 = 27b - 18$

Solve using the quadratic formula. Leave all answers in fractional form.

43. $m^2 - 5m - 14 = 0$	44. $2x^2 + 3x - 20 = 0$	45. $-4b^2 - 8b - 3 = 0$
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On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Simplify each of the radical expressions. Leave all answers in simplified radical form.

46. $\sqrt{192}$	47. $\sqrt{72}$	48. $\sqrt{112}$
49. $\sqrt{245}$	50. $-\sqrt{1944}$	51. $\sqrt[3]{-125}$

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Solve each of the equations using square roots. Leave all answers in simplified radical form.

52. $k^2 = 36$	53. $m^2 = 32$	54. $3x^2 = 147$
55. $-6n^2 = -384$	56. $2n^2 = -144$	57. $y^2 - 5 = 95$

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Simplify each of the radical expressions. Leave all answers in simplified radical form.

58. $3\sqrt{6} - 7\sqrt{6}$	59. $-2\sqrt{6} - 2\sqrt{24}$	60. $3\sqrt{18} - 3\sqrt{12} + 2\sqrt{27}$
61. $\sqrt{6} \cdot \sqrt{2}$	62. $2\sqrt{5} \cdot \sqrt{10}$	63. $\sqrt{8} \cdot -3\sqrt{6}$
64. $\frac{2}{\sqrt{3}}$	65. $(3\sqrt{5})^2$	66. $(3 + \sqrt{5})^2$

On a scale of 1 – 5 (1: Weak, 5: Strong) rate yourself on this section of math: 1 2 3 4 5

Gifted Geometry Summer Packet Answer Key

Check your answers after completing each section. Check whichever statement best applies to you.

Pages 2 and 3

	Answer	I got it on the 1 <sup>st</sup> try!	I got it with corrections.	I have no idea.
1a.	$-\frac{7}{3}$			
1b.	$\frac{9}{2}$			
1c.	0			
1d.	2			
1e.	$\frac{7}{5}$			
1f.	$\frac{3}{2}$			
1g.	-4			
2.	Perpendicular, opposite reciprocal slopes!			
3a.	$y = -\frac{1}{3}x + \frac{19}{3}$			
3b.	$y = 3x - 2$			
3c.	$y + 9 = \frac{-1}{4}(x + 7)$			
4.	Rising line; (0, 2), (-3, -3) Vertical line through (-4, 0)			
5.	$(4, 0); \left(0, -\frac{6}{5}\right)$			

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	Answer	I got it on the 1 <sup>st</sup> try!	I got it with corrections.	I have no idea.
6.	(2, 2)			
7.	(2, -1)			
8.	No solution			
9.	(3, -2)			

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10.	(6, -6)			
11.	(10, -1)			
12.	(-1, 3)			
13.	(9, 5)			
14.	(-6, 0)			
15.	Infinitely many solutions			

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16.	(2, 1)			
17.	(4, 3)			
18.	(3, -4)			
19.	No solution			
20.	(-2, 1)			
21.	(-3, -2)			

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22.	56 and -17			
23.	senior citizen ticket: \$4, child ticket: \$7			
24.	small box of oranges: \$7, large box of oranges: \$13			

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25.	$(8r^2 + 1)(r - 8)$			
26.	$(3p^2 + 7)(4p - 7)$			
27.	$(2x^2 - 5)(6x + 1)$			
28.	<i>Hint: Pull out GCF first!</i> $3(7k^2 + 5)(k - 4)$			
29.	$(4v^2 - 5)(v - 3)$			
30.	$(4v^2 - 3)(7v + 4)$			
31.	$(x - 6)(4y - 1)$			
32.	$(3x^2 + 7y)(4u + v)$			
33.	$(5a + 4b)(8c^2 + 5k^2)$			

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34.	$\{-5, -2\}$			
35.	$\{6, 4\}$			
36.	$\{3, -6\}$			
37.	$\{0, -\frac{2}{7}\}$			
38.	<i>Hint: Pull out GCF first!</i> $\{4, -1\}$			
39.	$\{-5, -3\}$			
40.	$\{6, -\frac{2}{3}\}$			
41.	$\{\frac{3}{2}, \frac{2}{3}\}$			
42.	$\{\frac{3}{2}, \frac{6}{5}\}$			

43.	$\{7, -2\}$			
44.	$\{\frac{5}{2}, -4\}$			
45.	$\{-\frac{1}{2}, -\frac{3}{2}\}$			
46.	$8\sqrt{3}$			
47.	$6\sqrt{2}$			
48.	$4\sqrt{7}$			
49.	$7\sqrt{5}$			
50.	$-18\sqrt{6}$			
51.	$-5$			

52.	$\{\pm 6\}$			
53.	$\{\pm 4\sqrt{2}\}$			
54.	$\{\pm 7\}$			
55.	$\{\pm 8\}$			
56.	No solution			
57.	$\{\pm 10\}$			
58.	$-4\sqrt{6}$			
59.	$-6\sqrt{6}$			
60.	$9\sqrt{2}$			
61.	$2\sqrt{3}$			
62.	$10\sqrt{2}$			
63.	$-12\sqrt{3}$			
64.	$\frac{2\sqrt{3}}{3}$			
65.	45			

66.	$14 + 6\sqrt{5}$			
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