June 2010

Dear Future Honors Algebra 2 Student,

This packet is a review of some of the things that you learned in Algebra 1. It will help to prepare you for what we will be doing at the beginning of next year. It is assumed that you have completed both Algebra 1 and Honors Geometry and have good grades in both of them along with the recommendation of both your algebra and geometry teachers.

You should complete the packet over the summer and bring it with you to the second algebra class next year. It will count as several homework assignments. **Do your work neatly on a separate paper**. Do not just list the answers – **show all work** where necessary. Most of the material is very basic and we will not be spending a lot of time going over it next year.

If you have difficulty doing this work, you need to re-evaluate whether you should stay in the honors section, or whether you should change to the academic section. You or your parents may wish to contact the guidance department, or me, to discuss this.

You will need a three ring binder for algebra class, and at least a scientific calculator. Don't get one too fancy; you won't use most of the features. A graphing calculator would be helpful (we use them most of the second semester), but it is not required. If you are interested in purchasing a graphing calculator, I would suggest that you consider a TI-83+ or 84+. We have several of these available for use in class, and it is the calculator of choice for pre-calculus and calculus, where graphing calculators are required. Try to stay away from the graphing calculators that have equation solving programs since they are not allowed for use on standardized tests or in higher-level courses.

If you have any questions or concerns, feel free to contact me over the summer. You can email my Kingsway account (reynoldsl@kingsway.k12.nj.us). I will be checking it periodically over the summer.

Have a great summer! I am looking forward to having you all in the fall.

Sincerely,

Mrs. Reynolds

P.S. If you are downloading this packet from the district website you will need coordinate graphing paper. It is available online at http://incompetech.com/graphpaper/plain/ .

Section 1 – 1
Properties of Real Numbers

Simplify.

1. $-|4.2|$
2. $|12-16|$
3. $\left|-\frac{7}{6}\right|$
4. $|3|-|-2|$
5. $\left|\frac{2}{3}\right|$
6. $0.3|-6|$
7. $|14-8|$
8. $|-0.01|$

Replace each $ with the symbol <, >, or = to make the sentence true.

9. $-\sqrt{6}\ \$\ \sqrt{10}$
10. $\frac{3}{2}\ \$\ 1.5$
11. $0.06\ \$\ 0.6$
12. $4\ \$\ |-4|$
13. $-0.4\ \$\ 0$
14. $-|-7|\ \$\ |-7|$
15. $0.9\ \$\ \frac{2}{3}$
16. $\sqrt{2}\ \$\ \sqrt{5}$

Name all the sets of numbers to which each number belongs.

17. -5
18. 0
19. $\sqrt{5}$
20. $2.\overline{7}$
21. 9
22. $\frac{10}{7}$
23. $1.234567831\ldots$
24. $-\frac{4}{2}$

Name the property of real numbers illustrated by each equation.

25. $\pi + 3 = 3 + \pi$
26. $\sqrt{2} + 0 = \sqrt{2}$
27. $(2 + x) + 3 = 2 + (x + 3)$
28. $\frac{5}{9} \cdot \frac{9}{5} = 1$
29. $16(3t + 4v) = 48t + 64v$
30. $\sqrt{2} \cdot 3 = 3 \cdot \sqrt{2}$
31. $0.01 \cdot 1 = 0.01$
32. $\frac{3}{2} \cdot \frac{2}{3} = 1$
33. $7 + (-7) = 0$
34. $2(xy) = (2x)y$

Find the opposite and reciprocal of each number.

35. $-2\frac{1}{2}$
36. 3
37. $\frac{5}{9}$
38. -1

Section 1-2
Algebraic Expressions

Simplify by combining like terms.

1. $6x + x$
2. $11t + 3t - 5$
3. $-6a - 5a + b - 1$
4. $5i + 7j - 3i$
5. $16xy - 4xy$
6. $5x - 3x^2 + 16x^2$
7. $3(m - 2) + m$
8. $\frac{3(a-b)}{9} + \frac{4}{9}b$
9. $t + \frac{t^2}{2} + t^2 + t$
10. $4a - 5(a + 1)$
11. $2(m - n^2) - 6(n^2 + 3m)$
12. $x(x - y) + y(y - x)$

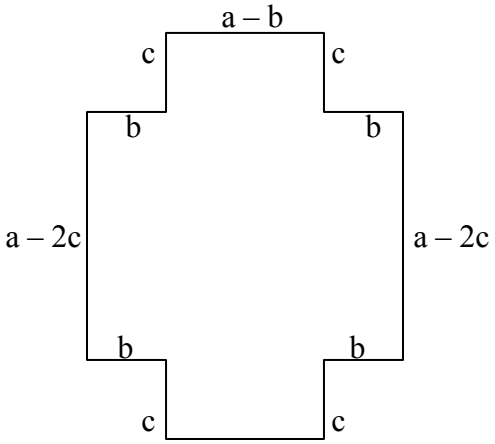
13. The expression $6s^2$ represents the surface area of a cube with edges of length s. Find the surface area of a cube with each edge length.
    a. 3 inches b. 1.5 meters

14. The expression $4.95 + 0.07x$ models a household's monthly long-distance charges, where x represents the number of minutes of long-distance calls during the month. Find the monthly charges for 73 minutes.

Evaluate each expression for the given value of the variable.

15. $5y^2 + y + 1$; $y = 4$
16. $a + 6 + 3a$; $a = 5$
17. $-t^2 - (3t + 2)$; $t = 5$
18. $i^2 - 5(i^3 - i^2)$; $i = 7$
19. $k + 2 - 4k - 1$; $k = -3$
20. $6a - 3a^2 - 2a^3$; $a = 1$
21. $-m(2m + m^2)$; $m = -4$
22. $3 - 2n - 5 + n^2$; $n = -3$
23. $12b - 3 + b^2$; $b = 9$
24. $a^2 + b^2$; $a = 3$, $b = 4$
25. $c(3 - a) - c^2$; $a = 4$, $c = -1$
26. $-a^2 + 3(d - 2a)$; $a = 2$, $d = -3$

27. Write an expression for the perimeter of the figure as the sum of the lengths of its sides. Then simplify your answer.



Section 1 – 3
Solving Equations

Solve each equation for the indicated variable.

Example:

$\frac{ax-b}{2} = x+2b$; *for x*

$2\left(\frac{ax-b}{2}\right) = 2(x+2b)$ *multiply each side by 2.*

$ax - b = 2x + 4b$ *simplify*

$ax - 2x = 4b + b$ *add and subtract. Move all terms with an x to one side and terms without an x to the other side.*

$ax - 2x = 5b$ *Simplify*

$x(a-2) = 5b$ *Factor to isolate the x.*

$x = \frac{5b}{a-2}$ *Divide each side by a – 2.*

1. $3m - n = 2m + n$; for m
2. $2(u + 3v) = w - 5u$; for u
3. $ax + b = cx + d$; for x
4. $k(y + 3z) = 4(y - 5)$; for y
5. $\frac{1}{2}r + 3s = 1$; for r
6. $\frac{2}{3}f + \frac{5}{12}g = 1 - fg$; *for f*
7. $\frac{x+k}{j} = \frac{3}{4}$; *for x*
8. $\frac{a-3y}{b} + 4 = a + y$; *for y*
9. $V = \frac{\pi}{3}r^2h$; *for h*
10. $S = L(1 - r)$; for r
11. $S = \ell w + wh + \ell h$; for w
12. $\frac{x+3}{t} = t^2$; *for x*

Solve each equation.

13. $\frac{1}{2}(x-3) + \left(\frac{3}{2} - x\right) = 5x$
14. $5w + 8 - 12w = 16 - 15w$
15. $7y + 5 = 6y + 11$
16. $1.2(x + 5) = 1.6(2x + 5)$
17. $t - 3\left(t + \frac{4}{3}\right) = 2t + 3$
18. $0.5(c + 2.8) - c = 0.6c + 0.3$
19. $3(x + 1) = 2(x + 11)$
20. $\frac{u}{5} + \frac{u}{10} - \frac{u}{6} = 1$

Section 1 – 3
Solving Equations
Word Problems

Write an equation to solve each word problem below. Then solve the problem. You may find it helpful to use a chart or draw a picture.

1. Mike and Adam left a bus terminal at the same time and traveled in opposite directions. Mike's bus was in heavy traffic and had to travel 20 miles per hour slower than Adam's bus. After 3 hours, their buses were 270 miles apart. How fast was each bus going?

2. Two trains left a station at the same time. One traveled north at a certain speed and the other traveled south at twice the speed. After 4 hours, the trains were 600 miles apart. How fast was each train traveling?

3. Find four consecutive odd integers whose sum is 336.

4. Find three consecutive integers where triple the first is ten more than to the sum of the other two.

5. The length of a rectangle is 5cm. greater than its width. The perimeter is 58 cm. Find the dimensions of the rectangle.

6 The base of an isosceles triangle is 3 less than twice a leg. The perimeter is 117 in. Find the dimensions of the triangle.

Section 1 – 4
Solving Inequalities

Solve each inequality. Graph your solution on a number line.

1. $16 - 4t \leq 36$
2. $2(m + 3) + 1 > 23$
3. $7 + 13(x + 1) \leq 3x$
4. $-6a < 21$
5. $\frac{2}{3}(4x + 5) > \frac{9}{4}x$
6. $2[5x - (3x - 4)] < 3(2x + 3)$
7. $8(x - 5) \geq 56$
8. $6 - x \leq 7x + 3$
9. $10 - x \geq -2(3 + x)$

Solve each compound inequality. Graph the solutions.

Example:

$10 \leq 2(3 - 2x) \leq 22$			
$10 \leq 6 - 4x \leq 22$			distributive property
$10 \leq 6 - 4x$	and	$6 - 4x \leq 22$	separate into two inequalities
$4 \leq -4x$	and	$-4x \leq 16$	subtract like terms
$-1 \geq x$	and	$x \geq -4$	divide to isolate x (remember to switch signs when multiplying or dividing by a negative number.)
$-4 \leq x \leq -1$			Rewrite as a compound inequality.

10. $-9 \leq 4x + 3 \leq 11$
11. $16x \leq 32$ or $-5x < -40$
12. $9x < 54$ and $-4x < 12$
13. $6(x + 2) \geq 24$ or $5x + 10 \leq 15$
14. $14 > 3x - 1 \geq -10$
15. $4 < 1 - 3x < 7$
16. $2(x - 1) < -4$ or $2(x - 1) > 4$
17. $3x - 5 \geq -8$ and $3x - 5 \leq 1$

Solve each problem by writing an inequality.

18. A salesperson earns $350 per week plus 10% of her weekly sales. Find the sales necessary for the salesperson to earn at least $800 in one week.

19. The length of a rectangular yard is 50 ft., and its perimeter is less than 170 ft. Describe the width of the yard.

20. A research team estimates that 30% of their questionnaires will not be returned. How many questionnaires should they mail out in order to be reasonably certain that at least 750 will be returned?

Solve each problem by writing a compound inequality.

21. Watermelons cost $0.39 per pound at a local market. Kent's watermelon cost between $4.00 and $5.00. What are the possible weights of his watermelon?

22. How much must a carpenter cut off of a 48 inch board if the length must be 40 ± 0.25 inches?

Section 1 – 5 (A)
Absolute Value Equations

Solve each equation. Check for extraneous solutions.

Example:

$2|x-3|+1=6x+7$
$2|x-3|=6x+6$
$|x-3|=3x+3$
$x-3=3x+3 \quad or \quad x-3=-(3x+3)$
$-2x=6 \quad or \quad x-3=-3x-3$
$x=-3 \quad or \quad 4x=0$
$x=-3 \quad or \quad x=0$

Subtract 1 from each side.
Divide each side by 2.

Rewrite as a compound equality.

Solve each equation.

* To check for extraneous solutions, substitute each value for x in the original absolute value equation. Any value that does not satisfy the original equation must be discarded. It is an extraneous solution.

Check:

$2|-3-3|+1=6(-3)+7$
$2|-6|+1=-18+7$
$2(6)+1=-11$
$12+1=-11$
$13 \neq -11$

$2|0-3|+1=6(0)+7$
$2|-3|+1=0+7$
$2(3)+1=7$
$6+1=7$
$7=7$

The only solution is 0; –3 is an extraneous solution.

1. $|2x+7|=5$
2. $|x-3|=-1$
3. $|x+7|=2x+8$
4. $|x-0.5|+0.3=1$
5. $3|2x+5|=15$
6. $|5x-1|+7=3x$
7. $2|x+1|+x=1$
8. $|x+1|=2x$
9. $-\frac{1}{2}|x-5|-3=-5$
10. $|z-1|=7z-13$
11. $5|x+1|+6=21$
12. $|3x+5|-2x=3x+4$
13. $|-3x|=63$
14. $-|d+2|=7$

Section 1 – 5 (B)
Absolute Value Inequalities

Solve each inequality. Graph the solutions.

Example:

$2|x-3|+1>6x+7$

$2|x-3|>6x-6$

$|x-3|>3x-3$

$x-3>3x-3 \quad or \quad x-3<-(3x-3)$

$-2x>6 \quad or \quad x-3<-3x+3$

$x<-3 \quad or \quad 4x<6$

$x<-3 \quad or \quad x<\frac{3}{2}$

Subtract 1 from each side.
Divide each side by 2.
Once the absolute value is isolated, rewrite the inequality as two separate inequalities. (Use ***or*** for >,≥) (Use ***and*** for <, ≤)

Solve each inequality. Graph both inequalities on the same number line.

1. $|x+5|>12$
2. $|k-3|\leq 19$
3. $|x+2|\geq 0$
4. $2|t-5|<14$
5. $|3x-2|+7\geq 11$
6. $5|2b+1|-3\leq 7$
7. $|2-3w|\geq 4$
8. $-3|7m-8|<5$
9. $|2u|>6$

Section 2 – 1
Relations and Functions

For each function, find $f(-2), f\left(-\frac{1}{2}\right), f(3), and\ f(7).$

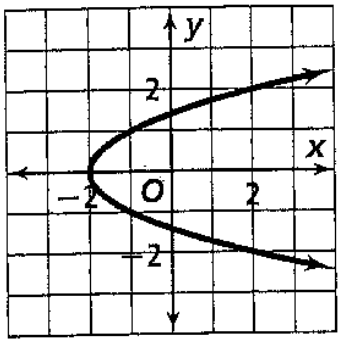
1. $f(x) = 5x + 2$

2. $f(x) = -\frac{1}{3}x + 1$

3. $f(x) = -3x + 1.8$

Use the vertical line test to determine whether each graph represents a function.

4.



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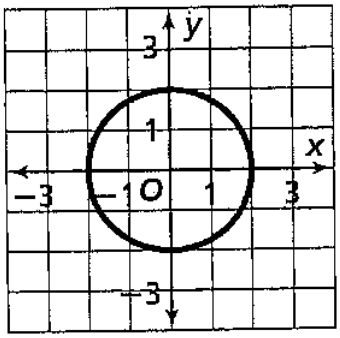

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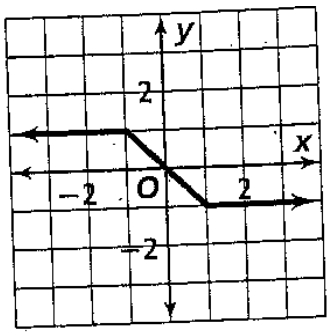


Determine if the relation is a function. If so, state the domain and range.

7. $\left\{(1,2),\left(2,\frac{3}{4}\right),\left(3,3\frac{1}{2}\right),(5,9)\right\}$

8. $\{(-3,5),(0,-2),(0,4),(1,-2)\}$

9. $\{(-1,2),(2,2),(3,2)\}$

10. $\{(0.5,-1),(0.5,0),(0.5,1),(0.5,3)\}$

Make a mapping diagram for each relation, and determine whether it is a function.

11. {(1,2), (2,3), (2,4), (3,5)}

12. {(-1,1), (0,0), (1,1), (2,4), (3,9)}

Suppose $f(x) = -3x + 2$ *and* $g(x) = \frac{1}{2}x - 1$. **Find each value.**

13. $f\left(\frac{1}{3}\right)$

14. $3g(4)$

15. $\frac{g(-2)}{f(3)}$

16. $\frac{f(-1)}{g(5)}$

Section 2 – 2
Linear Equations

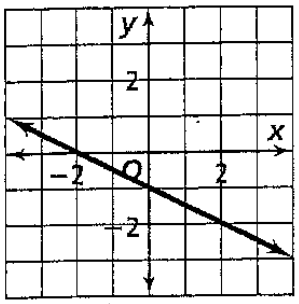
Find the slope of each line.

1. $2x - 5y = 0$

2. $5x - y = -7$

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

4.



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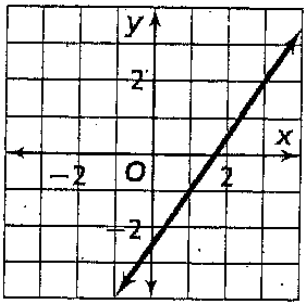

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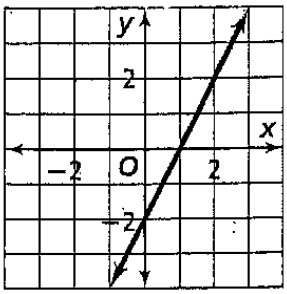

7. through (4, –1) and (–2, –3)

8. Through (3, –5) and (1, 2)

Find an equation of the line through each pair using point-slope form [$y - y_1 = m(x - x_1)$]. Rewrite your answer in slope-intercept form [$y = mx + b$].

9. (0, 1) and (3, 0)

10. $\left(\frac{1}{2}, \frac{2}{3}\right) and \left(-\frac{3}{2}, \frac{5}{3}\right)$

11. (–3, –2) and (1, 6)

Graph each equation on a coordinate plane.

12. $4x + 3y = 12$

13. $\frac{x}{3} - \frac{y}{6} = 1$

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

Write in standard form [Ax + By = C where A, B, and C are integers] an equation of the line with the given slope through the given point.

15. m = –4; (2, 2)

16. m = $\frac{2}{5}$; (–1, 3)

17. m = 0; (3, –4)

Find the x-intercept, the y-intercept and the slope of each line.

18. $3x - 4y = 12$

19. $y = -2$

20. $f(x) = \frac{4}{5}x + 7$

21. $x = 5$

Write an equation for each line. Then graph the line.

22. through (–1, 3) and parallel to $y = 2x + 1$

23. through (2, 2) and perpendicular to $y = -\frac{3}{5}x + 2$

24. through (–3, 4) and vertical

25. through (4, 1) and horizontal

Factoring and Solving Equations Using Factoring

Factor each expression completely.

1. $2x^2 - 8$
2. $2x^2 + 8x + 6$
3. $7a^2 - 11a + 4$
4. $3n^2 + 9n - 30$
5. $6x^2 - 26x - 20$
6. $2x^3 + 12x^2 - 80x$
7. $12y^2 + 7y + 1$
8. $5t^2 + 15t + 10$
9. $8n^2 - 18$
10. $9a - 30a^2 + 24a^3$
11. $6x^2 - 7x - 20$
12. $x^4 - 3x^2 - 4$

Solve each equation by factoring.

a. Rewrite equation in standard form
b. Factor completely
c. Set each factor equal to 0. Then solve.
d. Check results in original equation.

13. $x^2 - 5x - 6 = 0$
14. $y^2 - 3y - 10 = 0$
15. $z^2 = 49$
16. $n^2 - 16n = 0$
17. $x^2 + 9 = 10x$
18. $3x^2 - 2 = x^2 + 6$
19. $3y^2 + 2y - 1 = 0$
20. $5x^2 - 2x = 3$