RAMAPO-INDIAN HILLS SCHOOL DISTRICT

Dear Ramapo-Indian Hills Student:

Please find attached the summer packet for your upcoming math course. The purpose of the summer packet is to provide you with an opportunity to review prerequisite skills and concepts in preparation for your next year's mathematics course. While you may find some problems in this packet to be easy, you may also find others to be more difficult; therefore, you are not necessarily expected to answer every question correctly. Rather, the expectation is for students to put forth their best effort, and work diligently through each problem.

To that end, you may wish to review notes from prior courses or on-line videos (www.KhanAcademy.com, www.glencoe.com, www.youtube.com) to refresh your memory on how to complete these problems. We recommend you circle any problems that cause you difficulty, and ask your teachers to review the respective questions when you return to school in September. Again, given that math builds on prior concepts, the purpose of this packet is to help prepare you for your upcoming math course by reviewing these prerequisite skills; therefore, the greater effort you put forth on this packet, the greater it will benefit you when you return to school.

Please bring your packet and completed work to the first day of class in September. Teachers will plan to review concepts from the summer packets in class and will also be available to answer questions during their extra help hours after school. Teachers may assess on the material in these summer packets after reviewing with the class.

If there are any questions, please do not hesitate to contact the Math Supervisors at the numbers noted below.

Enjoy your summer!

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To the students:
The following set of review problems were designed to prepare you for your Algebra 2 CPE course. You can either print out the problems or complete them on a separate piece of paper. Please bring the packet and your completed work in September.

Thank you.

♦♦ Section 1-4 Solving Absolute Value Equations

Example 1:

|x+5|-3 =8
|x+5| = 11
x+ 5 = 11 or x + 5 = -11
x = 6 or x = -16

Example 2:
|3+x| = 2x – 5

3+x = 2x – 5 or 3+ x = -(2x-5)
3 = x-5 3+x = -2x + 5
x= 8 3x = 2
x = 2/3 – check answers, 2/3 is an extraneous solution!

Practice 1-4:
Solve each equation.

1. |x + 12| = 9
2. |4b+1|-8 = 1
3. |8 + y| = 2y – 3

♦♦ Section 1-5: Solving Inequalities

Inequalities: statements comparing two quantities.
For any two real numbers, *a* and *b*, exactly one of the following statements is true:

$$a < b \qquad a = b \qquad a > b$$

The solution to an inequality is the set of numbers that make the inequality true.

The procedures for solving an inequality are the same as those for solving an equation, **except any time the inequality is multiplied or divided by a negative number, the inequality sign must be flipped.**

When graphing an inequality on a number line, the starting point is noted with either or○. The open circle is used when the value is strictly less than or greater than (< or >). The closed circle is used when the value is less than or equal to or greater than or equal to (≤ or ≥).

Practice 1-5:
Solve each inequality. Graph the solution on a number line.

1. $\frac{4x-3}{2} \geq -3.5$

2. $9(2x-5)-3 < 7x-4$

3. $4x-5(x-3) > 3(x+1)-4$

♦♦ Section 2-1: Relations and Function

Function: a relation in which each element of the domain is paired with exactly one element in the range.

One-to-one function: Each element of the domain pairs to exactly one unique element of the range. Ex. (1, 2), (2, 3), (3, 4)

Example: State the domain and range of the relation {(-4, -2), (-3, 1), (0, -2), (1, 2), (3, 3)}. Then determine whether each relation is a *function*. If it is a function, determine if it is *one-to-one.*

ANSWER: Domain: {-4, -3, 0, 1, 3} Range:{-2, 1, 2, 3} function, one-to-one

Equations that represent functions are often written in **function notation**. For example, y=2x+3 can be written as $f(x) = 2x + 3$. Function notation emphasizes the fact that the *y* values, the **dependent** variables, depend on the values of *x,* the **independent** variable.

Example: Given the function $f(x) = x^2 + 2$, find $f(5)$ and $f(9)$. ANSWERS: $f(5) = 27$, $f(9)=83$

Practice 2-1:

State the domain and range of each relation. Then determine whether each relation is a *function.* If it is a function, determine if it is *one-to-one.*

1. {(-6, -1), (-5, -9), (-3,-7), (-1, 7), (6,-9)}

2. {(2, -2), (-1, -1), (-2, 0), (-1, 0), (2, 2)}

Find each value, if $f(x) = -2x + 4$, *and* $g(x) = x^3 - x$

3. $f(-3)$

4. $g(5)$

5. $g(2) \cdot g(3)$

6. $g(2a)$

7. $f(x+1)$

♦♦ Section 2-3: Rate of Change and Slope

Slope: the ratio of the change in y- coordinates to the corresponding change in x- coordinates. The slope of a line is the same as its rate of change. Suppose a line passes through (x_1, y_1) and (x_2, y_2), then slope= $\frac{y_2 - y_1}{x_2 - x_1}$.

Facts about slope:

Vertical lines have Undefined slope or No Slope

Horizontal lines have 0 slope.

Parallel lines have the same slope. Perpendicular lines have slopes that are opposite reciprocals.

Practice 2-3:

Find the slope of the line that passes through each pair of points

1. (5, 10) and (-1, -2)
2. (6, 4) and (3, 4)
3. (1, 9) and (0 , 6)

Determine if the 2 lines are parallel, perpendicular are neither

4. line going through points (4,3) and (1, -3) and line through points (1, 2) and (-1, 3)

5. line through points (1, 5) and (3, 7) and line through (-1, -4) and (1, -2)

♦♦ Section 2-4: Writing Linear Equations

Slope Intercept form: $y = mx + b$, where *m* is the slope and *b* is the y-intercept.

Example1: Write an equation in slope-intercept form for the line that has slope -3/2 and passes through (-4, 1)

$$y = mx + b$$
$$1 = \left(\frac{-3}{2}\right)(-4) + b$$
$$1 = 6 + b$$
$$-5 = b$$
$$y = \left(\frac{-3}{2}\right)x - 5$$

Example 2 : Write an equation in slope-intercept form of the line through (-1, 4) and (-4, 5).

$$m = \frac{5 - -4}{-4 - -1} = \frac{9}{-3} = -3$$
$$y = mx + b$$
$$5 = (-3)(-4) + b$$
$$5 = 12 + b$$
$$-7 = b$$
$$y = -3x - 7$$

Practice 2-4:

Write an equation in slope-intercept form of the equation given the following information.

1. Slope=3, and passes through (0, -6)

2. Passes through (-2, 5) and (3, 1)

3. Passes through (-1, -2) and (-3, 1)

4. x-intercept = 2, y-intercept = 5

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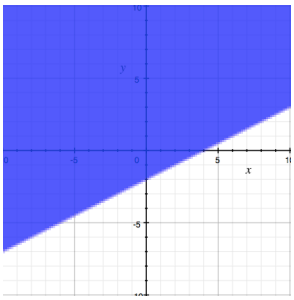
❖ 2-8 Graphing Linear and Absolute Value Inequalities

To graph a **linear inequality**, graph the linear equation associated with the inequality. You may need to convert to y=mx+b form. If < or > draw line with a dotted line. If $\leq$ *or* $\geq$ then draw a solid line. Then shade the appropriate area.



Example: Graph $x - 2y < 4$

ANSWER. Graph $y > \frac{1}{2}x - 2$ with a dotted line. Shade above (see graph).

Remember that the shaded region represents the values that make the statement true. The shaded region is your solution set.

<u>Practice 2-8:</u>

Graph each inequality.

1. *y ≥ 2x-3*
2. $x - 3y < 6$
3. 5x+3y≤1

Multiplying and Factoring Polynomial Expressions

Multiply

1. $2x^2(3x-5)$

2. $(x-4)(x-7)$

3. $(7x+1)(3x-4)$

4. $(2x+3)^2$

5. $(x+2)(x^2-5x+7)$

6. $(5x+2)(5x-2)$

Factor each polynomial completely.

7. $25x^2-81$

8. $12x^4+18x^3-6x$

9. $x^2+4x-12$

10. $x^2-10x+25$

11. x^2+16

12. $2x^2+2x-40$