

**FOR ALL STUDENTS TAKING ALGEBRA II
2021-2022**

SUMMER REVIEW PACKET

NAME _____

To all Orangeburg Prep Math Students:

In an effort to continue to improve our standardized test scores and prevent knowledge loss over the summer break, you are asked to complete the attached worksheets and be prepared to turn them in on the first day of classes. The questions in the packet focus on the skills you were taught in your previous math courses. Some problems may be a bit involved, so it is not a good idea to wait until the last minute.

Work needs to accompany each problem and all answers should be in simplified form. The PRINTED packet is due at the beginning of class on Aug. 19 and will be counted as a project grade. A score of 80% will be given if every problem is attempted. Additional points, up to 20%, will be given for accuracy.

You will also be given a quiz on this packet during the first week of school, so make sure to bring questions that you have during Open House on Aug. 17. Any assignment not turned in on time will receive a 10 point deduction for each day that it is late.

Enjoy your summer vacation and your math packet. We look forward to a great school year starting in August.

The Math Department

HONOR CODE: I promise that I completed this summer review packet independently from any other student. I used only the resources given in this packet. **I did NOT use Photomath or any similar program!**

PARENT: _____

STUDENT: _____

Helpful Websites

www.regentsprep.org

www.khanacademy.org

www.purplemath.com/modules

www.Aleks.com (a website where you can subscribe for individual math lessons)

Chapter 1 Equations and Inequalities

Example:

Evaluate $x^2 - (y + 2)$ if $x = 4$ and $y = 3$

$$\begin{aligned}x^2 - (y + 2) &= 4^2 - (3 + 2) && \text{Replace } x \text{ with } 4 \text{ and } y \text{ with } 3 \\ &= 4^2 - 5 && \text{Add } 3 \text{ and } 2 \\ &= 16 - 5 && \text{Evaluate } 4^2 \\ &= 11 && \text{Subtract } 5 \text{ from } 16\end{aligned}$$

Evaluate each expression if $x = 3$, $y = 4$, and $z = 2$

- $y^2 + 3z$
- $8(x - z)^2 + 3y$
- $5|x + 6| - |6y|$
- $|y - z| + 2|xz|$

Example:

Solve $7x + 56 = 5x - 11$

$$\begin{array}{r} -5x \quad -5x \\ \hline \end{array} \quad \text{Subtract } 5x \text{ from each side}$$

$$\begin{array}{r} 2x + 56 = -11 \\ -56 \quad -56 \\ \hline \end{array} \quad \begin{array}{l} \text{Simplify} \\ \text{Subtract } 56 \text{ from each side} \end{array}$$

$$2x = -67 \quad \text{Simplify}$$

$$\frac{2x}{2} = \frac{-67}{2} \quad \text{Divide each side by } 2$$

$$x = -33.5 \quad \text{Simplify and check the result}$$

Solve:

5. $7 + 5n = -58$

6. $3w + 14 = 7w + 2$

7. $-\frac{2}{3}a + 5 = 19$

8. $5y + 4 = 2(y - 4)$

Example:

Solve $3|2x + 9| = 33$

$$\frac{3|2x + 9|}{3} = \frac{33}{3} \quad \text{Divide each side by } 3 \text{ to isolate the absolute value}$$

$$|2x + 9| = 11 \quad \text{Simplify}$$

$2x + 9 = 11$ or $2x + 9 = -11$ Split using definition of absolute value and solve each equation.

$$2x = 2 \quad \text{or} \quad 2x = -20 \quad \text{Subtract } 9 \text{ from each side}$$

$$x = 1 \quad \text{or} \quad x = -10 \quad \text{Divide each side by } 2. \text{ Check your solutions}$$

Solve:

9. $|x - 18| = 5$

10. $|2w + 3| + 6 = 12$

$$11. 68 = 2|y - 2|$$

$$12. |3n + 2| + 4 = 2$$

Example:

Solve $7x - 5 > 6x + 4$ and graph

$$\begin{array}{r} -6x \\ \hline x - 5 > 4 \end{array}$$

Subtract $6x$ from each side

$$\begin{array}{r} x - 5 > 4 \\ +5 + 5 \\ \hline x > 9 \end{array}$$

Simplify
Add 5 to each side

$$x > 9$$

Simplify

** Recall when you divide or multiply by a negative number you switch the inequality symbol*

Solve and graph:

$$13. 4x + 7 \leq 3x + 9$$

$$14. -m > \frac{m + 4}{9}$$

$$15. 13 \leq 2x + 7 \leq 17$$

$$16. y - 2 > -3 \text{ or } y + 4 \leq -3$$

Example:

Solve $|3x - 12| \geq 6$

$$3x - 12 \geq 6 \text{ or } 3x - 12 \leq -6$$

$$3x \geq 18 \text{ or } 3x \leq 6$$

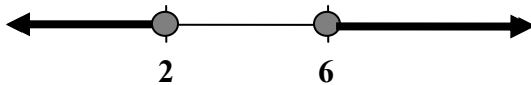
$$x \geq 6 \text{ or } x \leq 2$$

Solve $|3x + 4| < 10$

$$-10 < 3x + 4 < 10$$

$$-14 < 3x < 6$$

$$-\frac{14}{3} < x < 2$$



Solve and graph:

$$17. |4k - 8| < 20$$

$$18. |3y + 7| \geq 2$$

$$19. |5n - 8| > -4$$

$$20. |2y - 9| \leq 27$$

Chapter 2 Linear Relations and Functions

Forms of Linear Equations

Standard

$$Ax + By = C$$

Point-Slope

$$(y - y_1) = m(x - x_1)$$

Slope-intercept

$$y = mx + b$$

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

Example:

Graph $2x - 3y = -18$

Method A: using a table

Find the x-intercept

$$2x - 3(0) = -18$$

$$2x = -18$$

$$x = -9$$

Find the y-intercept

$$2(0) - 3y = -18$$

$$-3y = -18$$

$$y = 6$$

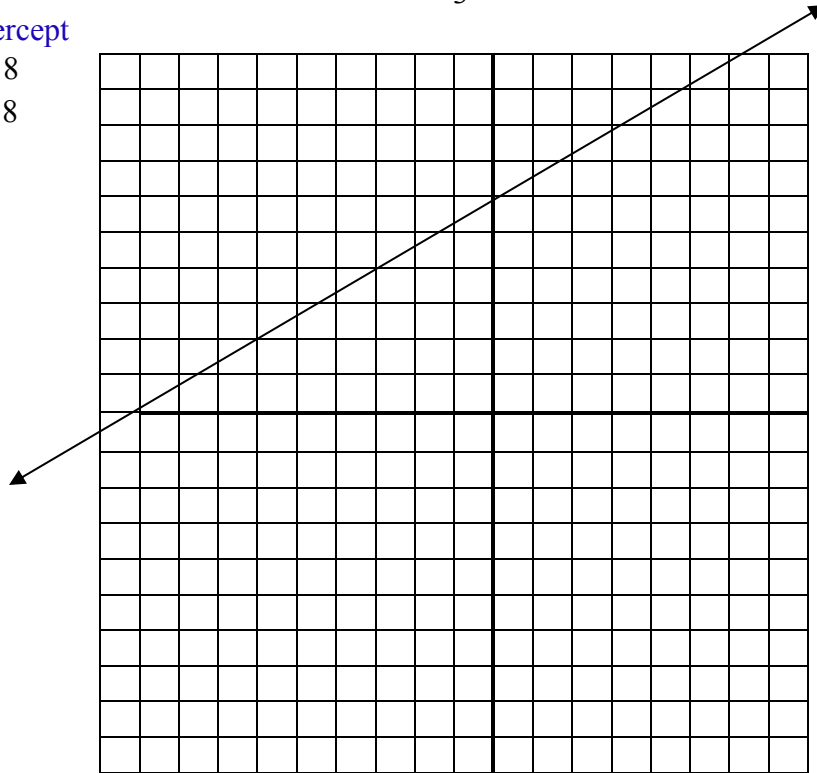
Method B: using slope-intercept form

Solve for y

$$2x - 3y = -18$$

$$-3y = -2x - 18$$

$$y = \frac{2}{3}x + 6$$



Graph:

1. $5x + 2y = 20$

2. $3y - x = -6$

Example:

Write equations of lines given slope and a point.

$$m = -\frac{3}{2}, \text{ passes through } (-4, 1)$$

$$y = mx + b$$

$$1 = -\frac{3}{2}(-4) + b$$

Substitute the point for x and y and the slope for m

$$1 = 6 + b$$

Simplify

$$-5 = b$$

Simplify

$$y = -\frac{3}{2}x - 5$$

Write the equation in slope-intercept form

Write the equation of the line with the given slope passing through the given point

3. $m = 3$; $(5, 7)$

4. $m = \frac{2}{3}$; $(-12, 2)$

Example:

Write equations of lines given two points.

$$(6, 1); (8, -4)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-4 - 1}{8 - 6} = -\frac{5}{2}$$

Use the slope formula to find slope

$$y = mx + b$$

$$1 = -\frac{5}{2}(6) + b$$

Use the slope and one point to find b

$$1 = -15 + b$$

$$16 = b$$

$$y = -\frac{5}{2}x + 16$$

Write the equation

Write the equation of the line passing through the two given points.

5. $(2, -3); (-3, 7)$

6. $(-3, 5); (2, 2)$

Example:**Write equations of parallel and perpendicular lines.**

If $m = -\frac{5}{2}$, then the parallel slope is the same $m = -\frac{5}{2}$

and the perpendicular slope is the opposite reciprocal $m = \frac{2}{5}$

Write the equation of the line that passes through $(2, -1)$, perpendicular to the graph of $2x + 3y = 6$.

First find the slope of the line (solve for y)

$$\begin{array}{r}
 2x + 3y = 6 \\
 \underline{-2x} \quad \quad \underline{-2x} \qquad \qquad \text{Subtract } 2x \\
 3y = \frac{-2x}{3} + \frac{6}{3} \qquad \qquad \text{Divide by 3} \\
 y = -\frac{2}{3}x + 2 \qquad \qquad \text{Simplify}
 \end{array}$$

Perpendicular slope is $m = \frac{3}{2}$

$$y = mx + b$$

$$-1 = \frac{3}{2}(2) + b \qquad \qquad \text{Use the slope and the point to find } b$$

$$-1 = 3 + b$$

$$-4 = b$$

$$y = \frac{3}{2}x - 4 \qquad \qquad \text{Write the equation}$$

Write the equation of parallel or perpendicular lines

7. $(2, -1)$, parallel to graph of $2x + 3y = 6$

8. $(-4, 1)$, perpendicular to line whose slope is $-\frac{3}{2}$

Challenge: $(2, -5)$, perpendicular to graph of $x = 4$

Chapter 3 Systems of Equations and inequalities

Methods to solve a system of equations

1. Graphing

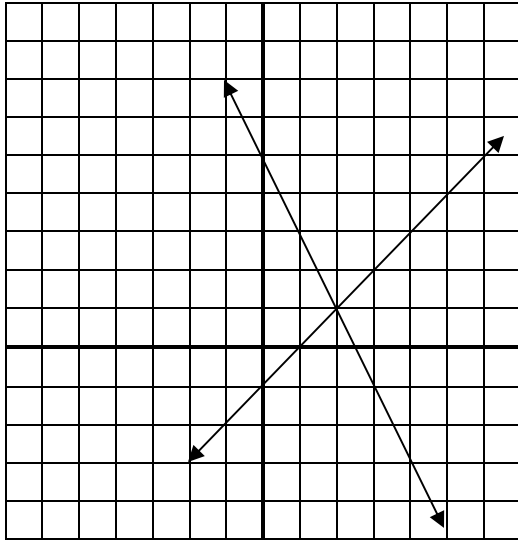
$$4x + 2y = 10$$

$$x - y = 1$$

Solve each equation for y

$$4x + 2y = 10 \rightarrow y = -2x + 5$$

$$x - y = 1 \rightarrow y = x - 1$$



The solution is $(2,1)$, where the two graphs intersect.

2. Substitution

$$4x + 2y = 10$$

$$x - y = 1$$

Solve one equation for one variable

$$x - y = 1 \rightarrow x = y + 1$$

Substitute into other equation

$$4(y + 1) + 2y = 10$$

Solve the equation

$$4(y + 1) + 2y = 10$$

$$4y + 4 + 2y = 10$$

$$6y + 4 = 10$$

$$6y = 6$$

$$y = 1$$

Plug the answer into one of the original equations to find the other variable.

$$x - (1) = 1$$

$$x = 2$$

Solution is $(2,1)$

3. Elimination

$$4x + 2y = 10$$

$$x - y = 1$$

Choose a variable to be opposite coefficients

Let's choose y. Multiply 2nd equation by 2

$$4x + 2y = 10 \rightarrow 4x + 2y = 10$$

$$2(x - y = 1) \rightarrow 2x - 2y = 2$$

$$\begin{array}{r} 4x + 2y = 10 \\ 2x - 2y = 2 \\ \hline 6x = 12 \end{array} \quad \text{Add}$$

$$x = 2$$

Plug the answer into one of the original equations to find the other variable.

$$(2) - y = 1$$

$$-y = -1$$

$$y = 1$$

Solution is $(2,1)$

Solve the following system using all 3 methods. (Do all work on answer key)

$$x + 2y = 6$$

$$2x + y = 9$$

1. Graphing
2. Substitution
3. Elimination

Solving systems of inequalities

The solution is the intersection of the shaded areas of the graphs.

$$3x - y \geq 4$$

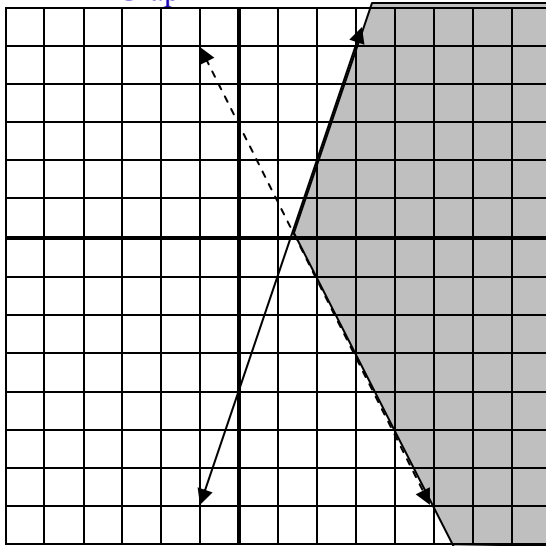
$$2x + y > 3$$

Solve for y

$$3x - y \geq 4 \rightarrow y \leq 3x - 4$$

$$2x + y > 3 \rightarrow y > -2x + 3$$

Graph



Solve the system of inequalities

4. $3x + 2y \geq 6$

$$4x - y > 2$$

Name _____

Summer Packet – Answer Sheet

You **MUST** show your work and circle your answers.

Chapter 1

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

12.

13.



14.



15.



16.



17.



18.



19.



20.



Name _____

Summer Packet – Answer Sheet

You **MUST** show your work and circle your answers.

Chapter 2

1.

2.

3.

4.

5.

6.

7. Parallel

8. Perpendicular

9. CHALLENGE:

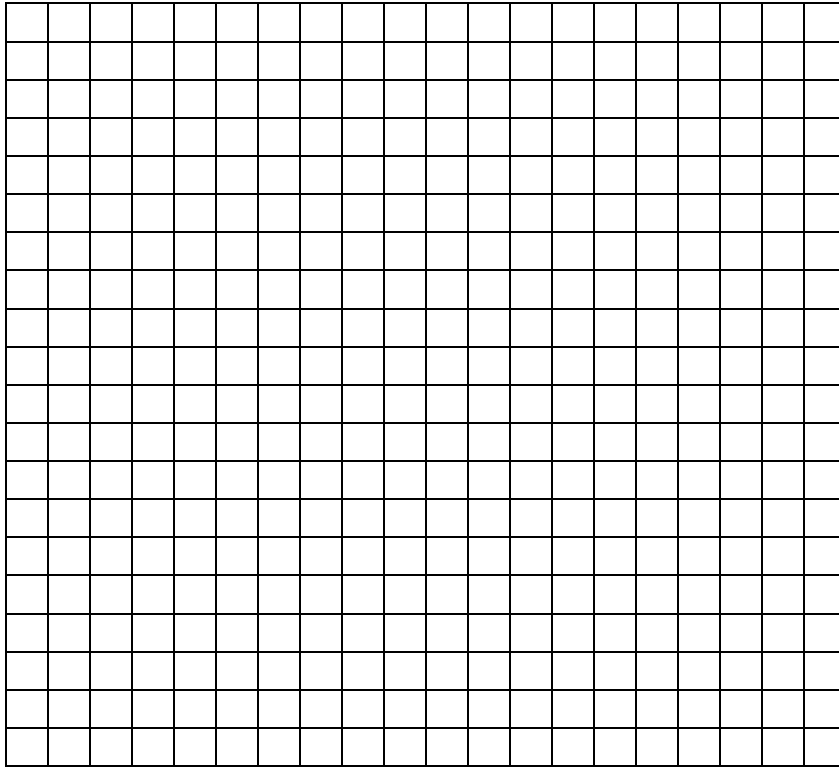
Name _____

Summer Packet – Answer Sheet

You **MUST** show your work and circle your answers.

Chapter 3

1. Graph



2. Substitution

3. Elimination

4. Graphing Inequalities

