

# Welcome to Honors Algebra II!



Next year in Honors Algebra II, you will strengthen and build upon your Algebra I knowledge. Through the course of the year, we will continue to explore basic Algebra skills and topics such as: linear, quadratic, exponential, logarithmic, radical, and rational functions. We will also be studying conics, sequences, series, probability and statistics, and begin to investigate basic trigonometry. I will challenge you to not only apply acquired knowledge but to use it to develop high level thinking skills.

The summer homework packet is on Anchor Bay High School's homepage.

## Complete the Summer Homework Packet.

This packet is a measure of what you remember from Algebra I. ***The packet is due the first day of school.*** Please complete the summer homework in PENCIL. To help, I have included examples of how to complete each section of problems. When finished, check your answers (last page) and attempt to make corrections in PEN. If you got a question right, put a check by it. That way I know you still checked your work. If you do not complete the packet in pencil or check in pen, you will not receive full credit on your summer homework.

We do NOT care how many questions you get right or wrong on the summer homework. The purpose is for you to review important concepts learned in Algebra 1, so it does you no good to copy or look up all the work to these problems.

## Grading

You will receive credit for completing the packet in pencil and checking it in pen. We will be spending the first two full days of school going over any questions you may have on the material and reviewing. The first assessment of the year will be early the second week of school and cover the material found in this packet.

If you have any questions about the summer homework, please contact Mrs. Fisher at [jfisher@abs.misd.net](mailto:jfisher@abs.misd.net)

Have a Wonderful Summer!!!

The Honors Algebra 2 Teachers

## Summer Homework Examples

### Properties of Exponents

Product Rule	$a^x \times a^y = a^{x+y}$
Quotient Rule	$a^x \div a^y = a^{x-y}$
Power Rule	$(a^x)^y = a^{xy}$
Power of a Product Rule	$(ab)^x = a^x b^x$
Power of a Fraction Rule	$\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$
Zero Exponent	$a^0 = 1$
Negative Exponent	$a^{-x} = \frac{1}{a^x}$

### Simplifying Exponents Examples

Simplify and rewrite each expression using only positive exponents.

a)  $(7a^2)(-2a^{-5})$   
 $-14a^{2+(-5)}$   
 $-14a^{-3}$   
 $-14 \cdot \frac{1}{a^3}$   
 $-14/a^3$

b)  $(-2x^{-1}y^2)^3$   
 $-2^3 (x^{-1})^3 (y^2)^3$   
 $-8x^{-3}y^6$   
 $-8 \cdot \frac{1}{x^3} \cdot y^6$   
 $-8y^6/x^3$

c)  $\frac{2ab^5c^2}{a^3bc^2}$   
 $2a^{1-3}b^{5-1}c^{2-2}$   
 $2a^{-2}b^4c^0$   
 $2 \cdot \frac{1}{a^2} \cdot b^4 \cdot 1$   
 $\frac{2b^4}{a^2}$

### Simplifying and Solving Algebraic Expressions and Equations Examples

Simplify each expression or solve each equation.

a)  $\underline{5z^2} - \underline{10z} - \underline{8z^2} + \underline{z}$   
 $-3z^2 - 9z$

b)  $\underline{13y} + 48 = \underline{8y} - 47$   
 $-8y$     $-8y$   
 $5y + 48 = -47$   
 $-48$     $-48$   
 $\frac{5y}{5} = \frac{-95}{5}$   
 $y = -19$

c)  $3x - 7(2x - 13) = 3(-2x + 9)$   
 $\underline{3x - 14x + 91} = -6x + 27$   
 $-11x + 91 = -6x + 27$   
 $+11x$     $+11x$   
 $91 = 5x + 27$   
 $-27$     $-27$   
 $\frac{64}{5} = \frac{5x}{5}$   
 $x = \frac{64}{5}$

**Solving Inequalities** → Solve just like an equation.

Solve each inequality. Write your answer in interval notation.

a)  $3x - 12 \leq 3$

$$3x \leq 15$$

$$x \leq 5$$

b)  $2x - 3 > 2(x - 5)$

$$2x - 3 > 2x - 10$$

$$-3 > -10$$

True Statement

∞ Many Solutions

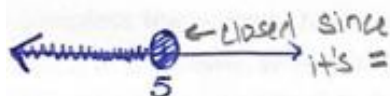
c)  $-6 < 2x - 4 < 12$

whatever you do to the middle, you must do to the ends.

$$-2 < 2x < 16$$

$$-1 < x < 8$$

To write in interval notation, first graph the inequality.



$(-\infty, 5]$  ← closed circles get brackets



open circles →  $(-1, 8)$   
get parenthesis

## Writing Equations of Lines Examples

Two forms of equation you need to know and be able to use:

1) Slope-Intercept Form

$$y = mx + b$$

slope                  y-intercept

2) Point-Slope Form <sup>Point</sup>

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

slope

slope

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

Write an equation in slope-intercept form through the two points.

a)  $(1, 5)$  and  $(4, -1)$

$$m = \frac{-1 - 5}{4 - 1} = \frac{-6}{3} = -2$$

using point-slope

$$y - 5 = -2(x - 1)$$

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

$$y = -2x + 7$$

b)  $(-2, -1)$  and  $(-10, 17)$

$$m = \frac{17 - (-1)}{-10 - (-2)} = \frac{18}{-8} = -\frac{9}{4}$$

using slope-intercept

$$-1 = -\frac{9}{4}(-2) + b$$

$$-1 = \frac{9}{2} + b$$

$$b = -\frac{11}{2}$$

$$y = -\frac{9}{4}x - \frac{11}{2}$$

\*Parallel Lines = Same Slope

\*Perpendicular Lines = Opposite Reciprocal Slope

Given the slope of the line is 2, find each of the following:

a) Through point  $(-2, 3)$  and Parallel  $m = 2$

$$y - 3 = 2(x + 2)$$

$$y - 3 = 2x + 4$$

$$y = 2x + 7$$

b) Through point  $(3, 2)$  and Perpendicular  $m = -\frac{1}{2}$

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

$$2 = -\frac{3}{2} + b$$

$$b = \frac{7}{2}$$

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

## Solving Systems of Equations

Three ways to solve a system of equations:

1) Graphing

2) Substitution

3) Elimination

Solve each using one of the ways above.

a)  $\begin{cases} x + 2y = -7 \\ 2x - 3y = 0 \end{cases}$

Graphing

$$x + 2y = -7$$

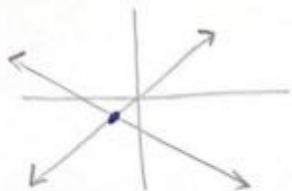
$$2x - 3y = 0$$

$$2y = -x - 7$$

$$-3y = -2x$$

$$y = -\frac{1}{2}x - \frac{7}{2}$$

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



$(-3, -2)$

b)  $\begin{cases} 4x + 3y = 4 \\ (2x - y = 7) \cdot 3 \end{cases}$

Elimination

$$4x + 3y = 4$$

$$+ \frac{6x - 3y = 21}{10x = 25}$$

$$10x = 25$$

$$x = \frac{5}{2}$$

$$2(\frac{5}{2}) - y = 7$$

$$5 - y = 7$$

$$-y = 2$$

$$y = -2$$

$(\frac{5}{2}, -2)$

c)  $\begin{cases} 4x - 2y = 7 \\ x + 2y = 3 \end{cases}$

Substitution

$$x = 3 - 2y \quad 4(3 - 2y) - 2y = 7$$

$$12 - 8y - 2y = 7$$

$$-10y = -5$$

$$y = \frac{1}{2}$$

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

$$x = 3 - 1$$

$$x = 2$$

$(2, \frac{1}{2})$

## Summer Homework Problems

Simplify each expression. Use only positive exponents.

1.  $(3a^2)(4a^6)$

2.  $(-4x^2)(-2x^{-2})$

3.  $(4x^3y^5)^2$

4.  $\frac{8a^5}{2a^2}$

5.  $\frac{6x^7y^5}{3x^{-1}}$

6.  $\frac{(12x^2y^6)^2}{8x^4y^7}$

7.  $\frac{xy^2}{2} \cdot \frac{6x}{y^2}$

8.  $\frac{s^2t^3}{r} \cdot \frac{sr^3}{t}$

9.  $(3x^{-3}y^{-2})^{-2}$

Simplify by combining like terms.

10.  $5a - a$

11.  $2a + 3b + 4a$

12.  $-(2x + y) - 2(-x - y)$

Solve each equation.

13.  $7w + 2 = 3w + 94$

14.  $4y - 8 - 2y + 5 = 0$

15.  $6(t - 2) = 2(9t - 2)$

Solve each inequality. Write your answer in interval notation.

16.  $8x - 15 \geq 73$

17.  $6x - 13 < 6(x - 2)$

18.  $11 < 3x + 2 < 20$

19. The length of a rectangle is 3cm greater than its width. The perimeter is 24cm. Find the dimensions of the rectangle.

Write in point-slope form the equation of the line through each pair of points.

20.  $(-10, 3)$  and  $(-2, -5)$

21.  $(1, 9)$  and  $(6, 2)$

Write in slope-intercept form the equation of the line through each pair of points.

22.  $(1, 6)$  and  $(8, -1)$

23.  $(\frac{3}{2}, -\frac{1}{2})$  and  $(-\frac{2}{3}, \frac{1}{3})$

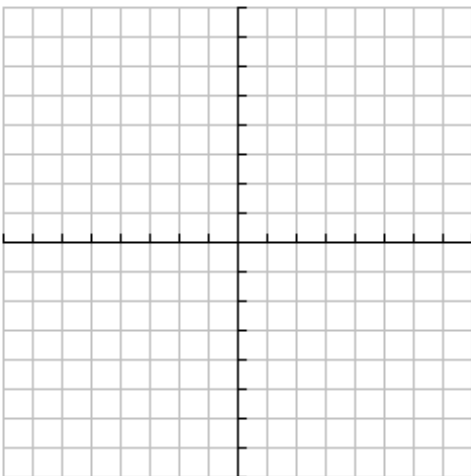
Write an equation for each line.

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

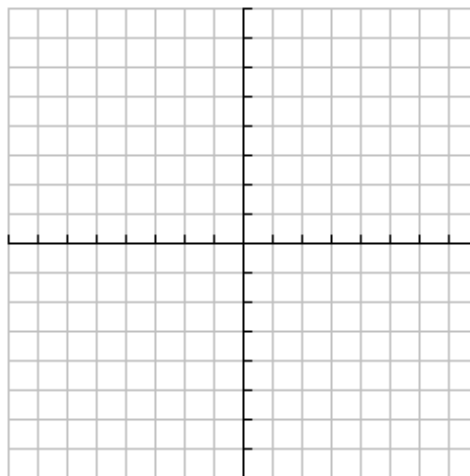
25. through  $(-3, -1)$  and perpendicular to  $2x + 5y = 20$

Graph each of the following equations.

26.  $y = -2x + 3$



27.  $3y - 2x = -12$



Graph and solve each system. Where necessary, round to the nearest tenth.

$$28. \begin{cases} y = x - 2 \\ x + y = 10 \end{cases}$$

$$29. \begin{cases} 5x + y = 11 \\ x - y = 1 \end{cases}$$

Solve each system using substitution.

$$30. \begin{cases} x + 3y = 7 \\ 2x - 4y = 24 \end{cases}$$

$$31. \begin{cases} 2x + 4y = 10 \\ 3x + 5y = 11 \end{cases}$$

Solve each system using elimination.

$$32. \begin{cases} x + 2y = 10 \\ x + y = 6 \end{cases}$$

$$33. \begin{cases} 5x - 2y = -19 \\ 2x + 3y = 0 \end{cases}$$

Create a system of equations and then solve each using either substitution or elimination.

34. A bookstore took in \$167 on the sale of 5 copies of a new cookbook and 3 copies of a new novel. The next day it took in \$89 on the sale of 3 copies of the cookbook and 1 copy of the novel. What was the price of each book?

## Summer Homework Answers

1.  $12a^8$

2. 8

3.  $16x^6y^{10}$

4.  $4a^3$

5.  $2x^8y^5$

6.  $18y^5$

7.  $3x^2$

8.  $s^3r^2t^2$

9.  $\frac{x^6y^4}{9}$

10.  $4a$

11.  $6a + 3b$

12.  $y$

13.  $w = 23$

14.  $y = 3/2$

15.  $t = -2/3$

16.  $[11, +\infty)$

17. Inf. Many Solutions

18. (3, 6)

19. Width: 4.5 cm

Length: 7.5 cm

20.  $(y - 3) = -1(x + 10)$  or

$(y + 5) = -1(x + 2)$

21.  $(y - 9) = -\frac{7}{5}(x - 1)$  or

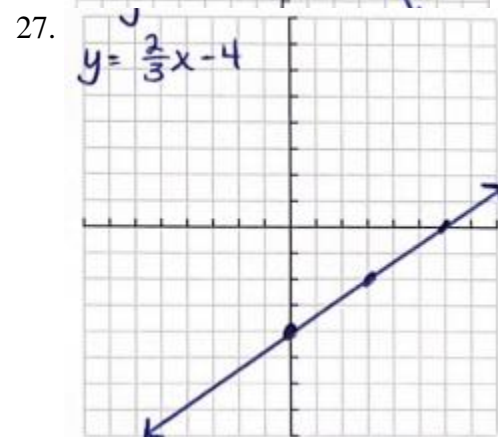
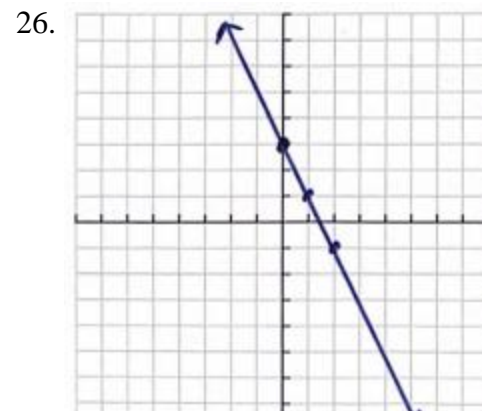
$(y - 2) = -\frac{7}{5}(x - 6)$

22.  $y = -x + 7$

23.  $y = -\frac{5}{13}x + \frac{1}{13}$

24.  $y = -3x - 5$

25.  $y = \frac{5}{2}x + \frac{13}{2}$



28. (6, 4)

29. (2, 1)

30. (10, -1)

31. (-3, 4)

32. (2, 4)

33. (-3, 2)

34. 14 novels, 25 cookbooks