

# **Summer Work Packet for MPH Math Classes**

**Students going into  
Geometry S  
Sept. 2021**

**Name:** \_\_\_\_\_

**This packet is designed to help students stay current with their math skills.**

**Each math class expects a certain level of number sense, algebra sense, and graph sense in order to be successful in the course.**

**These problems need to be completed in the space provided, or on a separate sheet of paper, by the first day of class. Be sure to show all work.**

**If you have any questions, please email Mrs. Meehan at [dmeehan@mphschool.org](mailto:dmeehan@mphschool.org).**

### **Supply List for Geometry**

- TI-84+ calculator
- Pencils/pens
- Colored pencils
- 3 ring binder (can be shared with another class), paper, graph paper
- Protractor
- Quality compass -- Compasses with a wheel between the arms are strongly preferred, as they prevent slippage, which is important for successful constructions.

**Show all work!** Do **NOT** round any answers. Write the answers as a **fraction** if the **decimal is repeating**, or the **calculator does not show the whole decimal**.

**Evaluate each expression. Find the answer and show your work. Remember Order of Operations: Grouping, Exponents, Multiplication and Division, then Addition and Subtraction, all from left to right.**

1.  $40 - \frac{20 - 3(5)}{5} + 3(2 - 6)^2 =$

2. If  $a = 6$ ,  $b = -2$ , and  $c = 8$ , then  $\frac{2(a - c)}{b + 4} =$  \_\_\_\_\_.

**Translate into algebra.**

3. Five times a certain number is half a different number.

**Simplify. Show all your work. Remember, you need an LCD to add or subtract fractions.**

4.  $\frac{7}{9} - \frac{4}{5} =$

5.  $\frac{6}{5} + 2\frac{5}{8} =$

6.  $\frac{8}{9} \div \frac{2}{3}$

7.  $\left(\frac{-5}{7}\right)\left(\frac{3}{10}\right) =$

**Simplify each expression.**

8.  $7b - 6c - 3c =$

9.  $(n^6)(n^4) =$

10.  $\frac{c^{50}}{c^{40}} =$

11.  $\frac{12a^6}{4a}$

**Solve each equation. Show all your work and CHECK!**

12.  $6x = -3x + 7$

13.  $4h = -2(3h + 5)$

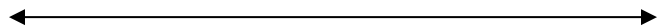
$$14. \quad 18 = -3y$$

$$15. \quad \frac{x}{-5} = 8$$

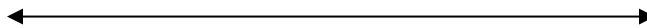
$$16. \quad -5(3 - x) = 3x + 1$$

**Solve each inequality and graph the solution on a number line. Show all your work.**  
**Remember, if you multiply or divide by a negative number you must switch the direction of the inequality sign.**

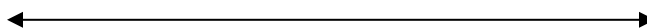
$$17. \quad x - (-4) > 9$$



18.  $\frac{x}{-2} < 3$

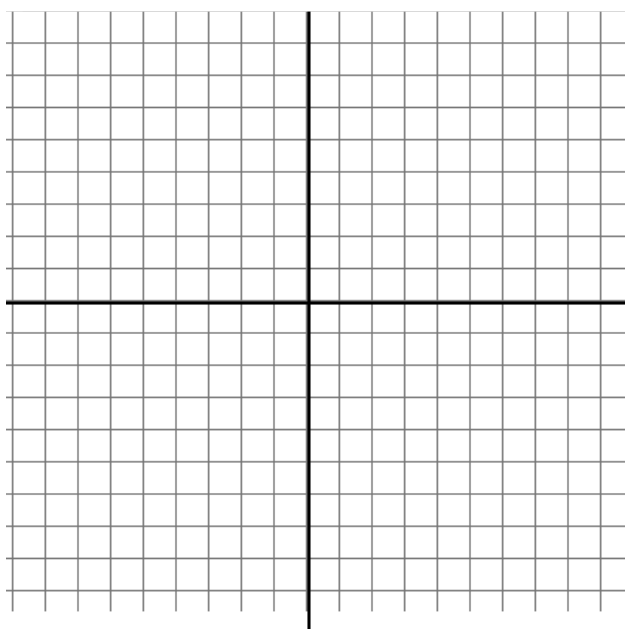


19.  $3n + 5 \geq -4$



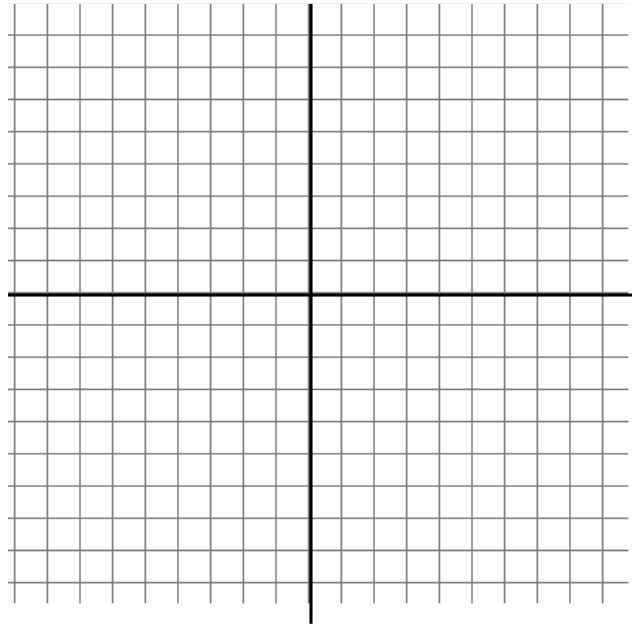
**Graph the equation. Use a table or the slope-intercept method,  $y = mx + b$ .**

20.  $y = -2x + 3$       slope: \_\_\_\_\_      y-intercept: \_\_\_\_\_



**Graph the inequality. Don't forget to shade the solution area and to show your check.**

21.  $y < 2x - 3$



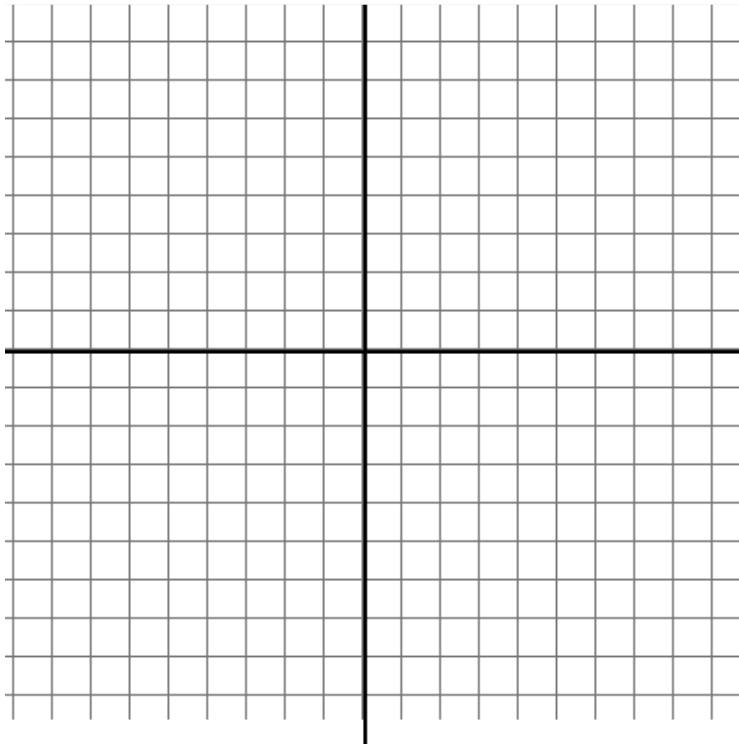
**Find the slope of the line containing the points.**

22.  $(-3, 11)$  and  $(2, 6)$



Find the **x-intercept** and **y-intercept**. **Graph** the points. Find the **slope** of the line through the points. Write the equation in **slope-intercept** ( $y = mx + b$ ) form.

23.  $6x - 4y = 12$



**Simplify the following expressions.**

**Example:**  $3(m^2 + n) - 2(3m^2 - 4n) = 3m^2 + 3n - 6m^2 + 8n = -3m^2 + 11n$

24.  $(3x^2 + 4x - 5xy) + (-7x^2 + 6x - 5xy)$

25.  $(5y^3 - 3y + 4) + (2y^2 + 6y - 4y^3) - (9y^2 - 6 + 2y^3)$

**Use the distributive property to expand the product. Follow the example.**

**EXAMPLE:**  $(x + 4)(2x - 11) = 2x^2 - 11x + 8x - 44 = 2x^2 - 3x - 44$

26.  $(x - 7)(x + 5)$

27.  $(y - 8)(y + 8)$

Factor each into the product of two binomials. Follow the example.

**EXAMPLE:**  $x^2 + 6x - 7 = (x - 1)(x + 7)$

28.  $x^2 - 10x + 24$

29.  $x^2 - 81$

30.  $x^2 - 8x - 20$

Factor each and solve for x. Follow the example.

**EXAMPLE:**  $x^2 + 5x - 6 = 0$   
 $(x + 6)(x - 1) = 0$   
 $(x + 6) = 0$  OR  $(x - 1) = 0$   
 $x = -6$  OR  $x = 1$

**Factored and equal to 0**  
**Either factor may equal 0**

31.  $x^2 + 6x + 8 = 0$

32.  $x^2 - 3x - 4 = 0$

Solve by using the substitution or elimination method. The problems are on next page.

**EXAMPLE Substitution:**  $y = 3x - 4$  and  $8x - 2y = 10$

$$8x - 2(3x - 4) = 10 \text{ Substitute the value for } y$$

$$8x - 6x + 8 = 10$$

$$2x + 8 = 10$$

$$2x = 2$$

$$x = 1 \text{ Finish solving: } y = 3(1) - 4 \text{ so } y = -1.$$

$$\begin{aligned} \text{Then CHECK! } 8(1) - 2(-1) &= 10 \\ 8 + 2 &= 10 \text{ yes} \end{aligned}$$

**EXAMPLE Elimination:**  $4x + 6y = 12$

$$\begin{array}{r} 4x + 6y = 12 \\ \underline{4x - 8y = 5} \quad \text{Subtract the two equations to get ----} \\ 14y = 7 \end{array}$$

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

$$\text{Finish solving for } x: 4x + 6(.5) = 12, \text{ so } x = \frac{9}{4}.$$

$$\text{Then CHECK! } 4(\frac{9}{4}) - 8(\frac{1}{2}) = 5$$

$$9 - 4 = 5 \text{ yes}$$

33.  $2y + x = 5$   
 $y = 3x - 1$

34.  $x = 3 + y$   
 $x - 7y = 45$

## RULES FOR SIMPLIFYING RADICALS (square roots)

$$a\sqrt{b} \times c\sqrt{d} = ac\sqrt{bd} \quad \frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}} \quad \sqrt{a} \times \sqrt{a} = \sqrt{a^2} = |a|$$

$$a\sqrt{b} + c\sqrt{b} = (a + c)\sqrt{b}$$

**Remember, proper form for radicals means:**

a. No perfect square factor under the radical. For example,  $\sqrt{45} = \sqrt{9 \times 5} = 3\sqrt{5}$ .

b. No fractions/decimals may be left under the radical. For example,  $\sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{\sqrt{4}} = \frac{\sqrt{3}}{2}$ .

c. No radical may be left in the denominator of a fraction. For example,

$$\sqrt{\frac{3}{7}} = \frac{\sqrt{3}}{\sqrt{7}} = \frac{\sqrt{3}}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{21}}{7}. \text{ Another example, } \frac{15\sqrt{75}}{20\sqrt{21}} = \frac{3\sqrt{25}\sqrt{3}}{4\sqrt{7}\sqrt{3}} = \frac{3 \times 5}{4\sqrt{7}} = \frac{3 \times 5 \times \sqrt{7}}{4\sqrt{7}\sqrt{7}} = \frac{15\sqrt{7}}{28}.$$

**Simplify each. Leave in best radical form. NO DECIMAL EQUIVALENTS.**

35.  $\sqrt{32}$

36.  $\frac{\sqrt{64}}{\sqrt{16}}$

37.  $\sqrt{20} - \sqrt{80}$

38.  $4\sqrt{5} \times 3\sqrt{10}$