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. LaPointe at klapointe@mphschool.org or Mrs. Meehan at dmeehan@mphschool.org.

Supply List for Geometry

- TI-84$^+$ calculator (Please bring in the points off the packaging, if you buy a new one.)
- Pencils/pens
- Colored pencils
- 3 ring binder (Can be shared with another class)
- 3 ring binder pencil pouch
- 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 <u>show your work</u>. Remember Order of Operations: Grouping, **E**xponents, **M**ultiplication and **D**ivision, then **A**ddition and **S**ubtraction, all from left to right.

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

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

Translate into algebra.

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

Simplify. <u>Show all your work</u>. Remember, you need an LCD to add or subtract fractions.

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

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

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

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

Simplify each expression.

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

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

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

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

Solve each equation. <u>Show all your work</u> and CHECK!

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

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

Check:

Check:

14. $18 = -3y$

15. $\dfrac{x}{-5} = 8$
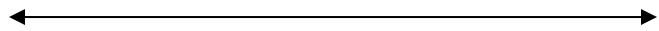
Check:

Check:

16. $-5(3 - x) = 3x + 1$ Check:

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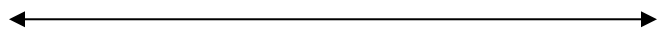**Remember, if you multiply or divide by a negative number you must switch the direction of the inequality sign.**

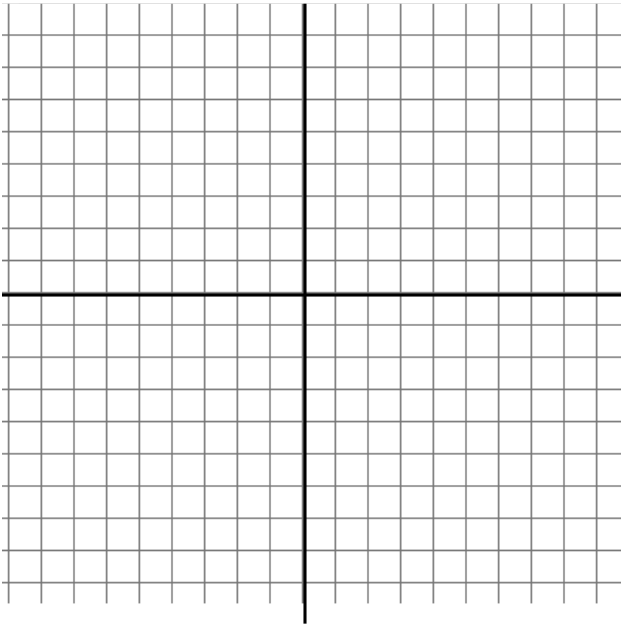17. $x - (-4) > 9$

18. $\dfrac{x}{-2} < 3$
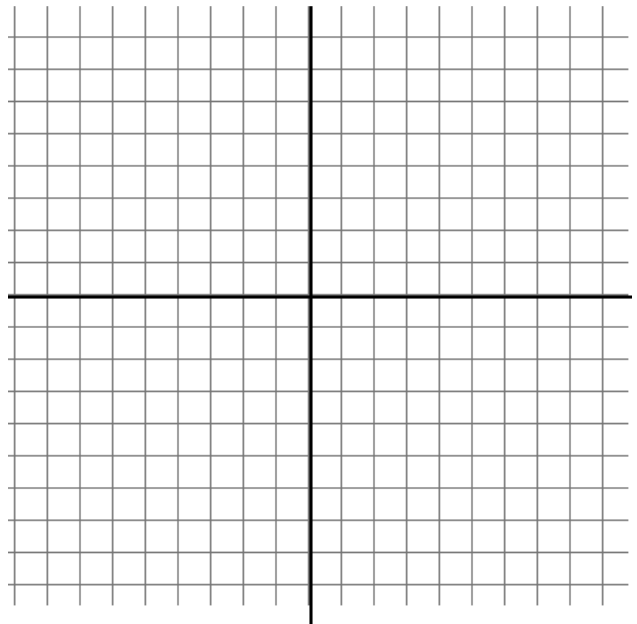
19. $3n + 5 \geq -4$

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 and to show your <u>check</u>.
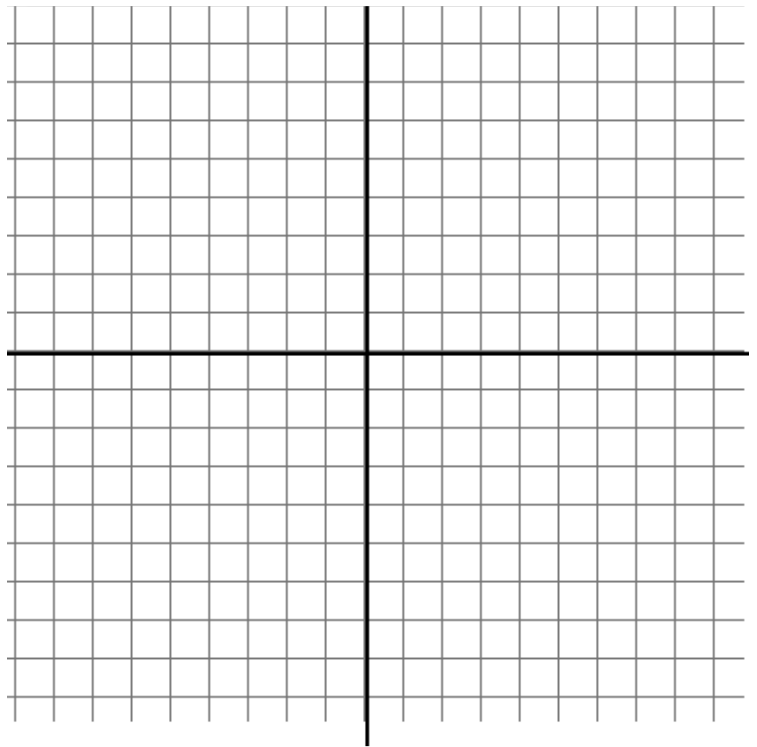
21. $y \le 2x - 3$

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:　$x^2 + 5x - 6 = 0$
　　　　　　$(x + 6)(x - 1) = 0$ 　　　　　Factored and equal to 0
　　　　　　$(x + 6) = 0$ OR $(x - 1) = 0$ 　　Either factor may equal 0
　　　　　　$x = -6$ 　　OR 　$x = 1$

31. 　$x^2 + 6x + 8 = 0$ 　　　　　　32. 　$x^2 - 3x - 4 = 0$

Solve by the graphing, substitution, or elimination method.

EXAMPLE Substitution: y = 3x – 4 and 8x – 2y =10

$8x – 2 (3x – 4) = 10$ **Substitute the value for y**

$8x – 6x + 8 = 10$

$2x + 8 = 10$

$2x = 2$

$x = 1$ **Finish solving: y = 3(1) – 4 so y = –1.**

Then CHECK! 8(1) – 2(–1) = 10

$8 + 2 = 10$ **yes**

EXAMPLE Elimination: 4x + 6y = 12

$\underline{4x – 8y = 5}$ **Subtract the two equations to get ----**

$14y = 7$

$y = ½$ **Finish solving for x: 4x + 6(.5) = 12, so x = 9/4.**

Then CHECK! 4(9/4) – 8(½) = 5

$9 – 4 \quad = 5$ **yes**

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

    Check:

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

    Check:

RULES FOR SIMPLIFYING RADICALS (square roots)

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

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

Remember, proper form for radicals means:

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

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

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

$$\sqrt{3/7} = \frac{\sqrt{3}}{\sqrt{7}} = \frac{\sqrt{3}}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{21}}{7}. \text{ Another example, } \frac{15\sqrt{75}}{20\sqrt{21}} = \frac{3\sqrt{25}\sqrt{3}}{4\sqrt{7}\sqrt{3}} = \frac{3\times5}{4\sqrt{7}} = \frac{3\times5\times\sqrt{7}}{4\sqrt{7}\sqrt{7}} = \frac{15\sqrt{7}}{28}.$$

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

35. $\sqrt{32}$

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

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

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