

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

**Students going into  
Pre-calculus  
Sept. 2018**

**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. Be sure to show all work.**

**Students can expect this packet to be graded and handed in on the first day of school. If you have any questions, please email Mr. Ochs at [jochs@mphschool.org](mailto:jochs@mphschool.org) or Mrs. Meehan at [dmeehan@mphschool.org](mailto:dmeehan@mphschool.org).**

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**\*\*You will need a TI-84<sup>+</sup> calculator for this class.\*\***

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**Show all work on the packet!! 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.**

I. Simplify completely (no negative exponents).

$$\frac{(4x^2)^{-2} y^2 z^4}{x^3 (yz)^{-3}}$$

$$\frac{(c)^{\frac{3}{5}} (2d)^{-2}}{c^{\frac{1}{5}} (2d)^3}$$

$$\sqrt[3]{24x^9 y^6 z^2}$$

$$\sqrt{250} + \sqrt{160}$$

II. Factor using the grouping method or the sum of two cubes.

$$x^2y - 2z^2 - 2xyz + xz$$

$$64x^3 + 27$$

III. Simplify completely:  $\frac{\frac{5}{2} + \frac{4}{x}}{1 + \frac{3}{4x}}$

IV. Factor each expression and cancel to simplify:

$$\frac{(3y^2 - 108)(y^3 + 2y^2 - 24y)}{y(y^2 + 12y + 36)(3y^2 - 30y + 72)}$$

V. Combine using addition and/or subtraction. Be sure to find the LCD.

$$\frac{5}{6x} + \frac{3}{4y}$$

$$\frac{x}{x+2} - \frac{1}{x^2-4}$$

VI. Solve for x by factoring. Check your answers.

$$x^2 + 7x - 8 = 0$$

$$3x^3 - 7x^2 + 4x = 0$$

VII. Solve. Use factor by grouping.

$$2x^3 + x^2 - 8x - 4 = 0$$

VIII. Solve by multiplying by the LCD. Check your answers.

$$\frac{5}{x} + \frac{1}{2} = -2$$

$$\frac{x}{x-3} + \frac{x^2}{x^2 - 7x + 12} = \frac{2x+1}{x-4}$$

IX. Solve each system of equations using the substitution or elimination method. Check your answers.

$$x - y = 10$$

$$x + y = 22$$

$$x + 2y = 9$$

$$3x + 5y = 15$$

Check:

Check:

X. Find an equation of a line that is determined by the following information:

Passes through the points  $(6, 3)$  and  $(2, -7)$

Perpendicular to the line  $3x + 2y = 5$  and goes through the point  $(5, -2)$

XI. Find all the solutions to the following equations and check your answers:

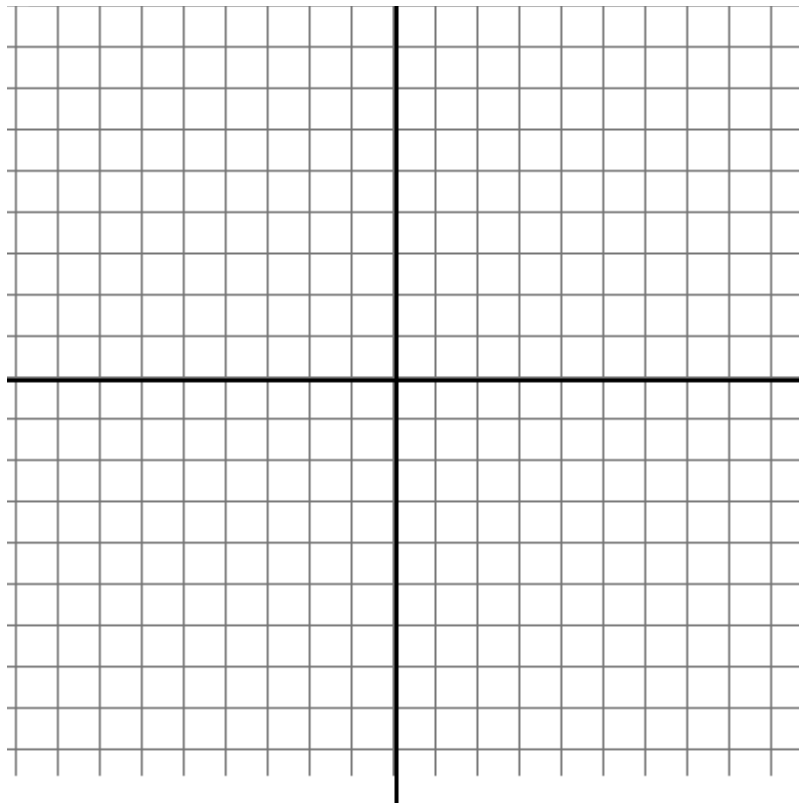
$$x^4 - 10x^2 + 24 = 0$$

$$\sqrt{x-1} = 2-x$$

XII. Change the following quadratic equation into vertex form by completing the square.

$$x^2 - 2x - 4 = 0$$

Now graph the answer above along with the equation  $y = x^2$  on the same graph. Then answer the questions below.



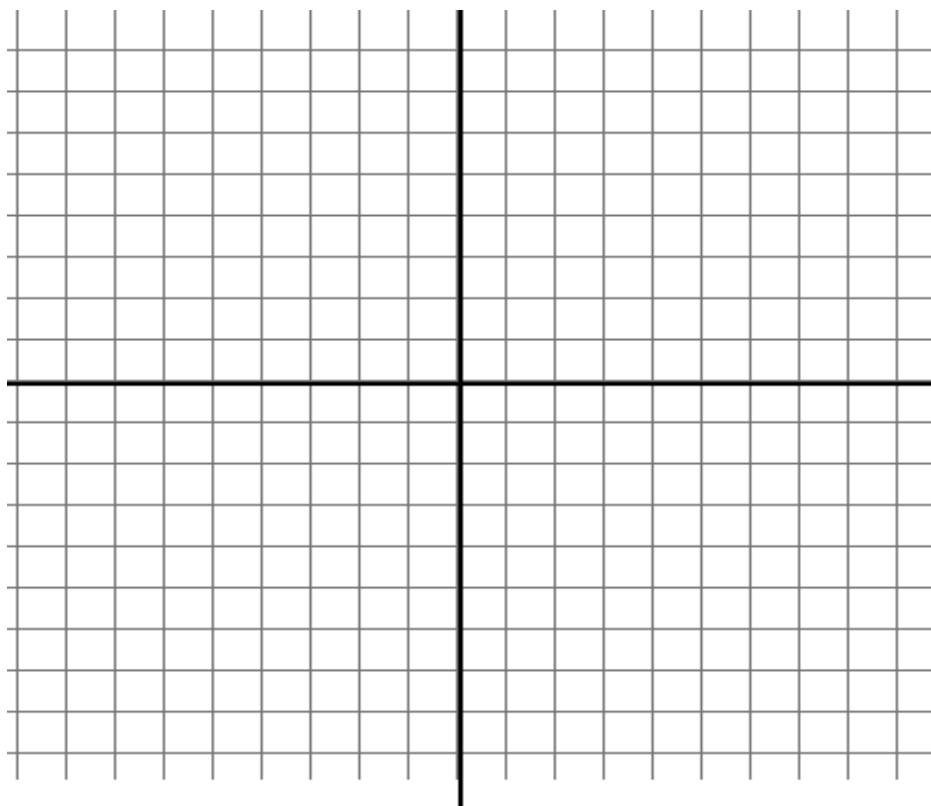
- What is the domain of both functions? \_\_\_\_\_
- What is the range of both functions? \_\_\_\_\_
- What is the vertex of each function? \_\_\_\_\_
- How did  $y = x^2$  become the equation you found by completing the square? Look at the movement of the vertex. \_\_\_\_\_



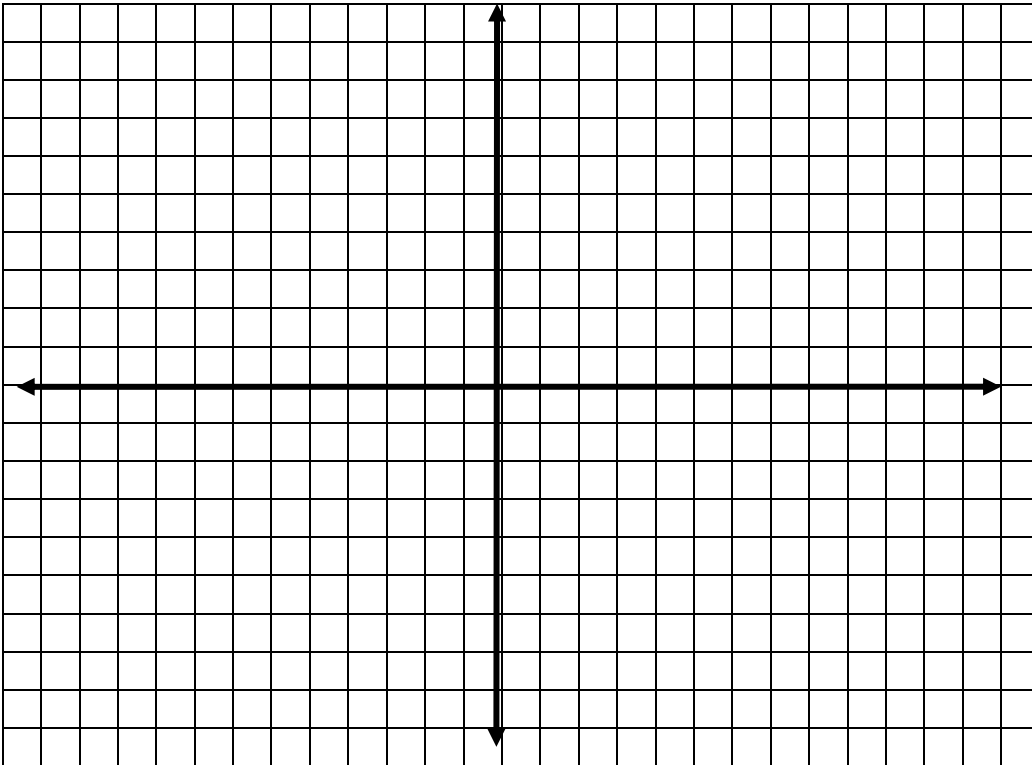
XIII. Graph  $y = 2^x$  and  $y = 2^{(x+1)} - 3$  on the same axes. Explain how the graph has been transformed.

x	$y = 2^x$
-3	
-2	
-1	
0	
1	
2	
3	

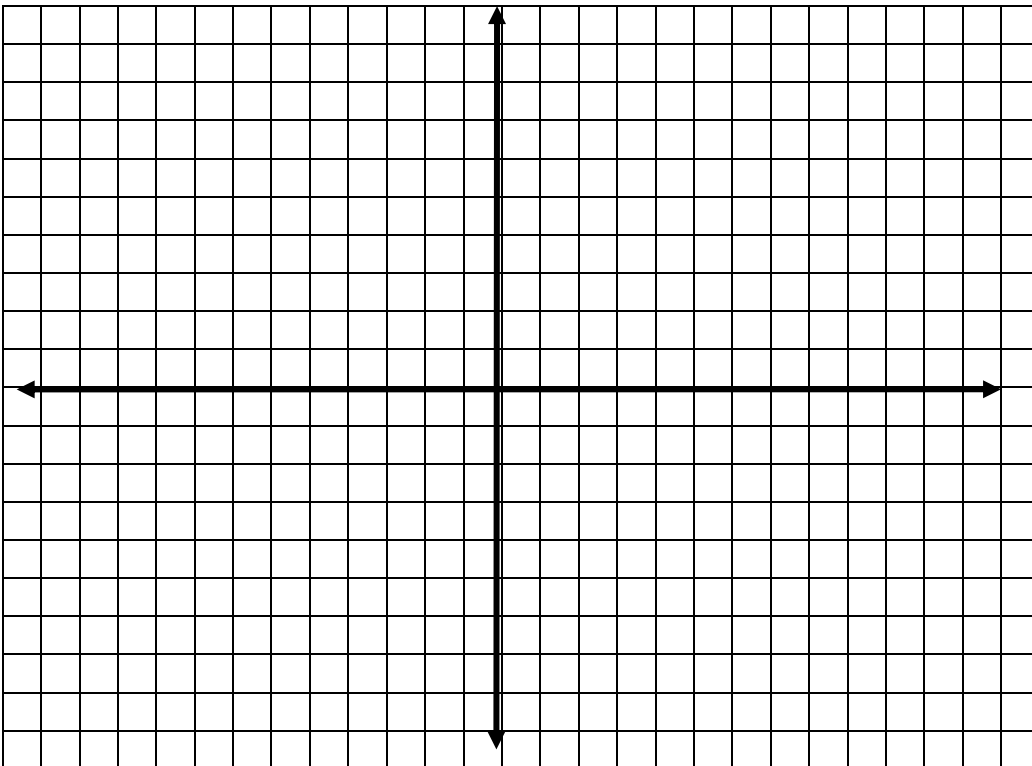
x	$y = 2^{(x+1)} - 3$
-3	
-2	
-1	
0	
1	
2	
3	



XIV. Graph  $y = \sin(x)$ ,  $y = 2\sin(x)$  on the same axes. Use your calculator. Be sure it is set to radians (go to mode) and use ZOOM TRIG for your window. What change took place to the graph? Use 6 BLOCKS =  $\pi$  on the x-axis and 2 BLOCKS = 1 on the y-axis.



Graph  $y = \cos(x)$  and  $y = \cos(2x)$  on the same axes. Use your calculator. Be sure it is set to radians (go to mode) and use ZOOM TRIG for your window. What change took place to the graph? Use 6 BLOCKS =  $\pi$  on the x-axis and 2 BLOCKS = 1 on the y-axis.



Graph  $y = \sin(x)$  and  $y = \sin(x) - 2$  on the same axes. Use your calculator. Be sure it is set to radians (go to mode) and use ZOOM TRIG for your window. What change took place to the graph? Use 6 BLOCKS =  $\pi$  on the x-axis and 2 BLOCKS = 1 on the y-axis.

