

**PRE-CALCULUS HONORS SUMMER WORK 2022-2023**

**WISSAHICKON HIGH SCHOOL**

Name \_\_\_\_\_ Date: \_\_\_\_\_

Welcome to Pre-Calculus Honors. Before you begin this course, it is important to review topics and concepts learned in previous math courses, including Algebra 1, Geometry and Algebra 2. Be sure to show all of your work throughout this packet. Do not rely on your calculator to work through the majority of these problems. Also, do not rely on Photomath. If you need additional assistance with any of these topics, use the math sites below.

**Directions/Information:**

1. This packet is due to your Pre-Calculus teacher on the first day of school.
2. ALL work MUST be shown in the packet or on separate paper attached to the packet.
3. Work must be neat and organized in a logical manner. Final answers should be boxed or circled.
4. Do not use a calculator for these problems, unless necessary.
5. Do not use Photomath. The use of this resource will not be allowed next year.
6. Round all decimals to three decimal places, where necessary.
7. Completion of this packet is worth a homework grade and a quiz grade.
8. Here are some resources if you need additional assistance with a specific topic or concept:

- Cool Math [www.coolmath.com](http://www.coolmath.com)
- Khan Academy [www.khanacademy.org/](http://www.khanacademy.org/)
- Paul's Online Math Notes [tutorial.math.lamar.edu/](http://tutorial.math.lamar.edu/)
- Purple Math [www.purplemath.com](http://www.purplemath.com)

See you in the fall.

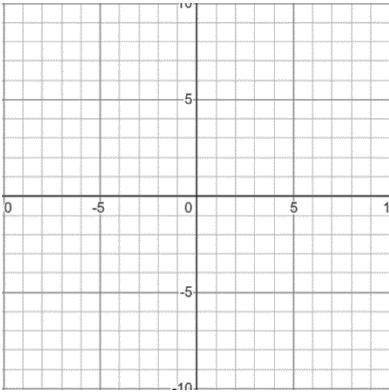
Have a wonderful summer!

Pre-Calculus Honors teachers

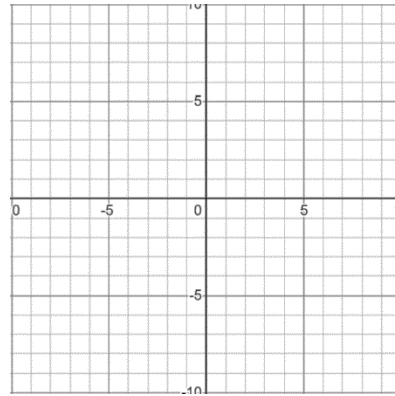
## Algebra 1

### Lines:

#1. Graph  $y = \frac{2}{3}x - 5$



#2. Graph  $2x + y = 1$



#3. Write the equation of a line in slope-intercept form if the slope is -8 and the line passes through the point (-3, -7)

#4. Write the equation of a line in slope-intercept form that passes through the points (4, 3) and (7, -2).

#5. Write the equation of a line in slope-intercept form that has an x-intercept of (-3, 0) and a y-intercept of (0, -2).

#6. Write the equation of a line in slope-intercept form that is perpendicular to the line  $y = \frac{3}{5}x + 7$  and passes through the point (10, -1).

#7. Determine where the two lines intersect.  
 $10x + 8y = 2$   
 $x + 4y = -7$

## Polynomial Operations

Simplify completely.

#8.  $(2x^2 + 5 - 3x) + (4 - 7x - 6x^2)$

#9.  $(5x + 3) - (x^2 - 7x + 10)$

#10.  $(3x - 5)(2x - 1)$

#11.  $(4x + 1)^2$

#12.  $(x - 3)^3$

## Factoring

Factor Completely.

#13.  $x^2 - 14x + 40$

#14.  $2x^2 - 8x$

#15.  $x^2 - 2x - 48$

#16.  $x^2 - 49$

#17.  $3x^2 - 6x - 9$

#18.  $4x^2 - 49$

## Radicals

Simplify Completely.

#19.  $\sqrt{12}$

#20.  $\sqrt{72}$

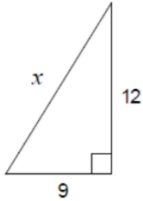
#21.  $5\sqrt{28}$

## Geometry

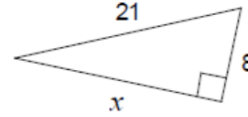
### Pythagorean Theorem

Solve for  $x$ . Exact answers only, no decimals.

#22.



#23.

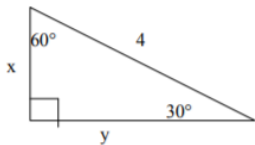


#24. Starting from the same spot, one runner jogs 8 miles north while another jogs 5 miles west. How far apart are the runners? Round to three decimal places.

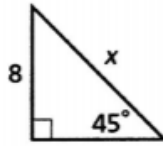
### Special Right Triangles

Solve for the variables. Give exact answers only, no decimals.

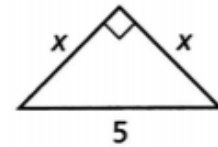
#25.



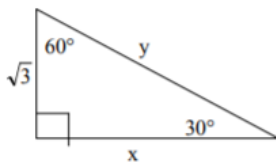
#26.



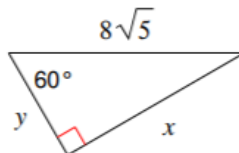
#27.



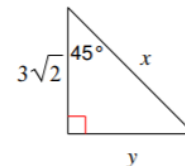
#28.



#29.



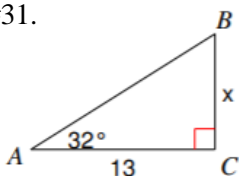
#30.



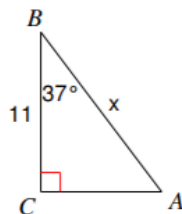
### Right Triangle Trigonometry

Solve for the variable. Round to three decimal places.

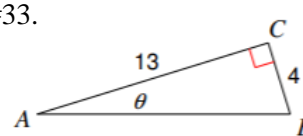
#31.



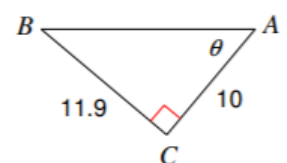
#32.



#33.



#34.



## Algebra 2

### Quadratics

Factor completely.

#35.  $x^2 - x - 20$

#36.  $2x^2 + 17x + 21$

#37.  $5x^2 - x - 18$

#38.  $8x^3 - 27$

#39.  $14x^2 - 64x - 120$

#40.  $12x^3 + 2x^2 - 30x - 5$

Solve for x. Leave answers in simplest radical form if necessary.

#41.  $x^2 - 9x + 14 = 0$

#42.  $x^2 + 25 = 10x$

#43.  $6x^2 - 27x - 15 = 0$

#44.  $4x^3 - 4x^2 = 0$

#45.  $5x^2 - 2x + 4 = 0$

#46.  $9x^2 - 11 = 6x$

### Rational Expressions

Simplify completely.

#47.  $\frac{x^2 - 5x + 4}{x^2 - 4x}$

#48.  $\frac{x^2 + 5x - 24}{2x + 2} \div \frac{3x + 24}{x^2 - 8x - 9}$

$$\#49. \frac{2}{x+3} - \frac{x}{x-1} + \frac{x^2+2}{x^2+2x-3}$$

$$\#50. \frac{\frac{2}{x+2} + \frac{6}{x+7}}{\frac{4x+13}{x^2+9x+14}}$$

## Radicals

Simplify completely.

$$\#51. \sqrt[3]{-64}$$

$$\#52. \frac{4}{\sqrt{3}}$$

$$\#53. \sqrt[3]{32x^7y^{12}}$$

$$\#54. \sqrt[4]{162x^{12}y^7}$$

$$\#55. (\sqrt{5} - \sqrt{6})(\sqrt{5} + \sqrt{2})$$

$$\#56. \frac{-3}{2-\sqrt{5}}$$

$$\#57. \sqrt{50} - \sqrt{18} - \sqrt{9}$$

$$\#58. \frac{\sqrt{24}}{4} - \frac{\sqrt{54}}{12}$$

Rewrite using radicals. Simplify, if possible.

$$\#59. 8^{\frac{2}{3}}$$

$$\#60. 9^{\frac{3}{2}}$$

$$\#61. (xy)^{\frac{1}{3}}$$

$$\#62. (x^2y^3)^{\frac{5}{6}}$$

$$\#63. \sqrt{u-4} = w, \text{ solve for } u$$

$$\#64. x - 5 = \sqrt{x+1}$$

## Imaginary Numbers

Simplify completely.

#65.  $\sqrt{-40}$

#66.  $i^{39}$

#67.  $(5 + i)(1 - 3i)$

#68.  $i^{52}$

## Logarithms

Solve for x by switching forms.

#69.  $\log_5 25 = x$

#70.  $\log_2 \frac{1}{8} = x$

#71.  $\log_x 32 = 5$

#72.  $6^x = 216$

#73.  $5^{x+1} = \frac{1}{125}$

#74.  $3^x = \sqrt{\frac{1}{3}}$

Expand each logarithm.

#75.  $\log x^2 y^5$

#76.  $\log_{\alpha} \frac{\sqrt{x}}{y^3 z}$

Condense each logarithm.

#77.  $2 \log_{\theta} x + 3 \log_{\theta} y - 5 \log_{\theta} z$

#78.  $\frac{1}{3} \log_4 x - \frac{2}{5} \log_4 y$

Solve for x.

#79.  $3^{x+2} - 5 = 12$

#80.  $\log(3x - 2) = 2$

#81.  $\log_3(x + 25) - \log_3(x - 1) = 3$

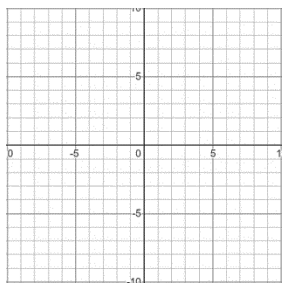
#82.  $\log_9(x - 5) + \log_9(x + 3) = 1$

## Parent Functions

Fill in the table of values and graph each parent function.

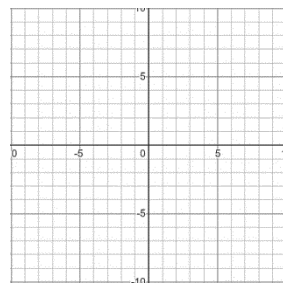
#83.  $y = x^2$

x	y
-2	
-1	
0	
1	
2	



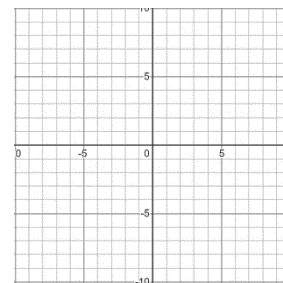
#84.  $y = |x|$

x	y
-2	
-1	
0	
1	
2	



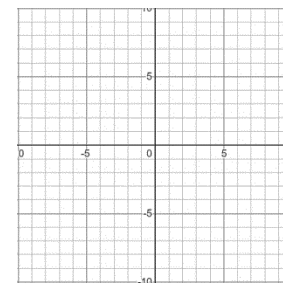
#85.  $y = \frac{1}{x}$

x	y
-2	
-1	
0	
1	
2	



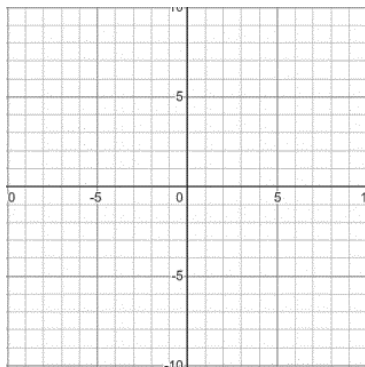
#86.  $y = \sqrt{x}$

x	y
0	
1	
4	
9	



Graph each transformation of the parent function, then describe the transformations taking place.

#87.  $y = (x - 2)^2 - 3$



#88.  $y = 2\sqrt{x + 5} + 1$

