

# PreCalculus with Trigonometry – Summer Packet



## Welcome to PreCalculus with Trigonometry!

This summer packet is for all students enrolled in PreCalculus with Trigonometry (regular) at Herndon High School for Fall 2023.

This summer assignment is not *required*, but it is *strongly recommended*. The exercises will give you the opportunity to self-assess how prepared you are for PreCalculus this year. Success in our first unit will depend how well you understand the topics included, so put your best effort into it! Feel free to use old notes and online resources as needed to ensure that you understand the content.

Complete the work for this packet on a separate piece of paper. You may use a calculator only on the last 4 problems of the packet (SOHCAHTOA review). Resist the temptation to use your calculator on the other problems! It is important to spend time keeping these skills and concepts fresh in your mind – especially your mental math! This will set you up for success next year because the vast majority of the work we do in PreCalc is done without a calculator. Start practicing now, so that you're ready! An answer key can be found [online here](#). Be sure to keep track of sticky spots and ask questions when we return. You are also welcome to reach out to us over the summer; our contact information is below.

FCPS-recommended activities for each level of mathematics are also posted on the Herndon High School website. Both resources will help you prepare for next year.

Have a great summer – we look forward to meeting you in August!

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**As you work through the packet, keep track of the following:**

“Things I learned, but forget how to do:”	“Things I never learned:”

**Online Resources:**

Mathspace

[www.mathspace.co](http://www.mathspace.co)

Select login with Clever and use your FCPS ID number and password.

Khan Academy

[www.khanacademy.org](http://www.khanacademy.org) or for videos in Spanish: <https://es.khanacademy.org/math/matematicas-es-high-school>

HippoCampus

<http://www.hippocampus.org>

Great video lessons! Click on Algebra & Geometry from the left "Subject" box and then select either Algebra 1 or Algebra 2. Scroll down or search to find the topic you need.

**Arithmetic Review**

Evaluate **without a calculator**. Put answers in simplest form.

1.  $\frac{3}{16} + \frac{1}{8}$

7.  $\left(\frac{3}{5} \div 3\right) - \left(6 \cdot \frac{4}{8}\right)$

2.  $\frac{5}{8} - \frac{5}{12} + \frac{1}{6}$

8.  $\frac{81 - (90 - 9)}{5}$

3.  $\frac{4}{5} \cdot \frac{1}{2} \cdot \frac{3}{4}$

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

4.  $\frac{27 - 35}{4}$

10.  $5^{-1} + 2^{-3}$

5.  $3\left(\frac{-5}{12} + \frac{3}{8}\right)$

11.  $\left(\frac{3}{2}\right)^{-2} - 2^2$

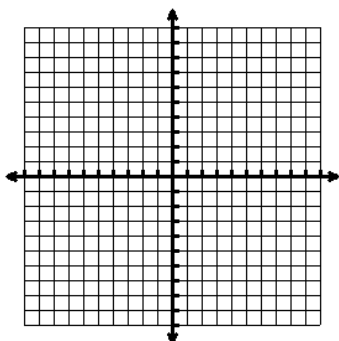
6.  $\frac{\frac{1}{5}(-8-9)}{\frac{-1}{3}}$

12.  $-3 + \frac{3}{7}$

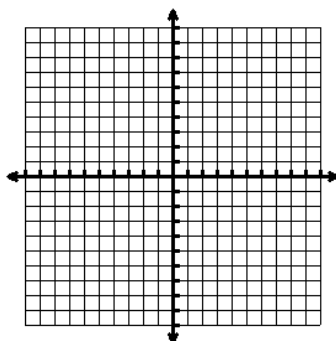
### Graphing

Graph each equation **without using a calculator**. Plot at least 3 points on each line.

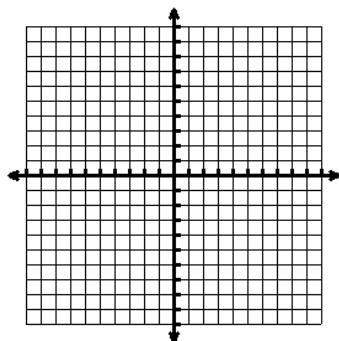
1.  $y = 3$



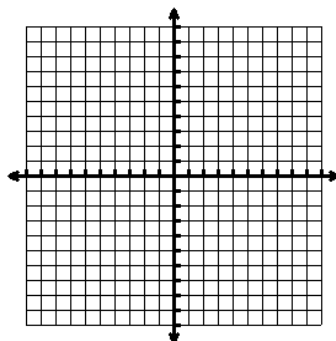
2.  $x = -4$



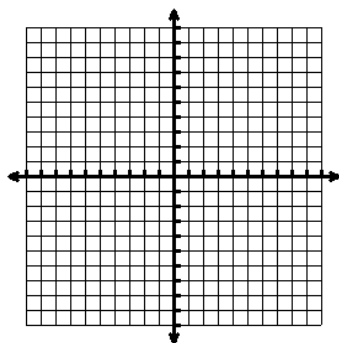
3.  $y = -3x + 2$



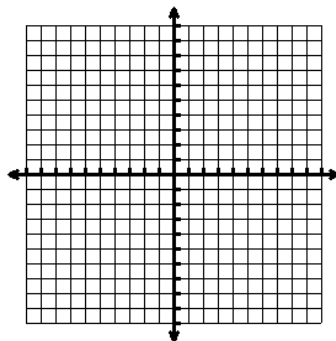
4.  $x - 2y = 6$



5.  $y = x^2$



6.  $y = \sqrt{x}$



Describe the transformations in the graphs from the parent function  $f(x) = x^2$  **without using a calculator**. Remember  $f(x) = A(x-h)^2 + k$  from Algebra 2.

7.  $g(x) = -(x+4)^2 - 3$

8.  $h(x) = 2(x-1)^2 + 6$

## Domain & Range Review

Domain: The possible x-values of a function

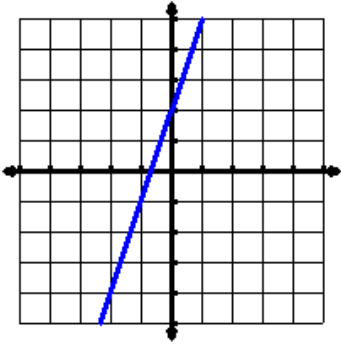
Range: The possible y-values of a function

Give the domain and range of the following in **interval notation**.

*Example 1:*

Domain:  $(-\infty, \infty)$

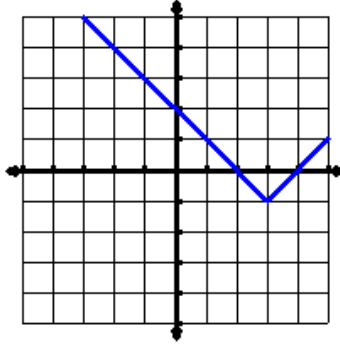
Range:  $(-\infty, \infty)$



*Example 2:*

Domain:  $(-\infty, \infty)$

Range:  $[-1, \infty)$



### Remember for Interval Notation:

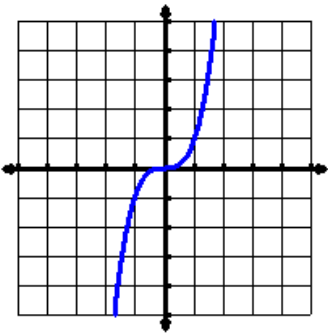
- Always start with the smaller number and go to the bigger number.

For example:  $(-2, 5)$  😊

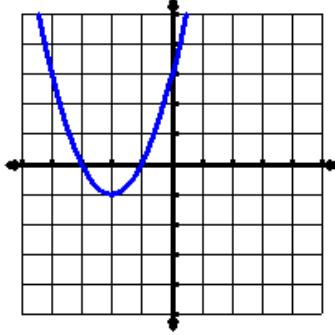
not  $(5, -2)$  😞

- A [ or ] means the value is included, like  $\leq$ ,  $\geq$ , or a closed point. A ( or ) means the value is not included like  $<$ ,  $>$ , or an open point.

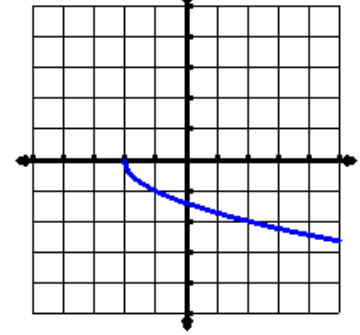
1. D: \_\_\_\_\_  
R: \_\_\_\_\_



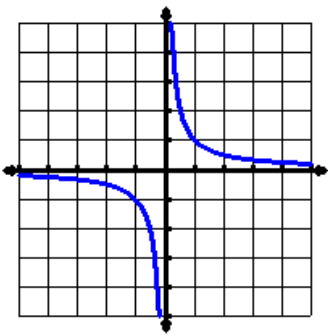
2. D: \_\_\_\_\_  
R: \_\_\_\_\_



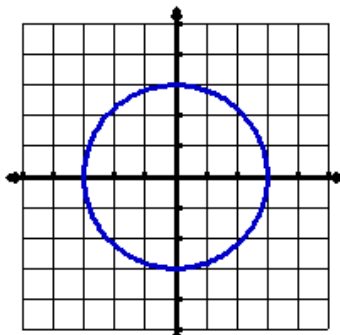
3. D: \_\_\_\_\_  
R: \_\_\_\_\_



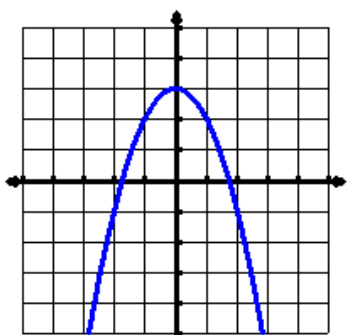
4. D: \_\_\_\_\_  
R: \_\_\_\_\_



5. D: \_\_\_\_\_  
R: \_\_\_\_\_



6. D: \_\_\_\_\_  
R: \_\_\_\_\_



## Factoring and Solving Quadratic Equations

Factor completely:

1.  $x^3 - 7x^2 + 6x$

2.  $3x^2 - 75$

3.  $-8x^2 + 40xy + 112y^2$

4.  $x^3 - y^3$

5.  $16x^2 - 24x + 9$

6.  $x^3 + y^3$

Solve by factoring:

7.  $x^2 - 49 = 0$

8.  $6x^2 - 10x = 4$

9.  $5x^2 - 37x + 14 = 0$

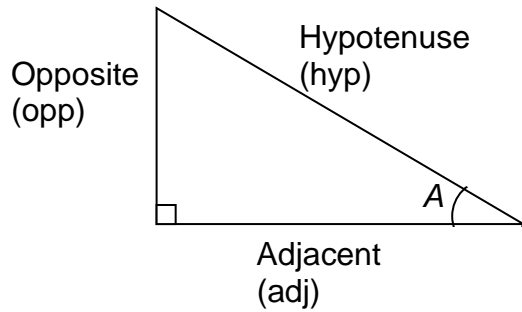
10.  $90x^4 - 10x^2 = 0$

Solve using the quadratic formula:  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

11.  $3x^2 + x - 1 = 0$

12.  $5x^2 + 8 = -12x$

## Basic Trigonometry Review: SOH-CAH-TOA



$$\sin A = \frac{opp}{hyp}$$

$$\cos A = \frac{adj}{hyp}$$

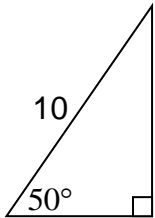
$$\tan A = \frac{opp}{adj}$$

Find the length of the two missing sides of the triangle. Show all work. You **MAY** use a **calculator** for these problems. If you don't have a calculator at home, use Desmos:

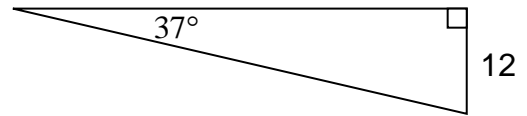
<https://www.desmos.com/testing/virginia/graphing>.

Don't forget to put your calculator in **degree mode**! Round to **3 decimal places**.

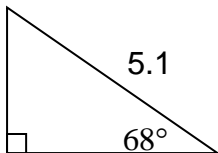
1.



2.



3.



4.

