



Rolesville High School

AP Calculus Summer Assignment 2016



Dear Future Calculus Students,

Welcome to AP Calculus. I am excited you have chosen to take on this challenge next year. Calculus is a rigorous, yet rewarding, math course, and I look forward to helping you succeed. Many Calculus students are surprised by how much prior knowledge is required to do well in this class. Quite often, it is Pre-Calculus, not Calculus, which gives students the most trouble. To help you prepare for this course and make it through the “tedious algebra” ahead, I believe it will be beneficial for you to create your own **Pre-Calculus Reference Booklet** this summer.

This **Pre-Calculus Reference Booklet** will be due on September 2, 2016. Per RHS policy, the summer assignment will count as 15% of your 1st Quarter Grade. You are encouraged to use reference tools such as notes from previous classes, textbooks, or internet resources. Websites such as Khan Academy (www.khanacademy.org) may be of great benefit to you.

I will be available via e-mail to answer questions and provide suggestions. My e-mail address is: eanthony2@wcpss.net. Please allow 3-4 days for a response over the summer. Also, make sure to e-mail me using your WCPSS e-mail address; otherwise, I am not permitted to respond.

Sincerely,

Ms. Anthony

Reference Booklet Content – Using your previous math notebooks and any necessary reference books, create an algebra/geometry/trigonometry reference booklet which will help you succeed in calculus. The topics are listed below.

TOPICS

Algebra

- | | |
|------------------------------------|---|
| 1. Writing the equation of a line | 5. Determining asymptotes of rational functions |
| 2. Simplifying algebraic fractions | 6. Completing the Square |
| 3. Laws of logarithms | 7. Factoring Polynomials |
| 4. Solving exponential equations | |

Geometry

1. Area formulas (circle, square, isosceles right triangle, equilateral triangle)
2. Volume formulas (sphere, cube, rectangular solid, cone)
3. Surface area formulas (sphere, cube, rectangular solid)
4. Solving similar triangles

Trigonometry

- | | |
|--|-------------------------|
| 1. Sum and difference formulas | 4. Unit circle |
| 2. Double-angle formulas | 5. Inverse Trigonometry |
| 3. Basic trigonometric identities (Pythagorean and reciprocal) | |

Families of Functions*

- | | | |
|----------------------------|-----------------------------------|-------------------------------|
| 1. Graph of $y = \ln(x)$ | 5. Graph of $y = x^3$ | 8. Graph of $y = \frac{1}{x}$ |
| 2. Graph of $y = e^x$ | 6. Graph of $y = \sqrt[3]{x}$ | 9. Graph of $y = \sin x$ |
| 3. Graph of $y = x^2$ | 7. Graph of $y = x^{\frac{2}{3}}$ | 10. Graph of $y = \cos x$ |
| 4. Graph of $y = \sqrt{x}$ | | 11. Graph of $y = \tan x$ |

Reference Booklet Format

1. Divide each page into two columns.
2. In the left column, state the topic; under the topic name, list any formulas, facts, definitions, procedures and/or equations which relate to that topic.
3. In the right column, write one or more examples which illustrate each formula, fact and equation from the left column. The examples should be worked out fully, with all steps shown. (See the sample below.)
4. *The Families of Functions topic should not have examples. It should, however, include a graph and a verbal description of the characteristics of the function, including domain/range, intercepts and asymptotes where appropriate.
5. Be neat and make your booklet easily readable.

Reference Booklet Example Entry:

Slope

The slope is the change in y over the change in x, which is sometimes expressed as "rise over run."

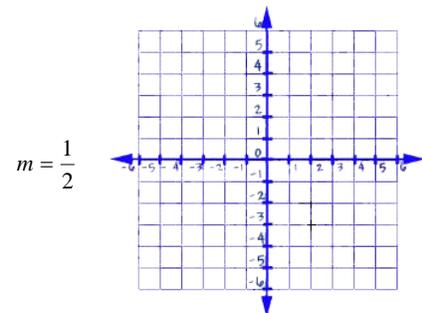
$$\text{Formula: } m = \frac{y_2 - y_1}{x_2 - x_1}$$

Procedures for finding slope:

1. If you are given two points on the line, use the formula above.
2. If you are given a graph, you may count the change in y and the change in x on the graph.
3. If you are given an equation in slope-intercept form, the slope is the coefficient of x.
4. If you are given an equation in standard form, the slope is the opposite of the ratio of the coefficients of x and y

1. Two points: (3,2) and (-4,5); $m = \frac{5-2}{-4-3}$

2. Graph:



3. Slope-intercept form: $y = -2x + 5$; $m = -2$
4. Standard form: $3x - 4y = 10$; $m = \frac{3}{4}$

Reference Booklet Grading Rubric

You may earn up to 4 points for completing each of the objectives below:

- 4pts – Completed with Excellence
- 3pts – Completed Sufficiently
- 2 pts – Missing Minor Aspects
- 1 pt – Missing Major Aspects
- 0 pts – Not Present

Objectives:

1. The reference booklet was completed using appropriate formatting.	0	1	2	3	4
2. The reference booklet is neat and well-organized.	0	1	2	3	4
3. The Algebra Section					
a. Contains accurate and comprehensive definitions/explanations	0	1	2	3	4
b. Contains accurate and well-developed example problems	0	1	2	3	4
4. The Geometry Section					
a. Contains accurate and comprehensive definitions/explanations	0	1	2	3	4
b. Contains accurate and well-developed example problems	0	1	2	3	4
5. The Trigonometry Section					
a. Contains accurate and comprehensive definitions/explanations	0	1	2	3	4
b. Contains accurate and well-developed example problems	0	1	2	3	4
6. The Families of Functions Section					
a. Contains accurate sketches of each function	0	1	2	3	4
b. Contains accurate verbal descriptions of each function	0	1	2	3	4

Total Grade _____ /40 =