

Electronic work must be completed  
**BEFORE July 29, 2018.**  
**About Me and MC Review Forms**  
**Available 7/9/2018**  
Written Work will be collected the first  
day of school, **August 6, 2018.**

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

Period: \_\_\_\_\_ Date: \_\_\_\_\_

Class of : \_\_\_\_\_

# AP Calculus AB

## 2018-2019

### Summer Assignment

### Ms. Speyer

TI-Nspire CX CAS is required for AB and BC Calculus. There are a limited number available to rent. More information will be given in class the first week of school. The math club will also be selling these calculators at cost the first week of school. The price in the past has been \$140 and these are being sold at cost. Make sure that you have a graphing calculator charged and in working condition the first day of school. I realize that it will take about two weeks for everyone to have the correct calculator. Any calculator will work in the beginning.

Moon Valley Website:

<http://moonvalley.guhsdaz.org/cms/One.aspx>

MV AP Webpage:

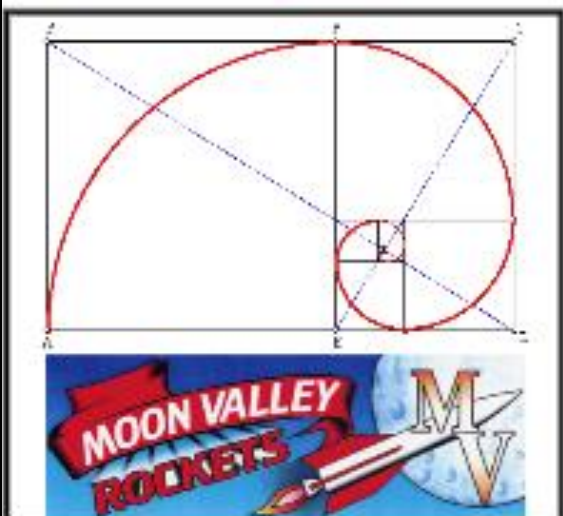
<http://moonvalley.guhsdaz.org/cms/One.aspx?portalId=759065&pageId=28620298>

Student Login to Google is Student

[ID#@student.guhsdaz.org](mailto:ID#@student.guhsdaz.org) *You must know your password.*

Contact Ms. Speyer using e-mail:

[Sherill.Speyer@guhsdaz.org](mailto:Sherill.Speyer@guhsdaz.org)



# Formula Sheet

Arc Length:  $s = r\theta$

Area of a Sector:  $A = \frac{1}{2}r^2\theta$

$$r = \sqrt{x^2 + y^2}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\sin \theta = \frac{y}{r} \quad \cos \theta = \frac{x}{r} \quad \tan \theta = \frac{y}{x}$$

$$\csc \theta = \frac{r}{y} \quad \sec \theta = \frac{r}{x} \quad \cot \theta = \frac{x}{y}$$

Sequences and Series

$$a_n = a_1 + (n-1)d \quad s_n = \frac{n}{2}(a_1 + a_n)$$

$$a_n = a_1 r^{n-1} \quad s_n = \frac{a_1(1-r^n)}{1-r} \quad s_\infty = \frac{a_1}{1-r}$$

$$\log_a x = y \Leftrightarrow x = a^y$$

$$\log_b M = \frac{\log_a M}{\log_a b}$$

Growth, Decay, & Compound Interest

$$P(t) = P_0 e^{kt} \quad P(t) = P_0 e^{-kt}$$

$$A = P \left( 1 + \frac{r}{n} \right)^{nt}$$

Conic Sections

$$(x-h)^2 = 4p(y-k) \quad (x-h)^2 + (y-k)^2 = r^2$$

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1 \quad \frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$$

Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

Permutation & Combination

$${}_n P_k = \frac{n!}{(n-k)!}$$

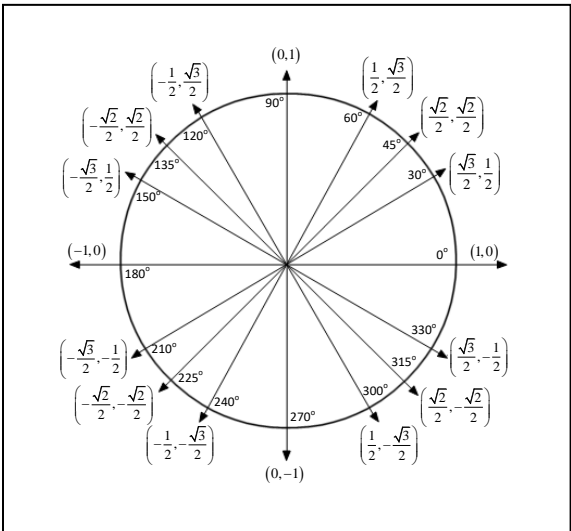
$${}_n C_k = \frac{n!}{k!(n-k)!}$$

Law of Cosines

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

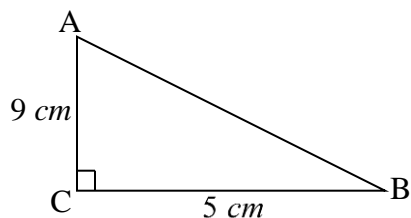
$$c^2 = a^2 + b^2 - 2ab \cos C$$



Complete each problem by selecting the best answer. Use your Honors Pre-Calculus notes and reviews. If you get stuck, call a friend or e-mail Ms. Speyer. Show ALL work on this document. This document with all work shown is due the first day of school.

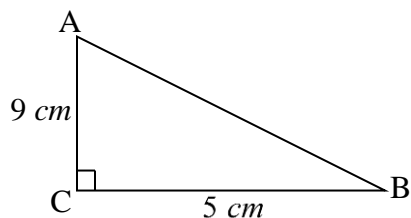
1. Use the diagram on the right to find  $\tan A$ :

- a.  $\frac{5}{9}$
- b.  $\frac{5}{\sqrt{106}}$
- c.  $\frac{9}{\sqrt{106}}$
- d.  $\frac{9}{5}$



2. Use the diagram on the right to find  $\cos B$ :

- a.  $\frac{5}{\sqrt{56}}$
- b.  $\frac{9\sqrt{106}}{106}$
- c.  $\frac{5\sqrt{106}}{106}$
- d.  $\frac{9}{5}$



3. Which of the following is equal to  $\csc \theta$ ?

- a.  $\frac{1}{\sin \theta}$
- b.  $\frac{1}{\cos \theta}$
- c.  $\frac{1}{\tan \theta}$
- d.  $\frac{1}{\sec \theta}$

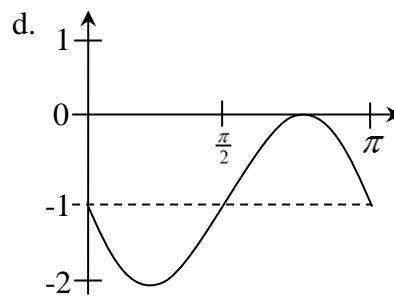
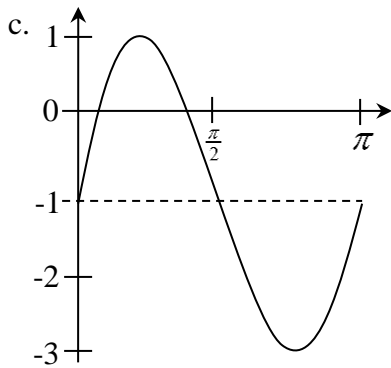
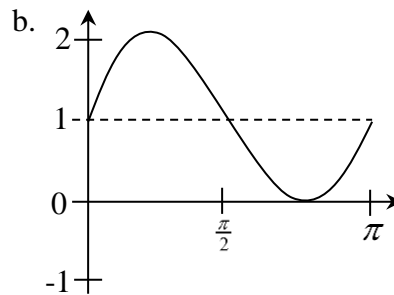
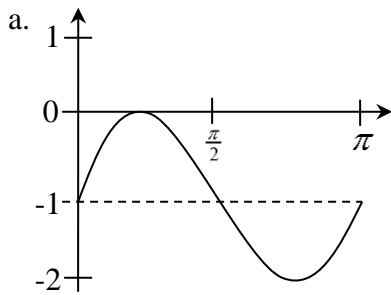
4. Find the exact value of  $\sec 300^\circ$ .

- a. 2
- b.  $-\frac{\sqrt{3}}{2}$
- c.  $-\frac{2\sqrt{3}}{3}$
- d.  $-\frac{\sqrt{3}}{3}$

5. Find the reference angle for an angle measuring  $145^\circ$ .

- a.  $35^\circ$
- b.  $225^\circ$
- c.  $135^\circ$
- d.  $55^\circ$

6. Graph the following equation,  $y = -1 + \sin 2x$ , over a one-period interval.



7. Change  $125^\circ$  to radian measure.

- a.  $\frac{5\pi}{6}$
- b.  $\frac{25\pi}{36}$
- c.  $\frac{6\pi}{7}$
- d.  $\frac{25\pi}{72}$

8. Change  $\frac{25\pi}{18}$  radians to degree measure.
- $125^\circ$
  - $60^\circ$
  - $250^\circ$
  - $130^\circ$
9. Given that  $f(x) = 2x^2 + x - 5$ , find  $f(-3)$ .
- 26
  - 20
  - 16
  - 10
10. For  $f(x) = x + 5$  and  $g(x) = 3x + 1$ , find the domain of  $\frac{f}{g}$ .
- $(-\infty, \infty)$
  - $(-\infty, -\frac{1}{3}) \cup (-\frac{1}{3}, \infty)$
  - $(-\infty, 5) \cup (5, \infty)$
  - $(-\infty, -\frac{1}{3}) \cup (-\frac{1}{3}, 5) \cup (5, \infty)$
11. Find the domain for  $f(x) = \sqrt{2x+5}$
- $(-\infty, -\frac{5}{2}) \cup (-\frac{5}{2}, \infty)$
  - $(-\infty, \frac{5}{2}) \cup (\frac{5}{2}, \infty)$
  - $(-\infty, -\frac{5}{2}]$
  - $[-\frac{5}{2}, \infty)$
12. For  $f(x) = 2x - 5$  and  $g(x) = x^2 - 6$ , find  $(f \circ g)(x)$ .
- $4x^2 - 20x + 19$
  - $2x^2 - 11$
  - $2x^2 - 17$

d.  $2x - 11$

13. Find the vertical asymptote:  $f(x) = \frac{4-x}{2+x}$

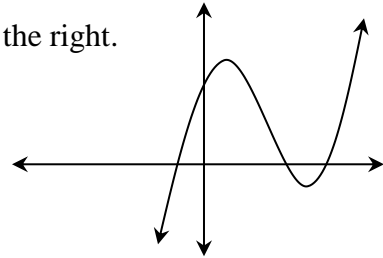
- a.  $x = 2$
- b.  $x = -2$
- c.  $x = -1$
- d.  $x = 4$

14. The graph of the equation  $\frac{x^2 + 3x - 10}{x - 2}$  is a line with a hole in it. That hole is called a removable point of discontinuity. Which point will fill that hole and make the graph of the equation and the point continuous? *Hint: Graph the equation and trace at  $x = 2$ .*

- a.  $(2, -10)$
- b.  $(2, 5)$
- c.  $(2, 7)$
- d.  $(-5, 2)$

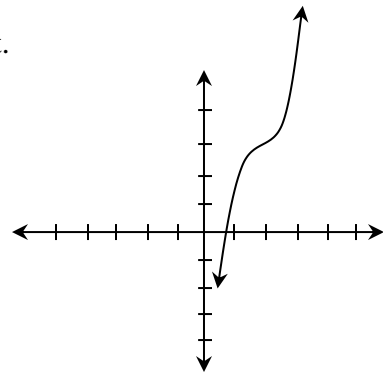
15. Identify the best formula to represent the graph shown on the right.

- a.  $y = (t+1)(t-4)(t-3)$
- b.  $y = (t-1)(t-4)(t+3)$
- c.  $y = (t+1)(t+4)(t+3)$
- d.  $y = -(t+1)(t+4)(t-3)$



16. Which formula best matches the graph shown on the right.

- a.  $y = (x^2 - 3) + 2$
- b.  $y = (x - 2)^3 + 3$
- c.  $y = (x^3 + 3) - 2$
- d.  $y = (x - 3)^3 + 2$



17. For the function  $f(x) = -8 + 4x + 3x^2 - x^3$ , what is the leading coefficient when the function is written in standard form?

- a. 4
- b. -8
- c. 1

d. -1

18. Find the roots of the following equation. Give the values in exact form.

$$x^3 - 25x^2 + 24x = 0$$

a. 0, -1, -24

b. 0, 1, 24

c. 1, -1, 4, -6

d. 1, -1,  $\frac{-1 \pm \sqrt{97}}{2}$

19. Find the vertex for the following equation.

$$x^2 - 8x - y + 18 = 0$$

a. (2, 4)

b. (-4, -2)

c. (4, 2)

d. (-2, -4)

20. Find a formula for the inverse of  $f(x) = 4x + 3$ .

a.  $f^{-1}(x) = -4x - 3$

b.  $f^{-1}(x) = 3x + 4$

c.  $f^{-1}(x) = \frac{x}{4} - 3$

d.  $f^{-1}(x) = \frac{x - 3}{4}$

21. Suppose \$8000 is invested at a 4% interest rate, compounded monthly. How much will the investment be worth after 9 years to the nearest dollar?

a. \$11,460

b. \$74,933

c. \$276,094

d. \$2.5 E17

22. Evaluate the logarithm:  $\log_2\left(\frac{1}{8}\right)$

a. -1

b. -3

c. 3

d.  $\frac{1}{3}$

23. Simplify using the rules of logarithms:  $\log_2 25 + \log_2 3$

- a.  $\log_4 28$
- b.  $\log_2 \left( \frac{25}{3} \right)$
- c.  $\log_2 75$
- d.  $\log_2 28$

24. Expand the following as sums and/or differences of simpler logarithmic expressions.

$$\ln \frac{3x\sqrt{x}}{(2x+1)^2}$$

- a.  $\ln 3x + \frac{1}{2} \ln x - 2 \ln(2x+1)$
- b.  $2 \ln(2x+1) - \ln 3x + \frac{1}{2} \ln x$
- c.  $3 \ln x + \ln \sqrt{x} - 2 \ln(2x+1)$
- d.  $\ln 3x + 2 \ln x - \frac{1}{2} \ln(2x+1)$

25. Convert to an exponential equation:  $\log x = 15$ .

- a.  $x = e^{15}$
- b.  $x = 10^{15}$
- c.  $x = 15^{10}$
- d.  $x^{15} = 10$

26. Solve:  $4^x = 2^{3x-5}$ .

- a.  $\frac{5}{2}$
- b. 5
- c. -5
- d.  $\frac{1}{5}$

27. Solve for  $x$ :  $\log_3(3x-15) = 3$

- a. 14
- b. 8
- c. 6



d. No Solution

28. The population at the start of an experiment was 16,000 and 4 hours later it was 20,000. Assuming the population grew exponentially, how long would it take, from the start of the experiment, for the population to reach 30,000?

- a. 6.5 hours
- b. 30 hours
- c. 8 hours
- d. 11.27 hours

29. Find the indicated term of the geometric sequence 100, 80, 64, ...,  $a_6$

- a.  $\frac{16,384}{625}$
- b.  $\frac{1024}{25}$
- c.  $\frac{4096}{125}$
- d.  $\frac{8192}{25}$

30. Find the sum of the first 36 terms in the arithmetic series:  
 $-0.2 + 0.3 + 0.8 + \dots$

- a. 318.6
- b. 332.2
- c. 307.8
- d. 314

Now that you have completed the written work, I want to make sure that you can find, access, and use the AP Calculus Website.

Go to Ms. Speyer AP Calculus Website (under construction). Find the Summer Assignment Tab and complete the following TWO tasks:

- Enter your answers from the summer assignment into the Google Form.
  - Complete the “About Me” Form
- 

These forms will be made available to you **July 9, 2017** and must be completed online by **July 29, 2017**. I want you to complete this summer assignment closer to the beginning of the school year, not at the end of this school year. (*By the way, I don't want you to complete the assignment the day before school starts either. As AP Calculus students, you do need to manage your time.*) The assignment is intended as a refresher of what you already know. Please bring the hard copy of the math questions with you on the first day of school August 6<sup>th</sup>.

You will need a 5 subject notebook dedicated to Calculus AB. Please bring on the first day of class, or you may purchase one from Ms. Speyer for \$3.00.

You also need a **TI-Nspire CX CAS** for AP Calculus. Math Club will be selling calculators the first week of school. Plan on \$140 at the most.