AP Calculus AB Summer Assignment, 2015

Bartow High School and Summerlin Academy

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First, you'll give me a little info about yourself. Then there are three things to submit to me electronically over the summer and some information to study for a quiz the first week of school. This document and the information to study are available at my web site, http://home.earthlink.net/~bhsfrisbie. You might want to go ahead and bookmark that site. You may contact me with questions at the e-mail address above.

Introduce yourself

Start by sending me an e-mail at bhsfrisbie@earthlink.net. Tell me a little about yourself. Why did you decide to take calculus? What teacher did you take precalculus with, and how did you like that? What questions do you have for me? If you send me this e-mail, I will help you out by sending you a reminder e-mail a week before each of the deadlines for the three submissions, so you don't lose track of time and miss out on some easy points. Please do it before school gets out. Tonight would be good!

What to study

During the first week of school, you will take a quiz on the material about functions and trigonometry found in the Summer Flash Cards document at my web site, http://home.earthlink.net/~bhsfrisbie. Having automatic knowledge of the material in this file will save you much time and frustration over the course of next year. The quiz will count 50 points.

Submission 1

Take the test located at http://mdtp.ucsd.edu/test/ *without using a calculator*. There are 45 multiple-choice questions on algebra, geometry, and precalculus material. The site suggests that it will take you about an hour, but the test is not timed. *Do not cheat.* The test is diagnostic, to determine your strengths and weaknesses. If you cheat, the results are useless to you and to me. When you get to the results screen, **select all** (CTRL-A), copy, and paste the entire page into an e-mail, along with your name, and send it to me at bhsfrisbie@earthlink.net no later than **Wednesday, June 24**. On-time completion of this assignment will count 10 points.

Submission 2

Take the test located at http://mdtp.ucsd.edu/crtest/ *without using a calculator*. There are 40 multiple-choice questions on precalculus material. The site suggests that it will take you about an hour, but the test is not timed. *Do not cheat.* This test is *also* diagnostic, to determine your strengths and weaknesses. If you cheat, the results are worthless. When you get to the results screen, **select all** (CTRL-A), copy, and paste the entire page into an e-mail, along with your name, and send it to me at bhsfrisbie@earthlink.net no later than **Wednesday, July 15**. On-time completion will count 10 points.

Submission 3

Send me your responses to the 40 questions below at bhsfrisbie@earthlink.net no later than **Wednesday, August 5**. You may type your answers as text in an e-mail, type them up in a word processor and send it as an attachment (which might allow you to use mathematical typesetting software), or write it up by hand and send me a scan or clear photo of your answers. Whichever method you choose, include your name with your answers. This assignment counts 20 points, and this time your score is based on how many you get right.

True or false? For all 40 statements, tell whether each is true or false, and how you know that. In the case of a true statement, this will likely be a sentence or two of explanation. For a false statement, it may be a brief explanation or a counterexample. Good communication is essential in calculus class; start that now.

1. The reciprocal of a nonzero integer is an integer.
2. The reciprocal of a nonzero rational number is a rational number.

3. Each real number is either rational or irrational.

4. The absolute value of each real number is positive.

5. If $x < 0$ then $\sqrt{x^2} = -x$

6. If a and b are any two distinct real numbers, then $a < b$ or $a > b$.

7. If $ab < 0$, then the point (a, b) lies in either the second quadrant or the fourth quadrant.

8. The distance between the points $(a + b, a)$ and $(a – b, a)$ is $2b$.

9. If the distance between two points is 0 the points must coincide.

10. If $ab = 0$, then the point (a, b) lies on the x-axis or the y-axis.

11. If (1, –2) is a point on a graph that is symmetric with respect to the x-axis, then (–1, –2) is also a point on the graph.

12. If (1, –2) is a point on a graph that is symmetric with respect to the y-axis, then (–1, –2) is also a point on the graph.

13. If $a = 8$ and $b = 0$, then the lines represented by $ax + by = p$ and $bx – ay = q$ are perpendicular.

14. It is possible for two lines with positive slopes to be perpendicular to each other.

15. If $f(a) = f(b)$, then $a = b$.

16. A vertical line can intersect the graph of a function at most once.

17. If $f(x) = f(–x)$ for all x in the domain of f, then the graph of f is symmetric with respect to the y-axis.

18. If f is a function, then $f(ax) = af(x)$.

19. If $b^2 - 4ac > 0$ and $a \neq 0$, then the graph of $y = ax^2 + bx + c$ has two x-intercepts.

20. If $b^2 - 4ac = 0$ and $a \neq 0$, then the graph of $y = ax^2 + bx + c$ has only one x-intercept.

For the following questions, a, b, c, and x are real numbers, and none of the denominators is zero. (These are also true-false questions.)

21. $\dfrac{3a}{3b+c} = \dfrac{a}{b+c}$

22. $\dfrac{1}{a-b} = \dfrac{1}{a} - \dfrac{1}{b}$

23. $\dfrac{a-b}{5} = \dfrac{a}{5} - \dfrac{b}{5}$

24. $4 \cdot \dfrac{a}{b} = \dfrac{a}{4b}$

25. $4 \cdot \dfrac{a}{b} = \dfrac{4a}{b}$

26. $4 \cdot \dfrac{a}{b} = \dfrac{4a}{4b}$

27. $4 \cdot \dfrac{a-b}{c} = \dfrac{4a-b}{c}$

28. $4 \cdot \dfrac{a-b}{c} = \dfrac{4a-4b}{c}$

29. $\sqrt{a^2 + b^2} = a + b$

30. $x^3 + 1 > x^3$

31. $x^3 + x > x^3$

32. $x^2 \geq 0$

33. $x^2 \geq x$

34. $2x \geq x$

35. If $x \geq 0$, then $\sqrt{x} \geq 0$.

36. $–x \leq 0$

37. $\dfrac{1}{x} \leq x$

38. $x \leq |x|$

39. If $a \leq b$, then $a^2 \leq ab$.

40. If $a \leq b$, then $a^3 \leq a^2 b$.