Bayonne Public Schools
667 Avenue A.
Bayonne, New Jersey 07002

Dawn Aiello
Director of Mathematics

(201) 858-5920
daiello@bboed.org

Dear Parents/Guardians of students entering AP Calculus AB,

This summer, your child will have the opportunity to prevent summer learning loss and to be better prepared for success in AP Calculus AB. He or she will also have the opportunity to earn up to ten extra credit points on the first mathematics test of the 2023-2024 school year.

Note: The assignment is attached to this letter. In order to receive credit, students must show ALL written work and submit it to their teacher by September 25, 2023.

Also, please do not wait until the end of summer to begin these skills.

Dawn Aiello
Director of Mathematics

Accelerated Calculus and AP Calculus AB

Summer Review Packet

What's inside?

- *Trigonometry and Algebra Review*
- *Logarithm Review*
- *Basic foundational Graph Practice (Need to know)*

DO NOT DO WORK OR PLACE ANSWERS ON THIS PACKET – SHOW ALL WORK ON SEPARATE SHEETS!

Accelerated Calculus and AP Calculus AB

I. Trigonometry Review

Convert to radian measure without a calculator.

1. $60°$
2. $150°$
3. $-20°$

Convert to degree measure without a calculator.

4. $\frac{\pi}{6}$
5. $\frac{\pi}{4}$
6. $\frac{5\pi}{3}$

Find the exact value without a calculator.

7. $\sin\frac{\pi}{6}$
8. $\sin\frac{4\pi}{3}$
9. $\csc 0$
10. $\sec\frac{3\pi}{4}$
11. $\tan\frac{2\pi}{3}$
12. $\cot\frac{11\pi}{6}$

Find the exact value without a calculator.

13. $\text{Sin}^{-1}\left(\frac{1}{2}\right)$
14. $\text{Tan}^{-1}(-1)$
15. $\text{Cos}^{-1}\left(-\frac{\sqrt{3}}{2}\right)$
16. $\text{Sec}^{-1}(2)$
17. $\arctan\left(\sqrt{3}\right)$

Use your calculator to find each value. Round to 4 decimal places.

18. $\sin 170°$
19. $\tan\frac{5\pi}{9}$
20. $\csc 233°$
21. $\sin 1.2$

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Accelerated Calculus and AP Calculus AB

Without using a calculator, find each of the following.

22. Given $\sin\theta = \frac{1}{2}$, find $\csc\theta$

23. Given $\sec\theta = \frac{13}{5}$, find $\cot\theta$

Without using a calculator, find each of the following if $0 \le \theta < 2\pi$

24. $\cot\theta = -\sqrt{3}$

25. $\sin\theta = -\frac{\sqrt{3}}{2}$

26. $\sec\theta = 2$

Solve for $0 \le \theta < 2\pi$***. Do not use a calculator.***

27. $2\cos^2\theta + \sin\theta = -1$

28. $\cos\theta = \cot\theta$

29. $\sin\theta + \cos\theta = 0$

Use a graphing calculator to solve for $0 \le \theta < 2\pi$.

30. $2\sin^3\theta = 1 - \cos^2\theta$

31. $4\sin\theta = \csc\theta$

Graph each of the following. Graph at least 2 periods

32. $y = -\cos\left(x - \frac{\pi}{2}\right)$

33. $y = \tan x$

34. $y = 2\sin x + 2$

35. $y = \cot 2x$

Algebra Review

Factor

36. $81 - y^4$

37. $y^3 + 64$

38. $2x^3 - 4x^2 - x + 2$

39. $\frac{1}{3}y^2 + \frac{1}{12}y - \frac{1}{4}$

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Accelerated Calculus and AP Calculus AB

Factor.

40. $\frac{3}{4}x+\frac{1}{2}$

41. $3x^{1/2}+4x^{3/2}$

42. $(2x+3)^{-3/2}-3(2x+3)^{-1/2}$

Solve each inequality.

43. $\sqrt{x^2-7x+12}\geq 0$

44. $x^3+2x^2+x<0$

Find the real roots.

45. $2x^2-5x-3=0$

46. $(x-5)(x+3)=33$

47. $(x+2)^2(x-1)+(x+2)(x-1)^2=0$

Simplify.

48. $\frac{4+\sqrt{6}}{2-\sqrt{6}}$

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

50. $\frac{x}{(x+1)^{3/2}}+\frac{2}{(x+1)^{1/2}}$

51. $\frac{2-x}{2\sqrt{1+x}}-\sqrt{1+x}$

52. $\frac{(x^2+2)^{1/2}-x^2(x^2+2)^{-1/2}}{x^2}$

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Accelerated Calculus and AP Calculus AB

Given points P (3 , - 4) and Q (-2 , - 1),find each of the following.

53. Slope of $\overline{PQ}$

54. Find the equation of $\overleftrightarrow{PQ}$

55. Find equation of the $\perp$ bisector of $\overleftrightarrow{PQ}$

56. The distance between P and Q.

57. Find the equation of a line parallel to 3x+y = 10 through point (-2 , 7).

Graph each of the following piece wise functions.

58. $y = \begin{cases} 2x-3 & x \geq 1 \\ -x+4 & x < 1 \end{cases}$

59. $y = \begin{cases} -x & x \leq -2 \\ x^2 & -2 < x < 2 \\ 4 & x \geq 2 \end{cases}$

Determine if the function is even, odd, or neither. Justify your answer with work.

60. $f(x) = x^2 - x^4$

61. $f(x) = x^3 + x$

Logarithm Review

Evaluate. Do not use a calculator

62. $\ln e^2$

63. $\log_5 \frac{1}{125}$

64. $7^{\log_7 14}$

65. $\log 4 + \log 25$

Use the properties of logarithms to expand the expression.

66. $\ln \frac{\sqrt{3x-5}}{7}$

Express the following as a single log simplified

67. $\frac{1}{2} log\, x + 3\log(x+1)$

olve. Do not use a calculator.

68. $\log_6 x + \log_6(x-5) = 2$

69. $\log_2(x+4) - \log_2 x = 5$

70. $e^{2x} = 7$ (leave in terms of ln)

Solve. Use a calculator. Round answers to 4 decimal places.

71. $2^x = 14$

72. $e^{2x+5} = 8$