



## Bayonne Public Schools

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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.

A handwritten signature in black ink, appearing to read "Dawn Aiello". The signature is fluid and cursive.

Dawn Aiello  
Director of Mathematics





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

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  $0 \leq \theta < 2\pi$

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

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

26.  $\sec \theta = 2$

Solve for  $0 \leq \theta < 2\pi$ . 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  $0 \leq \theta < 2\pi$ .

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  $\overline{PQ}$

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

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.**

**Express the following as a single log simplified**

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

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

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Accelerated Calculus and AP Calculus AB

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