

Calculus AB/BC
Summer Assignment
Mrs. Dailey

Calculus AB Summer '26 Expectations

- Complete all problems in this packet. This should be done without the use of a calculator. Completed packet will be turned in on 1st day of school, 9/2/26.
- No calculator quiz on assignment will be Friday 9/4/26.

Calculus BC Summer '26 Expectations

- Complete all problems in this packet. This should be done without the use of a calculator. Completed packet will be turned in on 1st day of school, 9/2/26.

Additional BC requirements

- Watch the first 7 lessons of Unit 1 on flippedmath.com (1.1-1.7)
- <https://calculus.flippedmath.com/version-1.html>
 - 1.1 Can Change Occur at an Instant? (even practice & test prep)
 - 1.2 Defining Limits and Using Limit Notation (even practice & test prep)
 - 1.3 Estimating Limit Values from Graphs (even practice & test prep)
 - 1.4 Estimating Limit Values from Tables (even practice & test prep)
 - 1.5 Determining Limits Using Algebraic Properties (even practice & test prep)
 - 1.6 Determining Limits Using Algebraic Manipulation (Practice # 5-9,27)
 - 1.7 Selecting Procedures for Determining Limits (Practice # 1,3,10)
- For each video,
 - Complete the class notes section
 - Practice problems as stated above.
 - Each section should take about 45 minutes to complete.
- These topics were covered in Pre-Calculus and it is assumed this is review.
- Unit 1 Class notes Packet (Notes and practice problems) will be collected on 1st day
- Test on Unit 1 will be 2nd week of school.

See you in September!

Mrs. Dailey

Email me at jdailey@pmschools.org if you have any questions.

Name _____

Summer 2026

AB/BC Calc

Getting Ready!

All of the following should be completed without the use of a calculator.

I. Algebra Skills:

Solve for x . Answers may be left in terms of e as appropriate.

1. $x^2 - 4x + 3 = 0$

6. $5^{x-3} = 125^x$

2. $x^2 + 6x = 1$

7. $16^{x-5} = 1024^{286}$

3. $6x^2 + 11x - 10 = 0$

8. $\ln x = 5$

4. $10 = \frac{100}{1 + e^{5x}}$

9. $\log_2 3x - \log_2 3 = 8$

5. $2^x = 64$

10. $4\ln(x+3) = 20$

Solve for x . Answers may be left in logarithmic form as appropriate.

$$11. 5^x = 128$$

$$12. e^{2x} = 144$$

$$13. 3^{x^2} = 18$$

II. Piecewise Functions

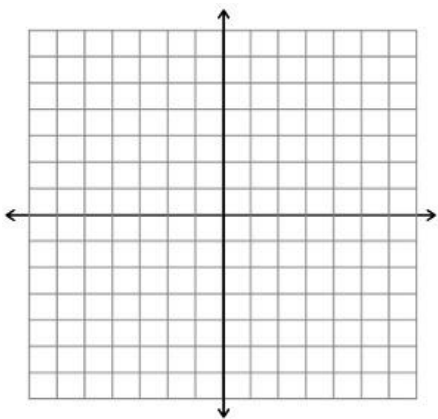
$$14. \text{ Given the function } f(x) = \begin{cases} -x^2 - 1, & x \leq 0 \\ 2, & 0 < x < 4, \\ \sqrt{x}, & x \geq 4 \end{cases}$$

a. Find $f(-2)$.

b. Find $f(9)$.

c. Find $f(0)$.

d. Graph $y = f(x)$.



e. Is $f(x)$ continuous at $x=4$? Why or why not?

f. Is $f(x)$ continuous at $x=0$? Why or why not?

15. Find the value of k that will make the following piecewise function continuous at

$$x = -1. \quad f(x) = \begin{cases} kx^2 + 1, & x \leq -1 \\ 2x - k, & x > -1 \end{cases}$$

16. Find the value of k that will make the following piecewise function continuous at

$$x = 2. \quad f(x) = \begin{cases} 2x - 3, & x \leq 2 \\ x^2 + k, & x > 2 \end{cases}$$

17. Given $f(x) = \begin{cases} 2x+10, & x < 0 \\ x^2+1, & x \geq 0 \end{cases}$, solve for x if $f(x) = 17$.

An absolute value function can be thought of as a piecewise function: $|x| = \begin{cases} -x & \text{if } x < 0 \\ x & \text{if } x \geq 0 \end{cases}$.

Here's another example: $|2x+6|$.

$2x+6$ will change signs when $x = -3$.

If $x < -3$, $2x+6$ comes out negative so to find the absolute value, it must be negated.

If $x \geq -3$, $2x+6$ comes out positive and its absolute value does not need to be changed.

Thus, $|2x+6| = \begin{cases} -2x-6, & x < -3 \\ 2x+6, & x \geq -3 \end{cases}$.

18. Express the absolute value function in piecewise form.

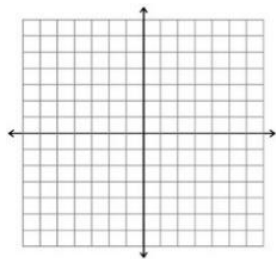
a. $f(x) = |x-1|$

b. $f(x) = |2x+3|$

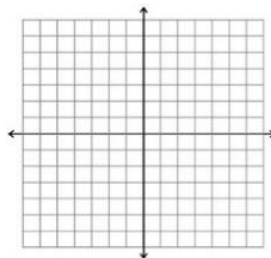
III. Common Functions

19. Graph each of the following functions. Show a few important points for each.

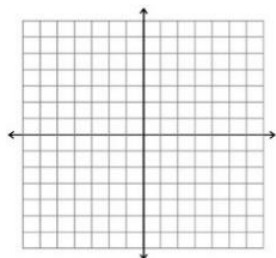
a. $y = \sqrt{x}$



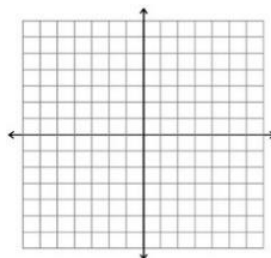
e. $y = e^x$



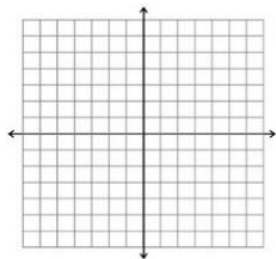
b. $y = \sqrt{x+5}$



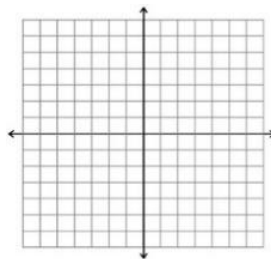
f. $y = e^{-x}$



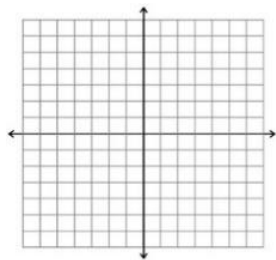
c. $y = 3 + \sqrt{x}$



g. $y = \ln x$



d. $y = 4 - x^2$



20. Match the function to its graph.

Equation	A	B	C	D	E	F	G
Graph							

A. $y = x^2$

B. $y = e^x$

C. $y = \frac{1}{x}$

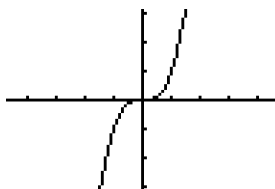
D. $y = \ln x$

E. $y = \sqrt{x}$

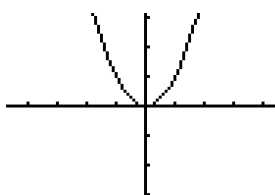
F. $y = x^3$

G. $y = |x|$

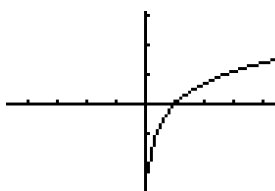
i.



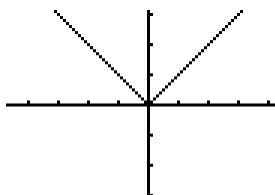
ii.



iii.



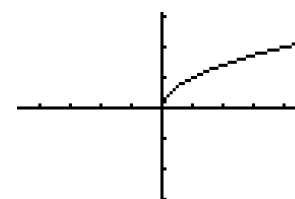
iv.



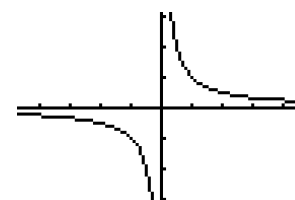
v.



vi.



vii.



IV. Odd & Even Functions

State whether the function is odd, even, or neither.

21. $y = x^4$

25. $y = \frac{x^3}{x^2 - 1}$

22. $y = x^3$

26. $y = \frac{1}{x-1}$

23. $y = x^3 + x^2$

27. $y = \cos x$

24. $y = \sqrt{x^2 + 2}$

28. $y = \sin x$

VI. Linear Equations

Write the equation of the line.

29. Passing through the point $(-2, 3)$ with slope $\frac{2}{3}$.

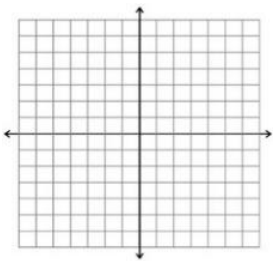
30. Parallel to the line $y = -2x + 3$ and passing through the point $(4, 0)$.

31. Passing through the point $(0, -3)$ with slope $\frac{3}{4}$.

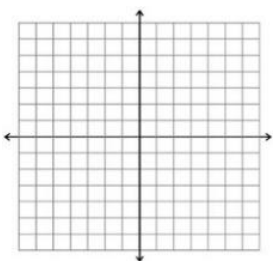
32. Through the points $(-2, 3)$ and $(2, -5)$.

Graph the line. State the coordinates of the x - and y -intercepts.

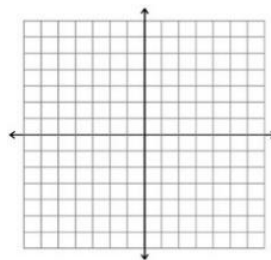
33. $y = \frac{2}{3}x - 6$



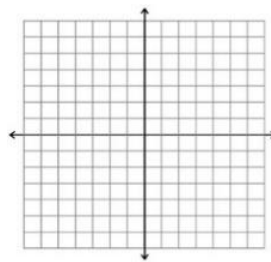
34. $y = -\frac{1}{3}x + 2$



35. $y - 2 = 3(x + 3)$



36. $y + 1 = \frac{2}{3}(x - 5)$



VII. Greatest Integer Function

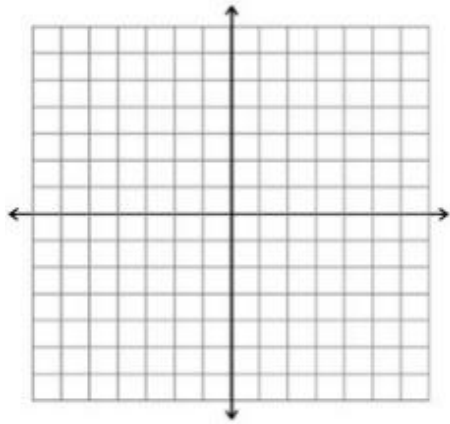
The Greatest Integer Function, also called a Floor Function, can be written in several ways:

$f(x) = \text{int}(x) = \lfloor x \rfloor = x$. It is defined to mean “the greatest integer less than or equal to x .”

For example, $\lfloor 2.3 \rfloor = 2$ $\lfloor 2.7 \rfloor = 2$ $\lfloor 2.9 \rfloor = 2$ $\lfloor 3 \rfloor = 3$

And also, $\lfloor -4.2 \rfloor = -5$ $\lfloor -4.7 \rfloor = -5$ $\lfloor -5 \rfloor = -5$ $\lfloor -5.2 \rfloor = -6$

37. Graph the function $y = \text{int}(x)$.



VIII. Rational Expressions

38. Rewrite as one fraction.

$$6x^2\sqrt{3x-1} + \frac{3x^3}{\sqrt{3x-1}}$$

39. Simplify (without a calculator; show every step)

$$\left[-\frac{1}{3} - \frac{1}{2} + 2 \right] - \left[\frac{8}{3} - 2 - 4 \right]$$

40. Given $f(x) = e^x \cos x - e^x(\sin x)$, find $f\left(\frac{3\pi}{2}\right)$. Simplify to one term.

IX. Algebra Skills

Simplify each. No calculator.

41. $\frac{\sqrt{x}}{x}$

45. $e^{\ln x}$

49. $\ln e^{2x}$

42. $e^{\ln x}$

46. $(5)^{-1}$

50. $\frac{2x-1}{2}$

43. $e^{1+\ln x}$

47. $(27)^{\frac{2}{3}}$

44. $\ln 1$

48. $\ln 6 - \ln 2$

X. Compositions

Find the composite of the following functions with $f(x)=x+5$ and $g(x)=x^2-3$.

51. $f(g(x))$

54. $g(f(0))$

57. $f(f(x))$

52. $g(f(x))$

55. $g(g(-2))$

53. $f(g(0))$

56. $f(g(4))$

58. Given the function $f(x) = x^2 + x$, solve the equation $f(\sqrt{x+5}) = 0$.

59. Given $f(x) = \frac{1}{x} + x^2$, find $f(x^{-2})$.

XI. Trigonometry

60. Fill in the chart with the exact values:

Degrees	30	45	60
Radians			
sin			
cos			
tan			

61. Evaluate each of the following using exact values.

a. $\tan \frac{2\pi}{3}$

d. $\sec \frac{\pi}{3}$

b. $\sin \frac{5\pi}{6}$

e. $\csc \frac{4\pi}{3}$

c. $\cos \frac{7\pi}{4}$

f. $\sin \frac{5\pi}{4}$

62. Solve for θ on the interval $[0, 2\pi)$:

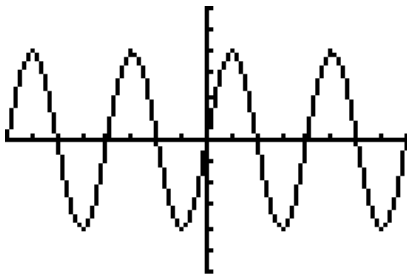
a. $2\sin\theta + 1 = 0$

b. $2\sin^2\theta + \sin\theta - 1 = 0$

c. $\sec\theta = \frac{2\sqrt{3}}{3}$

d. $2\cos^2\theta - \sqrt{2}\cos\theta = 0$

63. Which equation fits the given graph? [Window shows $-2\pi \leq x \leq 2\pi$]



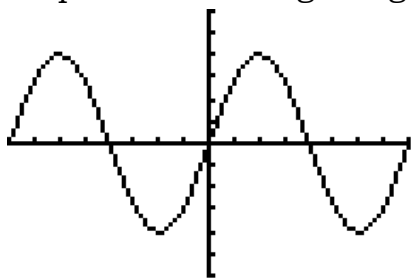
(A) $y = 4\sin x$

(B) $y = 4\sin 2x$

(C) $y = 4\cos x$

(D) $y = 4\cos 2x$

64. Which equation fits the given graph? [Window shows $-2\pi \leq x \leq 2\pi$]



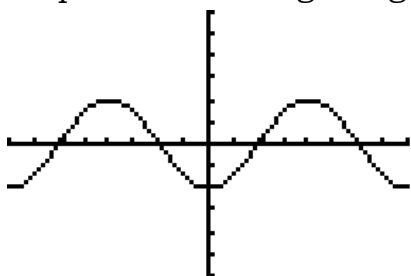
(A) $y = 4\sin x$

(C) $y = 4\cos x$

(B) $y = 4\sin 2x$

(D) $y = 4\cos 2x$

65. Which equation fits the given graph? [Window shows $-2\pi \leq x \leq 2\pi$]



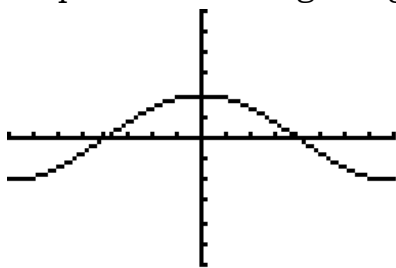
(A) $y = -2\cos x$

(C) $y = -2\sin x$

(B) $y = 2\cos \frac{1}{2}x$

(D) $y = 2\sin \frac{1}{2}x$

66. Which equation fits the given graph? [Window shows $-2\pi \leq x \leq 2\pi$]



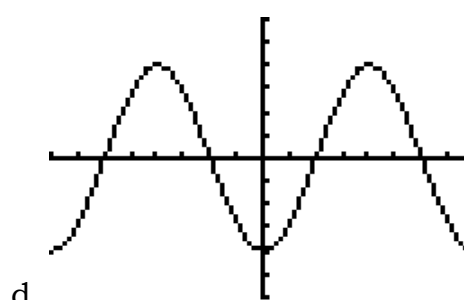
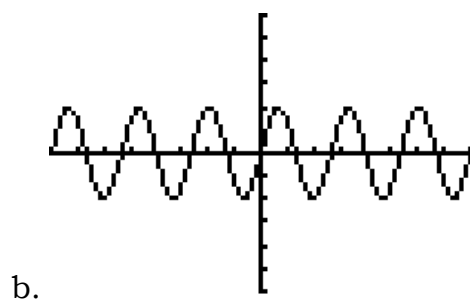
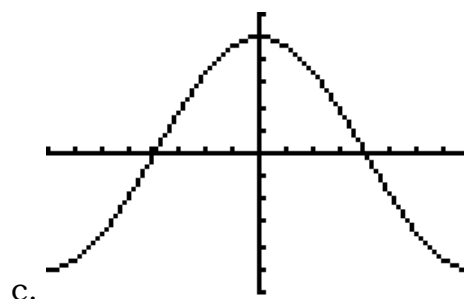
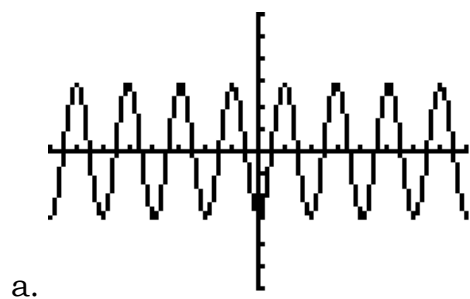
(A) $y = -2\cos x$

(C) $y = -2\sin x$

(B) $y = 2\cos \frac{1}{2}x$

(D) $y = 2\sin \frac{1}{2}x$

68. State the amplitude and frequency of the graph shown. [Window shows $-2\pi \leq x \leq 2\pi$]



69. State the amplitude and frequency of the equation:

a. $y = 4\sin 2x$

b. $y = -3\cos 2x$

c. $y = 3\sin \frac{1}{4}x$

XII. Basic Limits

Evaluate the limits.

70. $\lim_{x \rightarrow 3} \frac{x^2 - x}{2x - 2}$

72. $\lim_{x \rightarrow \infty} \frac{3x^7 - \frac{2}{3}x + 4}{x^3 - 24}$

71. $\lim_{x \rightarrow 2} \frac{x^2 - x - 2}{x - 2}$

73. $\lim_{x \rightarrow -\infty} \frac{5x^4 - x}{x^3 - 10}$

$$74. \lim_{x \rightarrow \infty} \frac{x^3 - 6x + 3}{x - 3}$$

$$76. \lim_{x \rightarrow \infty} \frac{6 - 5x^2}{3x + 4}$$

$$75. \lim_{x \rightarrow -\infty} \frac{9x + 7}{x^3 - 14}$$

$$77. \lim_{x \rightarrow \infty} \frac{4x^2 + 1}{2x^2 - 1}$$

XIII. Rational Functions

For each function, find all x -intercepts, Vertical Asymptotes, Holes, and Horizontal Asymptotes.

$$78. y = \frac{2x^2 - 3x + 4}{x^2 - 4}$$

$$79. y = \frac{3x^2 - 3x - 18}{x^2 - 2x - 3}$$

$$80. y = \frac{2x(x-3)(x+1)}{(x+5)(x+1)}$$

XV. Derivatives

Find the derivative.

$$81. f(t) = t^{-1}(6 + 8t^{-2})$$

$$82. y = \frac{3}{x+2}$$

$$83. f(x) = 3x^4 + 4x^2 - 2x$$

$$84. f(x) = \frac{x^2}{4x-1}$$

$$85. f(x) = \frac{x}{3} + \frac{x^2}{4}$$

$$86. y = \frac{3\sin x}{9x + \cos x}$$

$$87. f(x) = \frac{x^5}{25} - \frac{2}{x^3} + 4x^2$$

$$88. y = x^3 \sin^2(4x)$$

$$89. y = \cos(5x^2)$$

$$90. f(x) = \sqrt{6x^3 + 3}$$

91. $g(x) = \sin^3 x$

92. $f(x) = 3x^4 + 10x^3 - 36x^2 - 4$

93. $f(x) = 4\sqrt{x^3}$

94. $f(x) = 6\sqrt{x} - 3x^{-2} + 4x^3 - 7x + 5$