

AP PreCalculus AB
Summer Packet 2026

Welcome! PreCalculus AB is both a challenging and rewarding course, and we're excited that you've decided to take this class. To help you succeed in this course and prepare you for the rigorous expectations next fall, you should feel very confident and independent in the topics listed below. Please read through the list carefully.

- Linear Equations: Students should be able to graph linear equations, and represent equations of lines in a variety of formats (point-slope, slope-intercept, etc.). Solve a system of linear equations through multiple representations (given a graph, table, and/or equation).
- Factoring: It is absolutely imperative that students factor efficiently in a variety of methods, such as grouping, GCF, sum/difference of squares, area models, and product-sum.
- Basic Polynomial Function behavior and notation: Students should be able to graph and model the behavior of quadratic, cubic, and other polynomial functions. In addition, students should be able to work fluently with function notation and define the domain and range of a function. Students should be able to perform function operations such as addition, subtraction, multiplication, and function compositions. Students should be able to analyze the behavior of polynomial functions, including finding x/y-intercepts. Dividing polynomials using long division or area models is required.
- Exponential and Logarithmic behavior: Students should be able to sketch the graphs (and transformations) of the functions which includes asymptotes, intercepts, and identify end behavior using proper limit notation. Students should be able to evaluate, simplify, and justify equivalencies of basic logarithmic and exponential expressions without a calculator. Students should be able to work fluently between exponential and logarithmic functions as inverse relationships.
- Trigonometry: Students should be able to sketch the graphs of sine and cosine, with or without basic transformations. Students must be able to calculate the trigonometric ratios of 30° - 60° - 90° , 45° - 45° - 90° , and quadrantal angles. Finally, students must be proficient using radian measures instead of degrees.

THIS PACKET IS DUE ON MONDAY, AUGUST 17TH 2026.

We look forward to meeting you in August! Complete these problems without a calculator unless otherwise noted. Where possible, leave answers as reduced fractions.

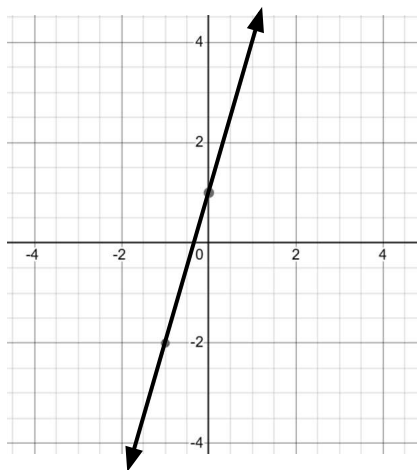
Sincerely,
The AP PreCalculus AB Team

Linear Equations

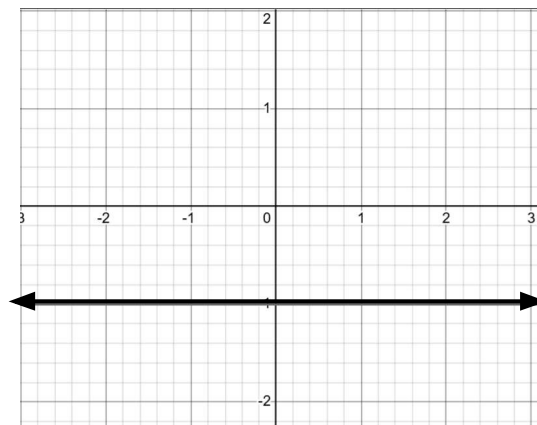
- 1) Given that the graph of a linear function $f(x)$ goes through the points $(2, 5)$ and $(-1, 3)$, write the equation of $f(x)$ in slope-intercept form.

- 2) Write the equation for each graph below.

a)



b)



- 3) Given $g(x) = 2x^2 + x - 1$, find the average rate of change between $x = -4$ and $x = 2$.

- 4) The table below represents function $h(x)$.

a) Show evidence of how you know $h(x)$ is linear.

x	2	5	8
$h(x)$	-1	6	13

b) Use the table to write the equation for $h(x)$ in point-slope form.

- 5) Solve the system of linear equations below.

$$y - 2 = -(x + 1)$$

$$3x - 2y = 6$$

Factoring

Factor the GCF of the following polynomials:

6) $6x^4 - 64x$

7) $24x^2 - 40x$

8) $18x - 9$

Factor the following trinomials:

9) $2x^2 + 5x + 3$

10) $3x^2 - 8x + 5$

11) $7x^2 + 2x - 5$

12) $x^2 - 13x + 42$

13) $x^2 - 8x - 9$

Factor the following binomials, using a difference of squares OR a sum/difference of cubes:

14) $4x^2 - 25$

15) $x^2 - 81$

16) $x^3 + 27$

17) $x^3 - 125$

Factor the following polynomials completely. (Check for a GCF first.)

18) $5x^3 - 16x^2 + 3x$

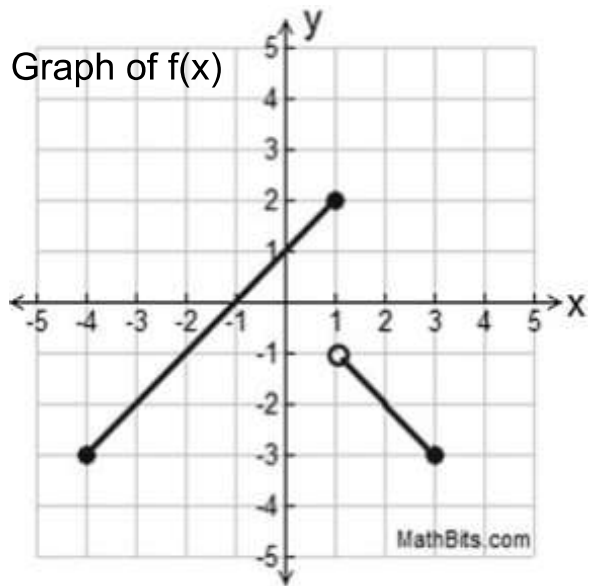
19) $4x^3 - 36x$

20) $5x^4 - 5x$

21) $2x^2 + 20x + 50$

Polynomial Function behavior and Notation

Given the graph of $f(x)$, the table of values with selected values of $g(x)$, and the equations for $h(x)$ and $j(x)$ below.



$$h(x) = 2x^2 - x - 1$$

$$j(x) = x - 3$$

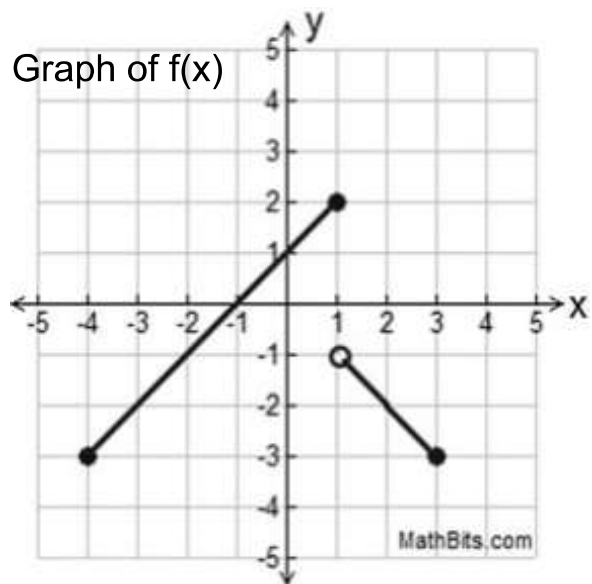
x	1	2	3	4
g(x)	1	3	7	13

22) Determine the domain and range of $f(x)$.

23) Find $h(x) + j(x)$.

24) Find $h(x) - j(x)$.

25) Use long division to find the quotient and remainder of: $\frac{h(x)}{j(x)}$.



$$h(x) = 2x^2 - x - 1$$

$$j(x) = x - 3$$

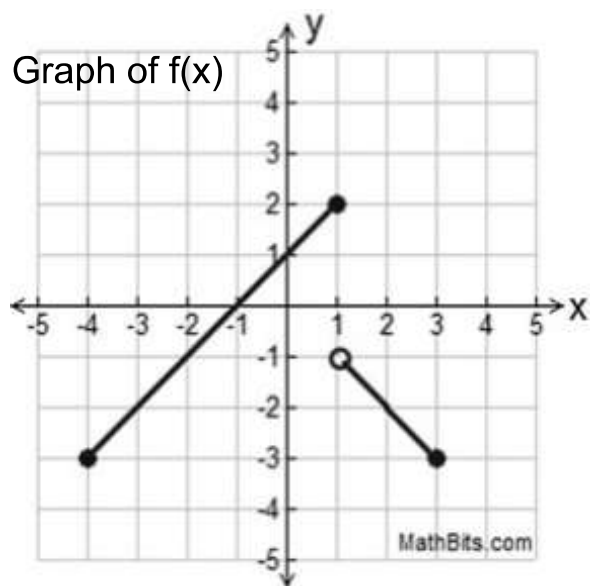
x	1	2	3	4
$g(x)$	1	3	7	13

26) Given $k(x) = g(j(x))$, find $k(5)$.

27) Given $m(x) = g(f(x))$, find $m(1)$.

28) If $g(x) = 13$, find x .

29) If $h(x) = 0$, find x .



$$h(x) = 2x^2 - x - 1$$

$$j(x) = x - 3$$

x	1	2	3	4
$g(x)$	1	3	7	13

30) If $j(x) = 7$, find x .

31) Evaluate $3(f(-3)) - g(4)$.

32) Find $h(x) \cdot j(x)$.

33) Determine the end behavior of $h(x)$. Write your answers as a limit.

Exponential and Logarithmic Functions

34) Solve for x: $3^{4x+1} - 5 = 22$

35) Solve for x: $\log_4(3x - 2) = 2$

36) Solve for x: $8^{x+2} = 16$

37) For the logarithmic equations, convert to an exponential equation. For the exponential equations, convert to logarithmic equations.

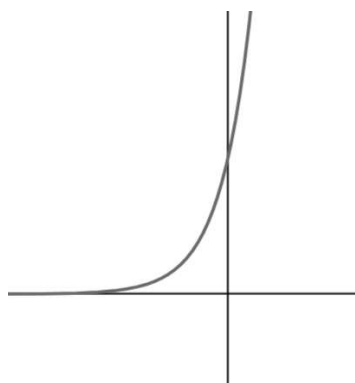
a) $\log_{16} 256 = 2$

b) $\log(x) = y$

c) $18^2 = 324$

d) $\left(\frac{1}{6}\right)^3 = \frac{1}{216}$

38) The following exponential functions follow the equation: $f(x) = ab^x$. Determine the restrictions for a and b , and the end behavior of $f(x)$.

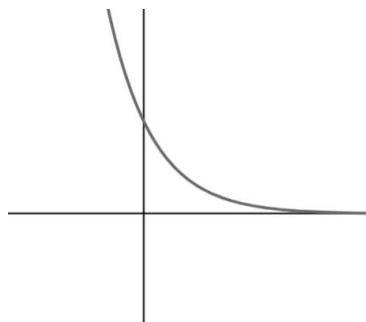


$a > 0$ or $a < 0$

$b > 1$ or $0 < b < 1$

Left end behavior limit:

Right end behavior limit:

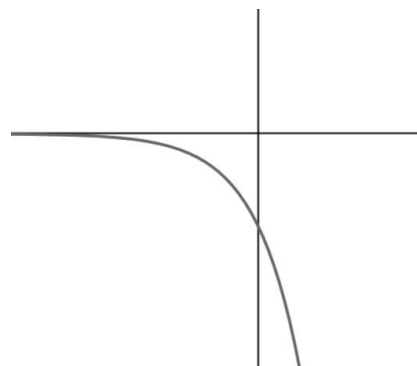


$a > 0$ or $a < 0$

$b > 1$ or $0 < b < 1$

Left end behavior limit:

Right end behavior limit:



$a > 0$ or $a < 0$

$b > 1$ or $0 < b < 1$

Left end behavior limit:

Right end behavior limit:

Trigonometry: Evaluate the following expressions.

39) $\sin(\frac{\pi}{6})$

40) $\tan(\frac{2\pi}{3})$

41) $\cos(\frac{5\pi}{6})$

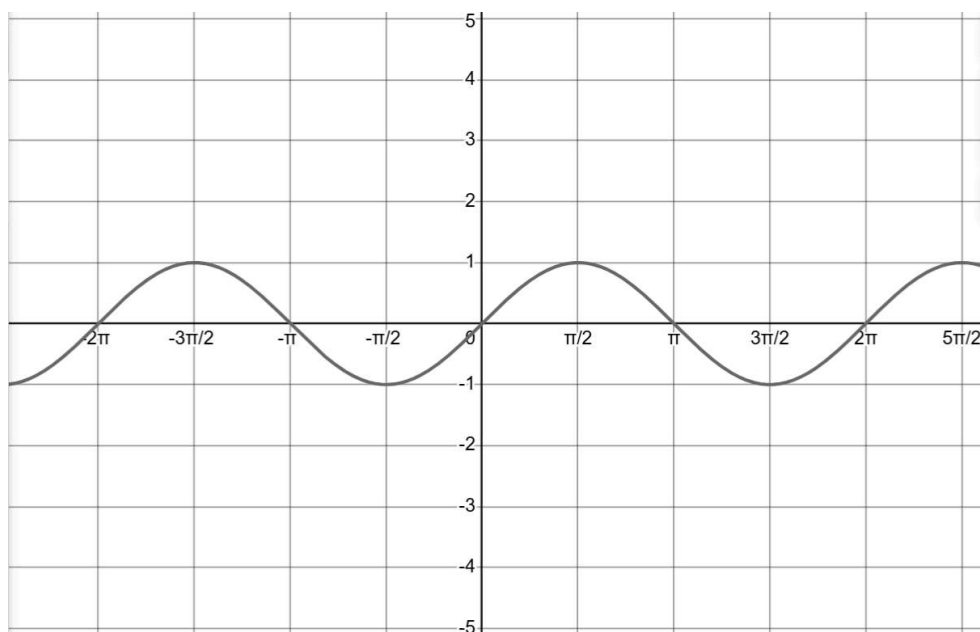
42) $\sin(\frac{11\pi}{6})$

43) $\cos(\pi)$

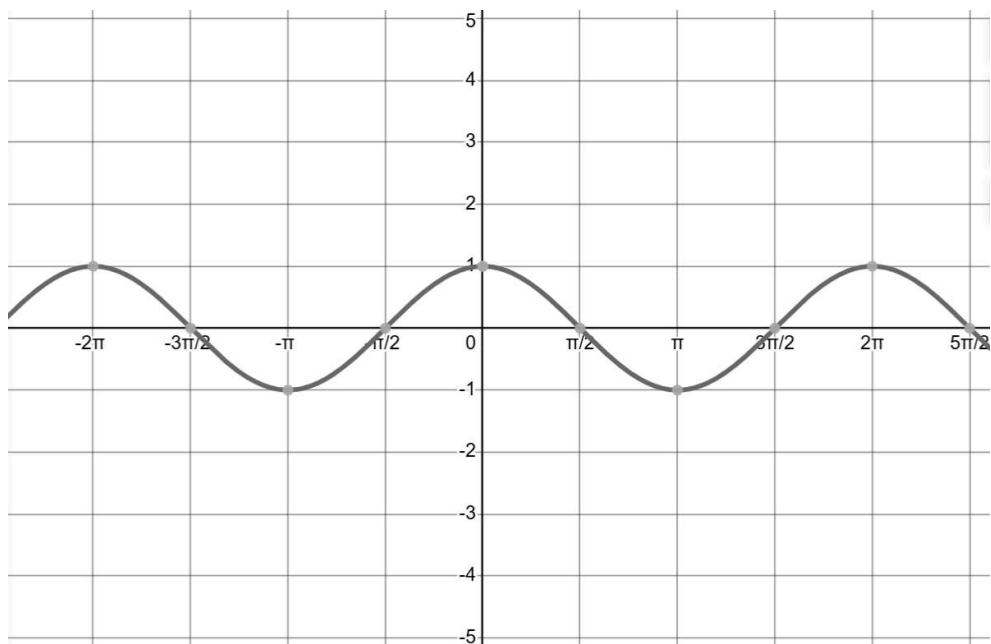
44) $\sec(\frac{5\pi}{4})$

45) $\csc(\frac{11\pi}{6})$

46) Below is the graph of $f(x) = \sin x$, where x is measured in radians. Use this to sketch $g(x) = 4\sin x$.

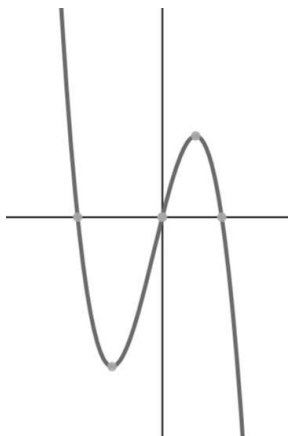


47) Below is the graph of $h(x) = \cos x$, where x is measured in radians. Use this to sketch $j(x) = -\cos(2x)$.



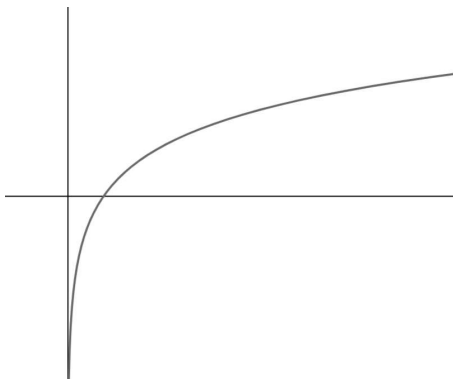
More with Functions

48) Given the graph of a function, state the type of function (linear, quadratic, cubic, quartic, square root, cubic root, exponential, logarithmic) and write the parent function.



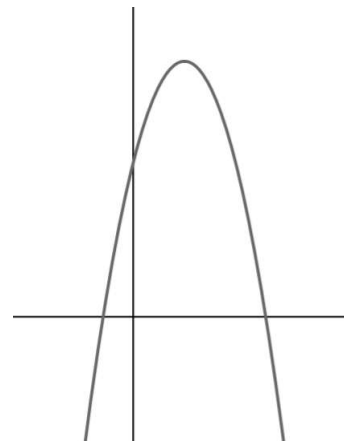
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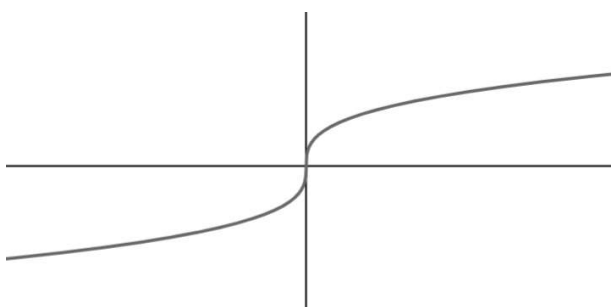
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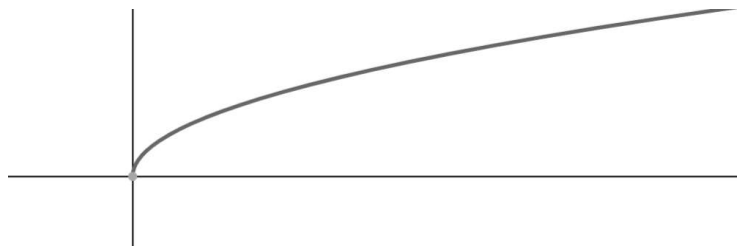
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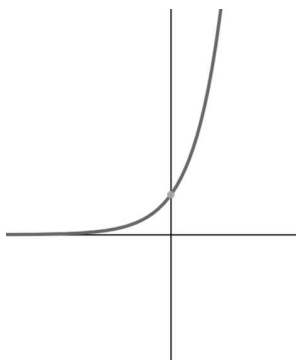
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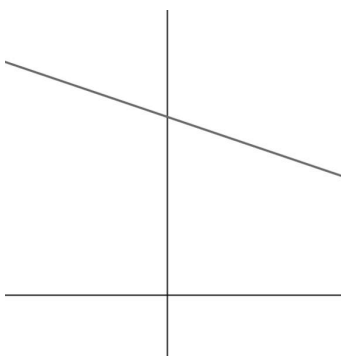
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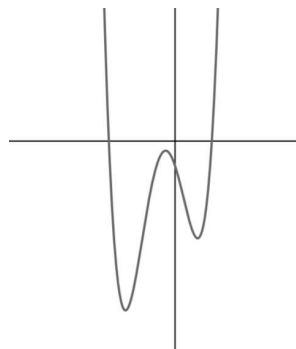
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