

AP Calculus AB

Summer Pre-View Packet

DUE THE SECOND DAY OF SCHOOL

The problems in this packet are designed to help you review topics from previous mathematics courses that are important to your success in

AP Calculus.

DO ALL PROBLEMS WITHOUT A CALCULATOR. Show all work that leads you to each solution on separate sheets of paper. You may use your notes from previous mathematics courses to help you. You must do all work without any help from another person.

ALL work should be completed and ready to turn in on the SECOND DAY of school. This packet will count as part of your first 6 weeks grade.

ENJOY YOUR SUMMER!! WE ARE LOOKING FORWARD TO SEEING YOU IN THE FALL.

Student Name: _____

School: _____

Date: _____

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Name _____

SHOW ALL WORK.

I. Simplify. Show the work that leads to your answer.

1. $\frac{x-4}{x^2-3x-4}$

2. $\frac{x^3-8}{x-2}$

3. $\frac{5-x}{x^2-25}$

4. $\frac{x^2-4x-32}{x^2-16}$

II. Complete the following identities.

1. $\sin^2x + \cos^2x =$ _____

2. $1 + \tan^2x =$ _____

3. $\cot^2x + 1 =$ _____

4. $\cos 2x =$ _____

5. $\sin 2x =$ _____

III. Simplify each expression.

1. $\frac{1}{x+h} - \frac{1}{x}$

2. $\frac{\frac{2}{x^2}}{\frac{10}{x^5}}$

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

4. $\frac{2x}{x^2-6x+9} - \frac{1}{x+1} - \frac{8}{x^2-2x-3}$

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IV. Solve for z:

1. $4x + 10yz = 0$

2. $y^2 + 3yz - 8z - 4x = 0$

V. If $f(x) = \{(3,5), (2,4), (1,7)\}$

$g(x) = \sqrt{x-3}$

$h(x) = \{(3,2), (4,3), (1,6)\}$

$k(x) = x^2 + 5$

determine each of the following:

1. $(f + h)(1) =$ _____

2. $(k - g)(5) =$ _____

3. $(f \circ h)(3) =$ _____

4. $(g \circ k)(7) =$ _____

5. $f^{-1}(x) =$ _____

6. $k^{-1}(x) =$ _____

7. $\frac{1}{f(x)} =$ _____

8. $(kg)(x) =$ _____

VI. Miscellaneous: Follow the directions for each problem.

1. Evaluate $\frac{f(x+h) - f(x)}{h}$ and simplify if $f(x) = x^2 - 2x$.

2. Expand $(x + y)^3$

3. Simplify: $x^{\frac{3}{2}}(x + x^{\frac{5}{2}} - x^2)$

4. Eliminate the parameter and write a rectangular equation for $\begin{matrix} x = t^2 + 3 \\ y = 2t \end{matrix}$

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VII. Expand and simplify

1. $\sum_{n=0}^4 \frac{n^2}{2}$

2. $\sum_{n=1}^3 \frac{1}{n^3}$

VIII. Simplify

1. $\frac{\sqrt{x}}{x}$ _____

2. $e^{\ln 3}$ _____

3. $e^{(1+\ln x)}$ _____

4. $\ln 1$ _____

5. $\ln e^7$ _____

6. $\log_3(1/3)$ _____

7. $\log_{1/2} 8$ _____

8. $\ln \frac{1}{2}$ _____

9. $e^{3 \ln x}$ _____

10. $\frac{4xy^{-2}}{12x^{-\frac{1}{3}}y^{-5}}$ _____

11. $27^{2/3}$ _____

12. $(5a^{2/3})(4a^{3/2})$ _____

13. $(4a^{5/3})^{3/2}$ _____

14. $\frac{3(n+1)!}{5n!}$ _____

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IX. Using the point-slope form $y - y_1 = m(x - x_1)$, write an equation for the line

1. with slope -2 , containing the point $(3, 4)$ 1. _____

2. containing the points $(1, -3)$ and $(-5, 2)$ 2. _____

3. with slope 0 , containing the point $(4, 2)$ 3. _____

4. perpendicular to the line in problem #1, containing the point $(3, 4)$ 4. _____

X. Given the vectors $\mathbf{v} = -2\mathbf{i} + 5\mathbf{j}$ and $\mathbf{w} = 3\mathbf{i} + 4\mathbf{j}$, determine

1. $\frac{1}{2}\mathbf{v}$ 2. $\mathbf{w} - \mathbf{v}$ 3. length of \mathbf{w} 4. the unit vector for \mathbf{v}

XI. **Without** a calculator, determine the exact value of each expression.

1. $\sin 0$ _____ 2. $\sin \frac{\pi}{2}$ _____ 3. $\sin \frac{3\pi}{4}$ _____

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

7. $\tan \frac{7\pi}{4}$ _____ 8. $\tan \frac{\pi}{6}$ _____ 9. $\tan \frac{2\pi}{3}$ _____

10. $\cos(\sin^{-1} \frac{1}{2})$ _____ 11. $\sin^{-1}(\sin \frac{7\pi}{6})$ _____

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XII. For each function, determine its domain and range.

Function	Domain	Range
1. $y = \sqrt{x-4}$	_____	_____
2. $y = \sqrt{x^2-4}$	_____	_____
3. $y = \sqrt{4-x^2}$	_____	_____
4. $y = \sqrt{x^2+4}$	_____	_____

XIII. Determine all points of intersection.

1. parabola $y = x^2 + 3x - 4$ and
line $y = 5x + 11$

2. $y = \cos x$ and $y = \sin x$ in the
first quadrant

XIV. Solve for x , where x is a real number. Show the work that leads to your solution.

1. $x^2 + 3x - 4 = 14$

2. $\frac{x^4 - 1}{x^3} = 0$

3. $(x - 5)^2 = 9$

4. $2x^2 + 5x = 8$

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Solve for x , where x is a real number. Show the work that leads to your solution.

5. $(x + 3)(x - 3) > 0$

6. $x^2 - 2x - 15 \leq 0$

7. $12x^2 = 3x$

8. $\sin 2x = \sin x$, $0 \leq x \leq 2\pi$

9. $|x - 3| < 7$

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

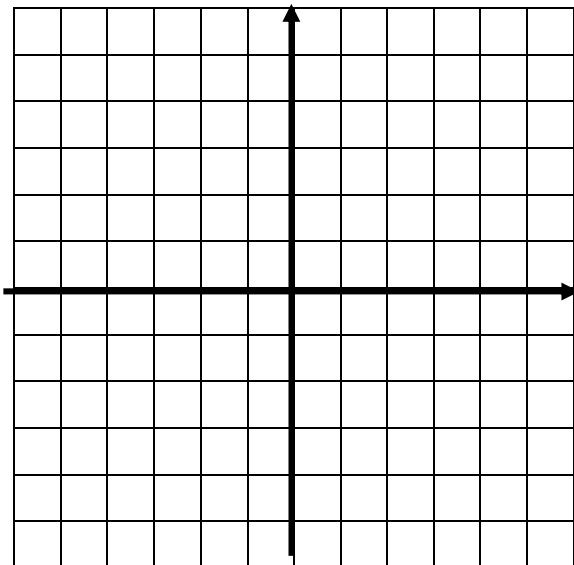
11. $27^{2x} = 9^{x-3}$

12. $\log x + \log(x - 3) = 1$

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XV. Graph each function. Give its domain and range.

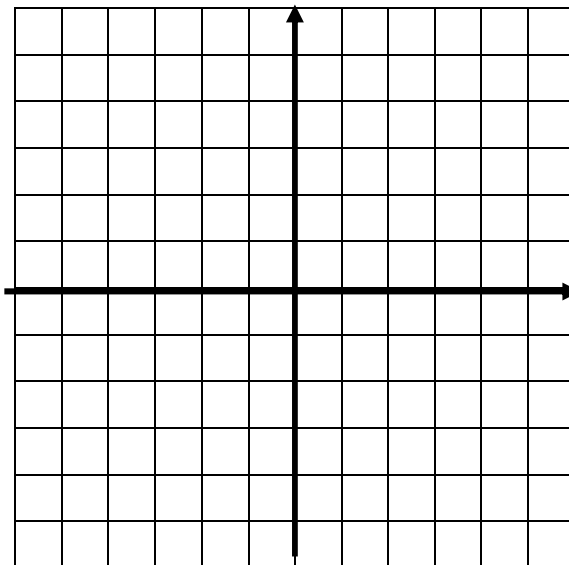
1. $y = \sin x$



Domain _____

Range _____

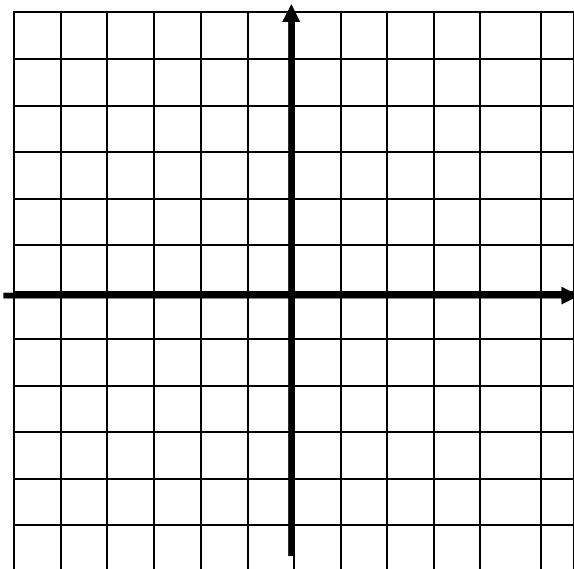
2. $y = e^x$



Domain _____

Range _____

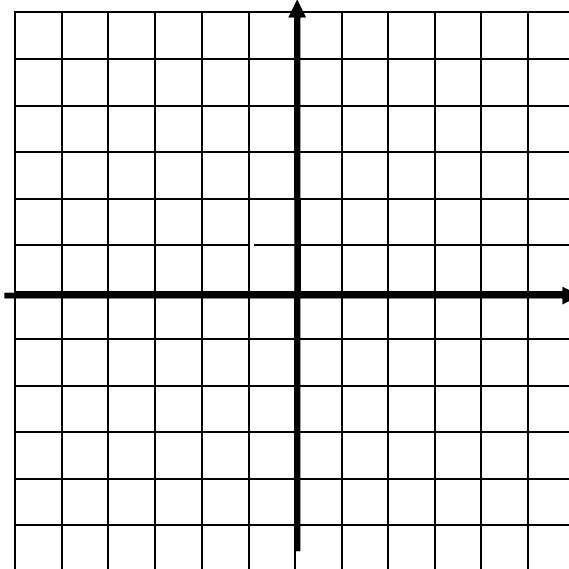
3. $y = \sqrt{x}$



Domain _____

Range _____

4. $y = \sqrt[3]{x}$



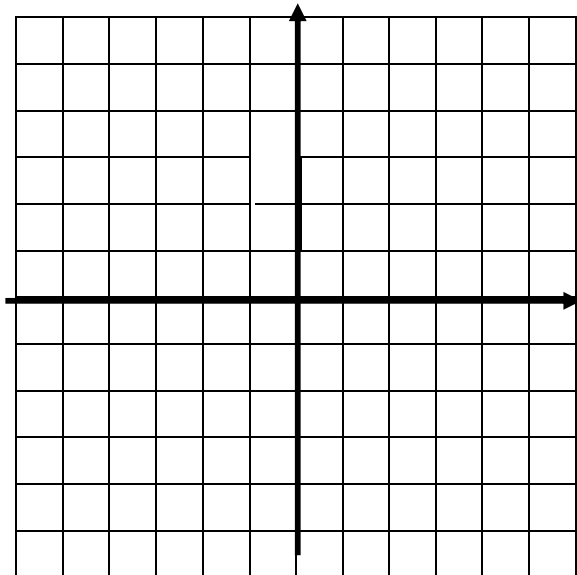
Domain _____

Range _____

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Graph each function. Give its domain and range.

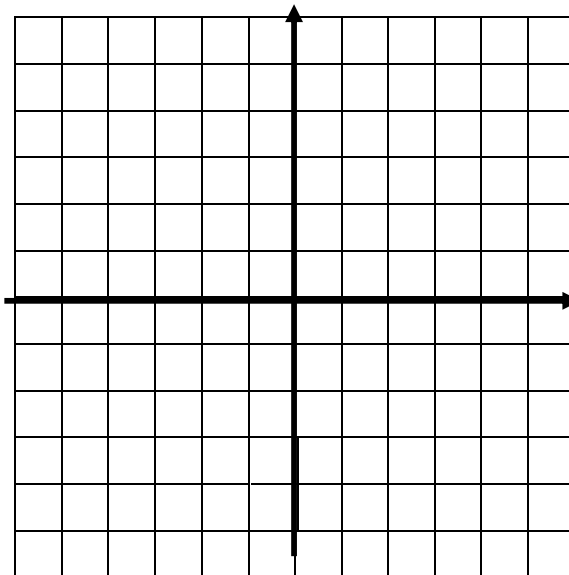
5. $y = \ln x$



Domain _____

Range _____

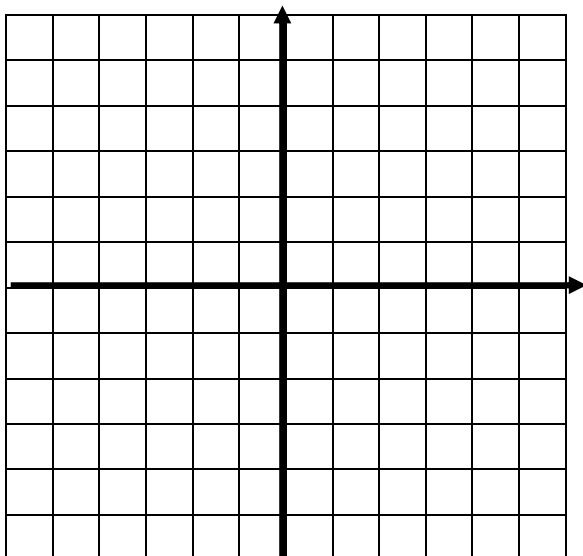
6. $y = |x + 3| - 2$



Domain _____

Range _____

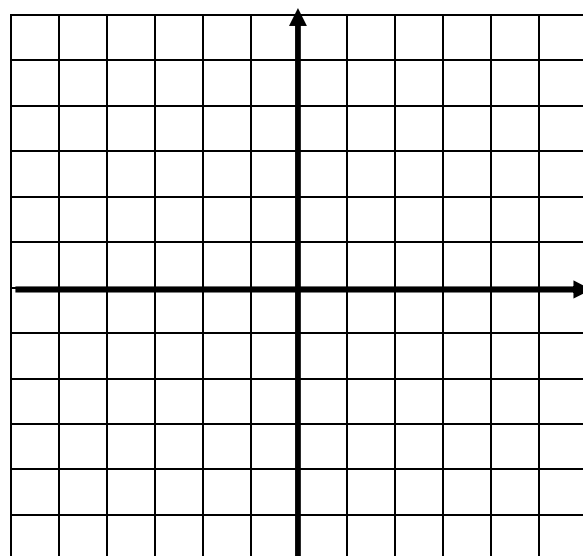
7. $y = \frac{1}{x}$



Domain _____

Range _____

8. $y = \begin{cases} x^2 & \text{if } x < 0 \\ x + 2 & \text{if } 0 \leq x \leq 3 \\ 4 & \text{if } x > 3 \end{cases}$



Domain _____

Range _____

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XVI. Identify, by name, each polar graph. Give at least one characteristic of each graph (e.g. radius, location, length of petal, point (other than the pole) on the graph, etc.) Then sketch a graph of each.

1. $r = 2$ _____

2. $r = 3\sec \theta$ _____

3. $r = 1 + \sin \theta$ _____

4. $r = 2\cos 3\theta$ _____