

AP Calculus Summer Review Packet

AKA - SUMMER FUN!!!

This packet is a review of the entering objectives for AP Calculus and is due on the **first day back to school**. It is to be done NEATLY and on a SEPARATE sheet of paper. Have a great summer.

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. Trigonometric Identities.

1. Pythagorean = _____

2. $\cos 2x =$ _____

3. $\sin 2x =$ _____

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

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 $x = t^2 + 3$
 $y = 2t$

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

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. parallel to $2x - 3y = 7$ and passes through $(5, 1)$

4. _____

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

5. _____

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. $\cos \frac{7\pi}{6}$

6. $\cos \frac{\pi}{3}$

7. $\tan \frac{7\pi}{4}$

8. $\tan \frac{\pi}{6}$

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

10. $\tan \frac{\pi}{2}$

11. $\cos(\sin^{-1} \frac{1}{2})$

12. $\sin^{-1}(\sin \frac{7\pi}{6})$

XII. For each function, determine its domain and 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. $2x^2 + 5x = 8$

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

13. $e^{3k} = 5$

14. $\ln y = 2t - 3$

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

1. $y = \sin x$

2. $y = \cos x$

3. $y = \tan x$

4. $y = x^3 - 2x^2 - 3x$

5. $y = x^2 - 6x + 1$

6. $y = \frac{x + 4}{x - 1}$

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

8. $y = e^x$

9. $y = \sqrt{x}$

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

11. $y = \ln x$

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

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

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

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.)

1. $r = 2$

2. $r = 3 \sec \theta$

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

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

PYD 9/24/04

(Modified from the www)