

AP Calculus Review Worksheet

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. Simplifying Rational Expressions

Simplify. (Show your work!)

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 Identities _____

2. $\cos 2x =$ _____

3. $\sin 2x =$ _____

III. Operations with Rational Expressions

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

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

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

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

IV. Solving equations

Solve for Z

$$1. \quad 4x + 10yz = 0$$

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

V. Operations with functions

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 the following:

$$1. \quad (f+g)(1) =$$

$$2. \quad (k-g)(5) =$$

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

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

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

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

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

$$8. \quad (kg)(x) =$$

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. Series

Expand and simplify.

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

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

VIII. Simplifying Expressions

Simplify.

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

2. $e^{\ln 3}$

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

4. $\ln 1$

5. $\ln e^7$

6. $\log_3\left(\frac{1}{3}\right)$

7. $\log_{\frac{1}{2}} 8$

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

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

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

11. $27^{\frac{2}{3}}$

12. $(5a^{\frac{2}{3}})(4a^{\frac{3}{2}})$

13. $(4a^{\frac{5}{3}})^{\frac{3}{2}}$

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 a slope of -2, containing the point (3,4)

2. containing the points (1,-3) and (-5,2)
3. with slope 0, containing the point (4,2)
4. parallel to $2x-3y=7$ and passes through (5,1)
5. perpendicular to the line in problem #1, containing the point (3,4)

X. Trigonometry

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

XI. Domain and Range

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. $y = \sqrt{x^2 + 4}$

XII. Determine all points of intersection

1. $y = x^2 + 3x - 4$
 $y = 5x + 11$
2. $y = \cos x$
 $y = \sin x$ in the 1st quadrant

XIII. Solving equations

Solve for x , where x is a real number. Show your work.

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. $e^{3x} = 5$

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