

1. If $f(x) = [\cos x + \sin x - \tan x]$, then find $f(7\pi/6)$.
2. Let $A = \lim_{x \rightarrow 0} \frac{1 - \cos x}{x}$, $B = \lim_{x \rightarrow 7} \frac{x^2 - 2x - 35}{x^2 - 49}$
 $C = \lim_{x \rightarrow -4} \sqrt{x^2 + 9}$; find $(7B + 5A)/C$.
3. For $f(x) = \frac{x^2 - 2x + 4}{x - 2}$, $x = A$ is the vertical asymptote,
 $x = B$ is the non-zero critical number and $(0, C)$ is the
 y -intercept. Find $A/C + B$.
4. Find the average value of $x(x^2 + 1)^3$ on $[0, 2]$.
5. A solarium is to be in the shape of a rectangle with a semi-circle on each end. If the perimeter of the room is to be 300 feet, find the radius, in feet, of the semi-circle that will make the area of the room as large as possible. Leave π in your answer.
6. The radius of a ball bearing is measured to be 1.2 cm. If the measurement is correct within .11 cm, estimate the relative error in the volume of the ball bearing to the nearest hundredth of a cubic centimeter.
7. Water is pouring into a conical tank with radius 4 feet and height 6 feet at the rate of 12 cubic feet per minute. At what rate is the water level rising, in feet per minute, when the depth is 3 feet? Leave π in your answer.
8. Evaluate $\int \text{Arctan } x \, dx$.
9. Find the volume of the solid formed by revolving about the y -axis the region enclosed by $2x - 3y = 2$, $x = 4$, and the x -axis. Leave π in your answer.
10. If a point moves along the curve $x^2 + 2xy + y = 3$ such that the rate of change of x is 4 units per second when $x = -1$, find the rate of change of y at the same point in units per second.
11. Find $\lim_{t \rightarrow 0} \frac{(t + 2)^7 - 2^7}{t}$.
12. Let $A =$ the sum of the roots of $f(x)$, $B =$ the sum of the roots of $f'(x)$ and $C =$ the sum of the roots of $f''(x)$ if $f(x) = x^3 - 3x^2 - 6x + 8$. Find $(B + C)/A$.
13. If the radius of a spherical balloon is decreasing at the rate of 4 cm per second, find the radius, in cm, when the volume is decreasing at the rate of 16π cubic centimeters per second.

14. Find the slope of the curve $y = (5^{2x})/\ln 5$ at $x = 2$.
15. Find the area of the region bounded by $x = y^2 - 2y$ and $y = x$.