

Mathematics Calculus Readiness Survey

Sample problems

(1) Solve for x : $x^2 + 2x = 2$

Solution: $x = -1 \pm \sqrt{3}$

(2) Factor $2a^2 + 3ab + 6a + 9b$

Solution: $(2a + 3b)(a + 3)$

(3) Factor $27r^6 + 8s^6$

Solution: $(3r^2 + 2s^2)(9r^4 - 6r^2s^2 + 4s^4)$

(4) Simplify $\left[\frac{x^3}{y^{-6}}\right]^{\frac{-4}{3}}$

Solution: $\frac{1}{x^4y^8}$

(5) If $f(x) = x^2 - 1$ and $g(x) = \frac{x+1}{x-1}$ find $f(g(2))$

Solution: 8

(6) Simplify $\frac{\frac{x+1}{x} - \frac{x^2-2}{x^2-x}}{2 - \frac{x}{x-1}}$

Solution: $\frac{1}{x^2-2x}$

(7) Simplify $\frac{1}{\sqrt{x}-\sqrt{x+1}}$

Solution: $-(\sqrt{x} + \sqrt{x+1})$

(8) Solve for x : $\frac{1}{x} + \frac{2}{x^2-1} = \frac{1}{x^2-x}$

Solution: $x = -2$ (not $x = 1$)

(9) Solve for x : $2^{x^2} = \frac{8^x}{4}$

Solution: $x = 1$ or $x = 2$

(10) If $\cos(A) = x$ find $\cos(2A)$

Solution: $2x^2 - 1$

(11) One angle of a triangle is 60° . The two adjacent sides are 1 and 3, respectively. Find the length of the opposite side.

Solution: $x = \sqrt{7}$

(12) Write the equation of the line through the points (1, 2) and (2, -3).

Solution: $y + 5x = 7$

(13) If $\cos(A) = \frac{1}{3}$ and $\sin(A) < 0$ then find $\tan(A)$.

Solution: $-2\sqrt{2}$

(14) Find all solutions to $2\sin^2x + 5\sin x + 2 = 0$ in the interval $[-\frac{\pi}{2}, \frac{\pi}{2}]$.

Solution: -30° or $x = -\frac{\pi}{6}$

(15) Simplify $\frac{\sin 2x + \cos 2x + 2\sin^2 x}{\sin x + \cos x}$

Solution: $\sin x + \cos x$