

FORMULÁRIO – M008

PRINCIPAIS DIRETIVAS DE DERIVAÇÃO E INTEGRAÇÃO:

$$\begin{array}{lll}
 \frac{d}{dx}[K] = 0 & \frac{d}{dx}[K \cdot f(x)] = K \cdot f'(x) & \int K \cdot dx = Kx + C \\
 \frac{d}{dx}[f(x)^m] = m \cdot f(x)^{m-1} \cdot f'(x) & & \int f(x)^m \cdot f'(x) \cdot dx = \frac{f(x)^{m+1}}{m+1} + C \\
 \frac{d}{dx}[a^{f(x)}] = a^{f(x)} \cdot \ln(a) \cdot f'(x) & & \int a^{f(x)} \cdot f'(x) \cdot dx = \frac{a^{f(x)}}{\ln(a)} + C \\
 \frac{d}{dx}[\log_a(f(x))] = \frac{f'(x)}{\ln(a) \cdot f(x)} & & \int \frac{f'(x)}{f(x)} \cdot dx = \ln(f(x)) + C \\
 \frac{d}{dx}[\sin(f(x))] = \cos(f(x)) \cdot f'(x) & & \int \sin(f(x)) \cdot f'(x) \cdot dx = -\cos(f(x)) + C \\
 \frac{d}{dx}[\cos(f(x))] = -\sin(f(x)) \cdot f'(x) & & \int \cos(f(x)) \cdot f'(x) \cdot dx = \sin(f(x)) + C \\
 \frac{d}{dx}[\tan(f(x))] = \sec^2(f(x)) \cdot f'(x) & & \int \tan(f(x)) \cdot f'(x) \cdot dx = \ln[\sec(f(x))] + C \\
 \frac{d}{dx}[\cot g(f(x))] = -\operatorname{cosec}^2(f(x)) \cdot f'(x) & & \int \sec^2(f(x)) \cdot f'(x) \cdot dx = \tan(f(x)) + C \\
 \frac{d}{dx}[f(x) \cdot g(x)] = f'(x) \cdot g(x) + f(x) \cdot g'(x) & & \int \operatorname{cosec}^2(f(x)) \cdot f'(x) \cdot dx = -\cot g(f(x)) + C \\
 & & \int \frac{f'(x)}{a^2 + f(x)^2} \cdot dx = \frac{1}{a} \arctg\left(\frac{f(x)}{a}\right) + C \\
 & & \int u \cdot dv = u \cdot v - \int v \cdot du
 \end{array}$$

FÓRMULAS DE PROBABILIDADE:

$$\begin{array}{lll}
 f_X(x) = \frac{dF_X(x)}{dx} & F_X(x) = P[X \leq x] & P[a < X \leq b] = F_X(b) - F_X(a) \\
 P[a \leq X \leq b, c \leq Y \leq d] = \sum_{y=c}^d \sum_{x=a}^b f_{XY}(x, y) & P[a \leq X \leq b] = \sum_{x=a}^b f_X(x) & P[a \leq X \leq b] = \int_a^b f_X(x) \cdot dx \\
 P[a \leq X \leq b, c \leq Y \leq d] = \int_{y=c}^d \int_{x=a}^b f_{XY}(x, y) \cdot dx \cdot dy & E[g(X)] = \sum_{i=1}^n g(x_i) \cdot f_X(x_i) & E[g(X)] = \int_{-\infty}^{\infty} g(x) \cdot f_X(x) \cdot dx \\
 E[g(X, Y)] = \sum_j \sum_i g(x_i, y_j) \cdot f_{XY}(x_i, y_j) & E[g(X, Y)] = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} g(x, y) \cdot f_{XY}(x, y) \cdot dx \cdot dy & \\
 \sigma_X^2 = E[(X - m_X)^2] & \sigma_X^2 = \overline{X^2} - m_X^2 = E[X^2] - \{E[X]\}^2 & \sigma_X = \sqrt{\sigma_X^2} \\
 \psi(w) = E[e^{jwX}] & E[X^n] = (-j)^n \cdot \left. \frac{d^n \psi(w)}{dw^n} \right|_{w=0} & f_Y(y) = \left. \frac{f_X(x)}{|g'(x)|} \right|_{x=g^{-1}(y)} \\
 \text{Poisson: } f_X(x) = \frac{\alpha^x}{x!} \cdot e^{-\alpha} \quad E[X] = \sigma_X^2 = \alpha & \text{Binomial: } f_X(x) = \binom{n}{x} \cdot p^x \cdot q^{n-x} & E[X] = np \quad \sigma_X^2 = npq \\
 \text{Padronização: } Z = \frac{X - m_X}{\sigma_X} & \text{Exponencial: } f_X(x) = \lambda \cdot e^{-\lambda x}, x > 0, \lambda > 0 & E[X] = \sigma_X = \frac{1}{\lambda} \\
 & \text{Gaussiana Padronizada: } Q(z) = P[Z > z] & \\
 & \text{Uniforme: } f_X(x) = \frac{1}{b-a} \quad E[X] = \frac{a+b}{2} \quad \sigma_X^2 = \frac{(b-a)^2}{12} &
 \end{array}$$

TABELA DA GAUSSIANA PADRONIZADA:

z	$Q(z)$									
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	5.000e-1	4.960e-1	4.920e-1	4.880e-1	4.840e-1	4.800e-1	4.760e-1	4.720e-1	4.681e-1	4.641e-1
0.1	4.601e-1	4.562e-1	4.522e-1	4.482e-1	4.443e-1	4.403e-1	4.364e-1	4.325e-1	4.285e-1	4.246e-1
0.2	4.207e-1	4.168e-1	4.129e-1	4.090e-1	4.051e-1	4.012e-1	3.974e-1	3.935e-1	3.897e-1	3.859e-1
0.3	3.820e-1	3.782e-1	3.744e-1	3.707e-1	3.669e-1	3.631e-1	3.594e-1	3.556e-1	3.519e-1	3.482e-1
0.4	3.445e-1	3.409e-1	3.372e-1	3.335e-1	3.299e-1	3.263e-1	3.227e-1	3.191e-1	3.156e-1	3.120e-1
0.5	3.085e-1	3.050e-1	3.015e-1	2.980e-1	2.945e-1	2.911e-1	2.877e-1	2.843e-1	2.809e-1	2.775e-1
0.6	2.742e-1	2.709e-1	2.676e-1	2.643e-1	2.610e-1	2.578e-1	2.546e-1	2.514e-1	2.482e-1	2.450e-1
0.7	2.419e-1	2.388e-1	2.357e-1	2.326e-1	2.296e-1	2.266e-1	2.236e-1	2.206e-1	2.176e-1	2.147e-1
0.8	2.118e-1	2.089e-1	2.061e-1	2.032e-1	2.004e-1	1.976e-1	1.948e-1	1.921e-1	1.894e-1	1.867e-1
0.9	1.840e-1	1.814e-1	1.787e-1	1.761e-1	1.736e-1	1.710e-1	1.685e-1	1.660e-1	1.635e-1	1.610e-1
1.0	1.586e-1	1.562e-1	1.538e-1	1.515e-1	1.491e-1	1.468e-1	1.445e-1	1.423e-1	1.400e-1	1.378e-1
1.1	1.356e-1	1.334e-1	1.313e-1	1.292e-1	1.271e-1	1.250e-1	1.230e-1	1.210e-1	1.190e-1	1.170e-1
1.2	1.150e-1	1.131e-1	1.112e-1	1.093e-1	1.074e-1	1.056e-1	1.038e-1	1.020e-1	1.002e-1	9.852e-2
1.3	9.680e-2	9.509e-2	9.341e-2	9.175e-2	9.012e-2	8.850e-2	8.691e-2	8.534e-2	8.379e-2	8.226e-2
1.4	8.075e-2	7.926e-2	7.780e-2	7.635e-2	7.493e-2	7.352e-2	7.214e-2	7.078e-2	6.943e-2	6.811e-2
1.5	6.680e-2	6.552e-2	6.425e-2	6.300e-2	6.178e-2	6.057e-2	5.937e-2	5.820e-2	5.705e-2	5.591e-2
1.6	5.479e-2	5.369e-2	5.261e-2	5.155e-2	5.050e-2	4.947e-2	4.845e-2	4.745e-2	4.647e-2	4.551e-2
1.7	4.456e-2	4.363e-2	4.271e-2	4.181e-2	4.092e-2	4.005e-2	3.920e-2	3.836e-2	3.753e-2	3.672e-2
1.8	3.593e-2	3.514e-2	3.437e-2	3.362e-2	3.288e-2	3.215e-2	3.144e-2	3.074e-2	3.005e-2	2.937e-2
1.9	2.871e-2	2.806e-2	2.742e-2	2.680e-2	2.618e-2	2.558e-2	2.499e-2	2.441e-2	2.385e-2	2.329e-2
2.0	2.275e-2	2.221e-2	2.169e-2	2.117e-2	2.067e-2	2.018e-2	1.969e-2	1.922e-2	1.876e-2	1.830e-2
2.1	1.786e-2	1.742e-2	1.700e-2	1.658e-2	1.617e-2	1.577e-2	1.538e-2	1.500e-2	1.462e-2	1.426e-2
2.2	1.390e-2	1.355e-2	1.320e-2	1.287e-2	1.254e-2	1.222e-2	1.191e-2	1.160e-2	1.130e-2	1.101e-2
2.3	1.072e-2	1.044e-2	1.017e-2	9.903e-3	9.641e-3	9.386e-3	9.137e-3	8.894e-3	8.656e-3	8.424e-3
2.4	8.197e-3	7.976e-3	7.760e-3	7.549e-3	7.343e-3	7.142e-3	6.946e-3	6.755e-3	6.569e-3	6.387e-3
2.5	6.209e-3	6.036e-3	5.867e-3	5.703e-3	5.542e-3	5.386e-3	5.233e-3	5.084e-3	4.940e-3	4.798e-3
2.6	4.661e-3	4.527e-3	4.396e-3	4.269e-3	4.145e-3	4.024e-3	3.907e-3	3.792e-3	3.681e-3	3.572e-3
2.7	3.466e-3	3.364e-3	3.264e-3	3.166e-3	3.071e-3	2.979e-3	2.890e-3	2.802e-3	2.717e-3	2.635e-3
2.8	2.555e-3	2.477e-3	2.401e-3	2.327e-3	2.255e-3	2.185e-3	2.118e-3	2.052e-3	1.988e-3	1.926e-3
2.9	1.865e-3	1.807e-3	1.750e-3	1.694e-3	1.641e-3	1.588e-3	1.538e-3	1.488e-3	1.441e-3	1.394e-3
3.0	1.349e-3	1.306e-3	1.263e-3	1.222e-3	1.182e-3	1.144e-3	1.106e-3	1.070e-3	1.035e-3	1.000e-3
3.1	9.676e-4	9.354e-4	9.042e-4	8.740e-4	8.447e-4	8.163e-4	7.888e-4	7.621e-4	7.363e-4	7.113e-4
3.2	6.871e-4	6.636e-4	6.409e-4	6.189e-4	5.976e-4	5.770e-4	5.570e-4	5.377e-4	5.190e-4	5.009e-4
3.3	4.834e-4	4.664e-4	4.500e-4	4.342e-4	4.188e-4	4.040e-4	3.897e-4	3.758e-4	3.624e-4	3.494e-4
3.4	3.369e-4	3.248e-4	3.131e-4	3.017e-4	2.908e-4	2.802e-4	2.700e-4	2.602e-4	2.507e-4	2.415e-4
3.5	2.326e-4	2.240e-4	2.157e-4	2.077e-4	2.000e-4	1.926e-4	1.854e-4	1.784e-4	1.717e-4	1.653e-4
3.6	1.591e-4	1.530e-4	1.473e-4	1.417e-4	1.363e-4	1.311e-4	1.261e-4	1.212e-4	1.166e-4	1.121e-4
3.7	1.077e-4	1.036e-4	9.961e-5	9.573e-5	9.201e-5	8.841e-5	8.495e-5	8.162e-5	7.841e-5	7.532e-5
3.8	7.234e-5	6.948e-5	6.672e-5	6.407e-5	6.151e-5	5.905e-5	5.669e-5	5.441e-5	5.222e-5	5.012e-5
3.9	4.809e-5	4.614e-5	4.427e-5	4.247e-5	4.074e-5	3.907e-5	3.747e-5	3.593e-5	3.445e-5	3.303e-5
4.0	3.167e-5	3.035e-5	2.909e-5	2.788e-5	2.672e-5	2.560e-5	2.453e-5	2.350e-5	2.251e-5	2.156e-5
4.1	2.065e-5	1.978e-5	1.894e-5	1.813e-5	1.736e-5	1.662e-5	1.591e-5	1.522e-5	1.457e-5	1.394e-5
4.2	1.334e-5	1.276e-5	1.221e-5	1.168e-5	1.117e-5	1.068e-5	1.022e-5	9.773e-6	9.344e-6	8.933e-6
4.3	8.539e-6	8.162e-6	7.801e-6	7.455e-6	7.124e-6	6.806e-6	6.503e-6	6.212e-6	5.933e-6	5.667e-6
4.4	5.412e-6	5.168e-6	4.935e-6	4.711e-6	4.497e-6	4.293e-6	4.097e-6	3.910e-6	3.732e-6	3.561e-6
4.5	3.397e-6	3.241e-6	3.091e-6	2.949e-6	2.812e-6	2.682e-6	2.557e-6	2.438e-6	2.324e-6	2.216e-6
4.6	2.112e-6	2.013e-6	1.918e-6	1.828e-6	1.742e-6	1.659e-6	1.581e-6	1.505e-6	1.434e-6	1.366e-6
4.7	1.300e-6	1.238e-6	1.179e-6	1.122e-6	1.068e-6	1.017e-6	9.679e-7	9.211e-7	8.764e-7	8.339e-7
4.8	7.933e-7	7.546e-7	7.177e-7	6.826e-7	6.491e-7	6.173e-7	5.869e-7	5.579e-7	5.304e-7	5.041e-7
4.9	4.791e-7	4.553e-7	4.327e-7	4.111e-7	3.906e-7	3.710e-7	3.524e-7	3.347e-7	3.179e-7	3.018e-7