

- ① DETERMINE THE LONG-TERM GROWTH RATE AND PERCENTAGE AGE DISTRIBUTION FOR A POPULATION OF FEMALE BIRDS WITH LESLIE MATRIX $L = \begin{bmatrix} 1 & 4 \\ 1/2 & 0 \end{bmatrix}$.
- ② FIND THE TAYLOR POLYNOMIAL $P_3(x)$ FOR $f(x) = \sqrt{x+3}$ CENTERED AT $a=1$.
- ③ FIND AN EQUATION FOR THE PLANE WHICH PASSES THROUGH THE POINT $P(6, 5, -3)$ AND IS PERPENDICULAR TO THE VECTOR $\vec{v} = \langle 5, -2, 4 \rangle$.
- ④ FIND THE FOLLOWING INDEFINITE INTEGRALS:
- $\int \frac{1}{x(1+\ln x)} dx$
 - $\int e^{2x} \sin x dx$
 - $\int \frac{(x+1)^2}{x^2(x-1)} dx$
- ⑤ SOLVE THE FOLLOWING DIFFERENTIAL EQUATIONS:
- $\frac{dy}{dx} + y = \frac{1}{1+e^{2x}}$
 - $\frac{dy}{dx} - y^3 x e^x = 0$
- ⑥ FIND AN EQUATION OF THE PLANE WHICH PASSES THROUGH THE POINTS $P(1, 2, -3)$, $Q(1, -1, 1)$, AND $R(-3, -2, 1)$.
- ⑦ FIND THE PARAMETRIC EQUATIONS FOR THE LINE WHICH PASSES THROUGH THE POINT $P(2, -3, 4)$ AND IS PERPENDICULAR TO THE PLANE $x - y - 5z = -3$.
- ⑧ USE THE COMPARISON TEST TO DETERMINE IF THE INTEGRAL $\int_1^{\infty} \frac{3}{\sqrt{x^2 + 4x - 2}} dx$ CONVERGES OR DIVERGES.
- ⑨ LET A BE A MATRIX WITH EIGENVALUES $\lambda_1 = 2$ AND $\lambda_2 = -3$ AND CORRESPONDING EIGENVECTORS $v_1 = \begin{bmatrix} 7 \\ -3 \end{bmatrix}$ AND $v_2 = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$. FIND $A^{31} \begin{bmatrix} 2 \\ -1 \end{bmatrix}$.
- ⑩ FIND THE AREA OF THE REGION BOUNDED BY THE GRAPHS OF $y = x$, $y = 1$, AND $y = \frac{1}{4x}$.
- ⑪ FIND $\int \frac{x e^{2x}}{(2x+1)^2} dx$.
- ⑫ EVALUATE $\int_0^4 \frac{12x}{\sqrt{2x+1}} dx$.