```
> a := proc(n) option remember:
    if n = 0 then
     0:
    elif n = 1 then
     1:
    elif n = 2 then
      8:
     elif n = 3 then
     27:
    else
     4*a(n-1) - 6*a(n-2) + 4 a(n-3) - a(n-4):
    fi:
     end:
> seq(a(i), i = 1..8);
```
$$1, 8, 27, 64, 125, 216, 343, 512 \tag{1}$$

ii) Explicit formula for a(n) = n^3
iii) proof for explicit formula: $1^3 = 1, 2^3 = 8, 3^3 = 27, 4^3 = 64, 5^3 = 125, 6^3 = 216, 7^3 = 343, 8^3 = 512$

```
> dsolve( { D(y)(t) = y(t)^3/(t+1), y(0) = 1 }, y(t) )
```
$$y(t) = \frac{1}{\sqrt{1 - 2\ln(t+1)}} \tag{2}$$

```
> dsolve( { D(D(y))(t) - 3 D(y)(t) + 2 y(t) = 0, y(0) = 2, D(y)(0) = 3 }, y(t) )
```
$$y(t) = e^t + e^{2t} \tag{3}$$

```
> with(LinearAlgebra)
```
$$\tag{4}$$
[&x, Add, Adjoint, BackwardSubstitute, BandMatrix, Basis, BezoutMatrix, BidiagonalForm, BilinearForm, CARE, CharacteristicMatrix, CharacteristicPolynomial, Column, ColumnDimension, ColumnOperation, ColumnSpace, CompanionMatrix, CompressedSparseForm, ConditionNumber, ConstantMatrix, ConstantVector, Copy, CreatePermutation, CrossProduct, DARE, DeleteColumn, DeleteRow, Determinant, Diagonal, DiagonalMatrix, Dimension, Dimensions, DotProduct, EigenConditionNumbers, Eigenvalues, Eigenvectors, Equal, ForwardSubstitute, FrobeniusForm, FromCompressedSparseForm, FromSplitForm, GaussianElimination, GenerateEquations, GenerateMatrix, Generic, GetResultDataType, GetResultShape, GivensRotationMatrix, GramSchmidt, HankelMatrix, HermiteForm, HermitianTranspose, HessenbergForm, HilbertMatrix, HouseholderMatrix, IdentityMatrix, IntersectionBasis, IsDefinite,

IsOrthogonal, IsSimilar, IsUnitary, JordanBlockMatrix, JordanForm, KroneckerProduct, LA_Main, LUDecomposition, LeastSquares, LinearSolve, LyapunovSolve, Map, Map2, MatrixAdd, MatrixExponential, MatrixFunction, MatrixInverse, MatrixMatrixMultiply, MatrixNorm, MatrixPower, MatrixScalarMultiply, MatrixVectorMultiply, MinimalPolynomial, Minor, Modular, Multiply, NoUserValue, Norm, Normalize, NullSpace, OuterProductMatrix, Permanent, Pivot, PopovForm, ProjectionMatrix, QRDecomposition, RandomMatrix, RandomVector, Rank, RationalCanonicalForm, ReducedRowEchelonForm, Row, RowDimension, RowOperation, RowSpace, ScalarMatrix, ScalarMultiply, ScalarVector, SchurForm, SingularValues, SmithForm, SplitForm, StronglyConnectedBlocks, SubMatrix, SubVector, SumBasis, SylvesterMatrix, SylvesterSolve, ToeplitzMatrix, Trace, Transpose, TridiagonalForm, UnitVector, VandermondeMatrix, VectorAdd, VectorAngle, VectorMatrixMultiply, VectorNorm, VectorScalarMultiply, ZeroMatrix, ZeroVector, Zip]

> $A := Matrix([[3, -4], [4, 3]])$

$$A := \begin{bmatrix} 3 & -4 \\ 4 & 3 \end{bmatrix}$$ (5)

> $Eigenvalues(A)$

$$\begin{bmatrix} 3 + 4\,I \\ 3 - 4\,I \end{bmatrix}$$ (6)

> $Eigenvectors(A)$

$$\begin{bmatrix} 3 + 4\,I \\ 3 - 4\,I \end{bmatrix}, \begin{bmatrix} I & -I \\ 1 & 1 \end{bmatrix}$$ (7)