1. Create a variable `a` that is a row vector with the following elements: 9, 1, 3^2, 7/4, 0, 2.25×8.5, 0.8, and $\sin(\pi / 8)$.

2. Create a variable `b` that is a row vector with the following elements: $\sqrt{5.2^3}$, 6.71×10^3, $(3 + 5.1^2)\cos 53°$, 15.8, $\sqrt[3]{90}$, and $\frac{\sin(\pi/3)}{\tan 20°}$.

3. Create a variable `c` that is a column vector with the following elements: 2.1×10^{-2}, $\sin(1.7\pi)$, 28.5, $2.7^{4/3}$, and e^3.

4. Create a variable `d` that is a column vector with the following elements: $0.75 \times 5.2^{0.7}$, 11.1, $\sqrt[3]{60}$, $\tan(10\pi / 11)$, $\cos^2 5°$, and 0.116.

5. Define the variables $x = 3.4$ and $y = 5.8$, and then use them to create a row vector (assign it to a variable named `e`) that has the following elements: x/y, $x+y$, x^y, $x \times y$, y^2, and x.

6. Define the variables $c = 4.5$ and $d = 2.8$, and then use them to create a column vector (assign it to a variable named `f`) that has the following elements: d^2, c, $(c+d)$, c^d, and d.

7. Create a variable `g` that is a row vector in which the first element is 3 and the last element is 27, with an increment of 4 between the elements (3, 7, 11, … , 27).

8. Create a variable `h` that is a row vector with eight equally spaced elements in which the first element is 68 and the last element is 12.

9. Create a variable `M` that is a column vector in which the first element is 6.4, the elements increase with increments of 0.8, and the last element is 12. (A column vector can be created by the transpose of a row vector.)

10. Create a variable `N` that is a column vector with seven equally spaced elements in which the first element is 44 and the last element is 23. (A column vector can be created by the transpose of a row vector.)

11. Using the colon symbol, create a row vector (assign it to a variable named `Time`) in which the first element is 0, the spacing is 1, and the last element is 20.

12. Using the `linspace` command, create a row vector (assign it to a variable named `Fours`) with nine elements that are all 4.

13. Using the colon symbol, create a variable named `Sevens` that is a row vector of seven elements that are all the number 7.

14. Use a single command to create a row vector (assign it to a variable named `P`) with eight elements such that the last element is 5.9 and the rest of the elements are 0s. Do not type the vector elements explicitly.

15. Use a single command to create a row vector (assign it to a variable named `q`) with nine elements such that the last four elements are 8.1 and the rest of the elements are 0s. Do not type the vector elements explicitly.

16. Use a single command to create a row vector (assign it to a variable named `R`) with 10 elements such that

```
R =
  -4    -1     2     5     8    14    18    22    26    30
```

Do not type the vector elements explicitly.

17. Create two row vectors `v=41:-3:29` and `w=17:4:37`. Then, by only using the name of the vectors (`v` and `w`), create a row vector `u` that is made from the elements of `w` followed by the elements of `v`.

18. Create two column vectors `T=[5:5:25]'` and `S=[27:2:33]'`. Then, by only using the name of the vectors (`T` and `S`), create a column vector `R` that is made from the elements of `T` followed by the elements of `S`.

19. Create a row vectors `A=4:3:13` and a column vector `B=[14:-2:6]'`. Then only using the name of the vectors (`A` and `B`), create the following:
    (*a*) A row vector `C` that is made from the elements of `B` followed by the elements of `A`.

(*b*) A column vector `D` that is made from the elements of `A` followed by the elements of `B`.

20. Create a row vector `vA=1:3:34` that has 12 elements. Then, create a new nine-element vector `vB` from the elements of `vA` such that the first five elements are the first five elements of the vector `vA`, and the last four are the last four elements of the vector `vA`. Use the colon symbol to address a range of elements. (Do not type the elements of the vector `vA` explicitly.)

21. Create a row vector `vC=2:3:38` that has 13 elements. Then, create the following new vectors by assigning elements of `vC` to the new vectors:
    (*a*) A vector (name it `vCodd`) that contains all the elements with odd index of `vC`; i.e., `vCodd = 2 8 14 ... 38`.
    (*b*) A vector (name it `vCeven`) that contains all the elements with even index of `vC`; i.e., `vCeven = 5 11 17 ... 35`.
    In both parts use vectors of odd and even numbers to address the elements of `vC` that are assigned to `vCodd`, and `vCeven`, respectively. Do not enter the elements of the vectors explicitly.

22. Create two row vectors `vD=20:4:44` and `vE=50:3:71`. Then, create the following new vectors by assigning elements of `vD` and `vE` to the new vectors:
    (*a*) A vector (name it `vDE`) that contains the 2nd through the 5th elements of `vD` and the 4th through 7th elements of `vE`; i.e., `vDE = 24 28 32 36 59 62 65 68`.
    (*b*) A vector (name it `vED`) that contains elements 6, 5, 4, 3, and 2 of `vE` and elements 4, 3, 2, and 1 of `vD`; i.e., `vED = 65 62 59 56 53 32 28 24 20`.
    In both parts use vectors to address the elements of `vD` and `vE` that are assigned to `vDE` and `vED`, respectively. Do not enter the elements of the vectors explicitly.

23. Create a nine-element row vector `vF=5:7:61`. Then create a vector (name it `vFrev`) that consist of the elements of `vF` in reverse order. Do it by using a vector to address the elements of `VF`. (Do not type the elements of `vF` vector explicitly.)

24. Create the following matrix by assigning vectors with constant spacing to the rows (use the `linspace` command for the third row). Do not type individual elements explicitly.

```
A =
    1.0000 2.0000 3.0000 4.0000 5.0000 6.0000 7.0000
    7.0000 6.0000 5.0000 4.0000 3.0000 2.0000 1.0000
    2.0000 3.1667 4.3333 5.5000 6.6667 7.8333 9.0000
```

25. Create the following vector by using the `linspace` command. Do not type individual elements explicitly.

```
B =
     4     4     4     4     4     5     5     5     5
```

26. Create the following matrix by typing one command. Do not type individual elements explicitly.

```
C =
     6     8
     6     8
     6     8
     6     8
     6     8
```

27. Create the following matrix by typing one command. Do not type individual elements explicitly.

```
D =
     1     1     1     1
     1     1     1     1
     1     1     1     1
     8     6     4     2
```

28. Create the following matrix by typing one command. Do not type individual elements explicitly.

```
E =
     0     0     0     0     8
     0     0     0     0     7
     0     0     0     0     6
```

29. Create the following matrix by typing one command. Do not type individual elements explicitly.

```
F =
     0     0     0     0     0     0
     0     0     0     0     0     0
     0     0     8     6     4     2
```

30. Create the following matrix by typing one command. Do not type individual elements explicitly.

```
G =
     1     1     1     1     1
     1     1     1     1     1
     1     1     1     1     1
     0     0     0     1     1
     0     0     0     1     1
     0     0     0     1     1
```

31. Create the following three row vectors:
`a=[5 8 -1 0 2], b=[4 1 9 -2 3]`, and `c=[-3 5 0 6 1]`.
(*a*) Use the three vectors in a MATLAB command to create a nine-element row vector consisting from the first three elements of the vectors `a`, `b`, and `c`, respectively (i.e., `5 8 -1 4 1 9 -3 5 0`).
(*b*) Use the three vectors in a MATLAB command to create a nine-element column vector consisting from the last three elements of the vectors `a`, `b`, and `c`, respectively.

32. Create the following three row vectors:
`a=[5 8 -1 0 2], b=[4 1 9 -2 3]`, and `c=[-3 5 0 6 1]`.
(*a*) Use the three vectors in a MATLAB command to create a 3×5 matrix in which the rows are the vectors `c`, `b`, and `a`, respectively.
(*b*) Use the three vectors in a MATLAB command to create a 5×3 matrix in which the columns are the vectors `c`, `b`, and `a`, respectively.

33. Create the following two row vectors:
`d=[6-1 4 0 -2 5]`, and `e=[7 5 9 0 1 3]`.
(*a*) Use the two vectors in a MATLAB command to create a 3×3 matrix such that the first row consists of elements 2 through 4 of vector `d`, the second row consists of elements 3 through 5 of vector `e`, and the third row consists of elements 4 through 6 of vector `d`.
(*b*) Use the two vectors in a MATLAB command to create a 4×2 matrix such that the first column consists of elements 2 through 5 of vector `d`, and the second column consists of elements 3 through 6 of vector `e`.

34. By hand (pencil and paper) write what will be displayed if the following commands are executed by MATLAB. Check your answers by executing the commands with MATLAB. In parts (*b*), (*c*), (*d*), (*e*), and (*f*) use the vector that was defined in part (*a*).
(*a*) `a=2:2:20` (*b*) `b=a(4:8)` (*c*) `c=a(1:2:7)`
(*d*) `d=a(8:-1:4)` (*e*) `e=[a(1:5);a(6:10)]`
(*f*) `e=[a(2:5)' a(6:9)']`

35. Create the following vector:
`v=[5 0 -3 7 6 -1 2 8 4 9]`
By hand (pencil and paper) write what will be displayed if the following commands are executed by MATLAB. Check your answers by executing the commands with MATLAB.
(*a*) `a=v([4 5:7 10])` (*b*) `b=v([9, 1, 6:-2:2])'`
(*c*) `c=[b' a']`

36. Create the following vectors:
`u=[0 9 -5 6 3 -1 2]` and `w=[-2 3 7 -4 0 1 5]`
By hand (pencil and paper) write what will be displayed if the following commands are executed by MATLAB. Check your answers by executing the commands with MATLAB.
(*a*) `A=[u(2:5);w([7 5]) u([6 7])]`
(*b*) `B=[w(4:7)', zeros(4,2), u([1 3 5 7])']`

37. Create the following matrix `M`:

```
M =
   1     7    13    19    25
   3     9    15    21    27
   5    11    17    23    29
```

By writing one command and using the colon to address range of elements (do not type individual elements explicitly), use the matrix `M` to:
(*a*) Create a five-element row vector named `Va` that contains the elements of the third row of `M`.
(*b*) Create a three-element column vector named `Vb` that contains the elements of the fourth column of `M`.
(*c*) Create an eight-element row vector named `Vc` that contains the elements of the second row of `M` followed by the elements of the third column of `M`.

38. Create the following matrix `N`:

```
N =
    0     3     6     9    12    15
   18    21    24    27    30    33
   36    39    42    45    48    51
```

(It can be done by typing: `N=reshape(0:3:51,6,3)'`.)
By writing one command and using the colon to address range of elements (do not type individual elements explicitly), use the matrix `N` to:

(*a*) Create a six-element row vector named `Ua` that contains the first three elements of the first row of `N` followed by the last three elements of the third row of `N`.
(*b*) Create a nine-element column vector named `Ub` that contains the elements of the first column of `N`, followed by the elements of the third column of `N`, followed by the elements of the sixth column of `N`.
(*c*) Create a six-element column vector named `Uc` that contains elements 2, 3, 4, and 5 of the second row of `N`, followed by elements 2 and 3 of the fifth column of `N`.

39. Create the following matrix G:

```
G =
    0.1   0.2   0.3   0.4   0.5   0.6   0.7
     10     9     8     7     6     5     4
      0   0.2   0.4   0.6   0.8   1.0   1.2
      5     3     1    -1    -3    -5    -7
```

(*a*) Create a 3×4 matrix Ma from the first, third, and fourth rows and the first two and last two columns of matrix G.

(*b*) Create a 3×3 matrix Mb from the first three rows and the second, fourth, and sixth columns of matrix G.

40. Create the following matrix K:

```
K =
    0.25    0.5   0.75    1.0   1.25    1.5   1.75
       2      4      6      8     10     12     14
      25     30     35     40     45     50     55
```

(*a*) Create a 3×6 matrix Ga such that its first row includes the elements of the second column of K followed by the elements of the fifth column of K, the second row of Ga includes the first six elements of the second row of K, and the third row of Ga includes the last six elements of the third row of K.

(*b*) Create a 2×4 matrix Gb from the first two rows and columns 3 through 6 of K.

41. The following matrix is defined in MATLAB:

```
S =
     1     2     3     4     5     6
     7     8     9    10    11    12
    13    14    15    16    17    18
    19    20    21    22    23    24
```

By hand (pencil and paper) write what will be displayed if the following commands are executed by MATLAB. Check your answers by executing the commands with MATLAB.

(*a*) `A=S(2,[2,4])` (*b*) `B=S(3,[3:5])`

(*c*) `C=S([2:4],[4:6])` (*d*) `D=S(:,[1:3])`

42. The following matrix is defined in MATLAB:

```
T =
     2     4     6     8    10
    12    14    16    18    20
    22    24    26    28    30
```

By hand (pencil and paper) write what will be displayed if the following commands are executed by MATLAB. Check your answers by executing the commands with MATLAB.

(*a*)
```
D=[T(1,1:4);T(3,2:5)]
```
(*b*)
```
E=[T(:,4); T(2,:)']
```
(*c*)
```
F(3:5,3:5)=T(1:3,1:3)
```

43. By hand (pencil and paper) write what will be displayed if the following commands are executed by MATLAB. Check your answers by executing the commands with MATLAB.

```
V=[1:2:11;13:2:23]
V(:,4:6)=V(:,1:3)
V(3:4,:)=V
V(:,[2:3 5:6])=[]
```

44. Using the `zeros`, `ones`, and `eye` commands, create the following arrays by typing one command:

(*a*) $\begin{bmatrix} 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{bmatrix}$ (*b*) $\begin{bmatrix} 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 & 1 \end{bmatrix}$ (*c*) $\begin{bmatrix} 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix}$

45. Use the `eye`, `ones`, and `zeros` commands to create the following arrays:

$A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ $B = [1 \quad 1]$ $C = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

Using the variables `A`, `B`, and `C`, write a command that creates the following matrix `D`:

$D = \begin{bmatrix} 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 1 \end{bmatrix}$