

Solution

- 1 Create a 1×5 vector b with all elements equal to 0 and 3×1 vector c with all elements equal to 1

```
>> b=zeros(1,5)

b =
    0    0    0    0    0

>> c=ones(3,1)

c =
    1
    1
    1
```

- 2 Create a 1×5 vector d with elements equal to 1, 2, 3, 4, π respectively

```
>> d=[1:4,pi]

d =
    1.0000    2.0000    3.0000    4.0000    3.1416
```

Solution

- 3 Define the three vectors: $e = [2, 4, 6, \dots, 20]$; $f = [-21, 20, \dots, -12]$; $g = \text{randn}(1,10)$, and create a matrix A whose rows are e , f and g , in that order.

```
>> e = 2:2:20;  
>> f = -21:-12;  
>> g = randn(1,10);  
>> A = [e;f;g]
```

```
A =  
    2.0000    4.0000    6.0000    8.0000   10.0000   12.0000   14.0000   16.0000   . . .  
    18.0000   20.0000  
 -21.0000  -20.0000  -19.0000  -18.0000  -17.0000  -16.0000  -15.0000  -14.0000   . . .  
    -13.0000  -12.0000  
  -0.2050  -0.1241   1.4897   1.4090   1.4172   0.6715  -1.2075   0.7172   . . .  
    1.6302   0.4889
```

Solution

- read out the first five elements of rows one and two

```
>> A(1:2,1:5)

ans =
     2     4     6     8    10
    -21   -20   -19   -18   -17
```

- replace the element in the second row, third column, with $-\infty$

```
>> A(2,3)=-inf

A =
     2.0000     4.0000     6.0000     8.0000    10.0000    12.0000    14.0000    16.0000     . . .
    18.0000    20.0000
   -21.0000   -20.0000   -Inf   -18.0000   -17.0000   -16.0000   -15.0000   -14.0000     . . .
    -13.0000   -12.0000
   -0.2050   -0.1241    1.4897    1.4090    1.4172    0.6715   -1.2075    0.7172     . . .
     1.6302     0.4889
```

Solution

- 4 Find a short MATLAB expression to build the matrix

$$B = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 9 & 7 & 5 & 3 & 1 & -1 & -3 \\ 4 & 8 & 16 & 32 & 64 & 128 & 256 \end{pmatrix}$$

```
>> B=[1:7; 9:-2:-3; 2.^(2:8)]
```

```
B =
```

```
    1     2     3     4     5     6     7
    9     7     5     3     1    -1    -3
    4     8    16    32    64   128   256
```

- from B select submatrix $C1$, which contains 3rd and 5th column

```
>> C1=B(:, [3 5])
```

```
C1 =
```

```
     3     5
     5     1
    16    64
```

Solution

- from B select submatrix $C2$, which contains 3×4^{th} column

```
>> C2=A(:, [4 4 4])
```

```
C2 =
```

```
    4     4     4
    3     3     3
   32    32    32
```

- from B select submatrix $C3$ from 2^{nd} to 3^{rd} row and 4^{th} to last column

```
>> C3=A(2:3,4:end)
```

```
C3 =
```

```
    3     1     -1     -3
   32    64    128    256
```

Solution

- from B create a column vector

```
>> reshape(B, [], 1);
```

or

```
>> B(:);
```

- swap 2nd and 5th columns in the matrix in the B

```
>> B(:, [2 5])=B(:, [5 2])
```

B =

1	5	3	4	2	6	7
9	1	5	3	7	-1	-3
4	64	16	32	8	128	256