

■ Thema 1 a)

```
In[19]:= s[x_] := Apply[Plus, Divisors[x]]
```

```
In[20]:= s[6]
```

```
Out[20]= 12
```

□ b)

```
In[21]:= Do[If[s[x] == 2 x, Print[x]], {x, 1, 10000}]
```

```
6
```

```
28
```

```
496
```

```
8128
```

■ Thema 2;

```
In[1]:= f[x_Integer] := Nest[{{5, -6}, {1, 0}}.#1 &, {{1}, {1}}, x][[2]]
```

```
In[3]:= Table[f[i], {i, 0, 9}]
```

```
Out[3]=
```

```
( 1  
 1  
 -1  
 -11  
 -49  
 -179  
 -601  
 -1931  
 -6049  
 -18659 )
```

■ ΘΕΜΑ 3

```
In[4]:= a = Range[49];
```

```
In[5]:= b = {};
```

```
In[6]:= Do[k = Random[Integer, {1, 49}];  
AppendTo[b, a[[k]]]; a = Drop[a, {k}], {i, 1, 5}]
```

```
In[7]:= a
```

```
Out[7]:= {2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24,  
25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48}
```

```
In[8]:= b
```

```
Out[8]:= {49, 12, 29, 1, 47}
```

Άλλος τρόπος

```
In[19]:= a = Table[i, {i, 1, 49}];
```

```
In[20]:= b = {};
```

```
In[21]:= Do[a = Delete[a, Position[a, Random[Integer, {1, Length[a]}]]], {5}]
```

```
In[22]:= a
```

```
Out[22]:= {1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25,  
26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 47, 48, 49}
```

```
In[23]:= b = Complement[Table[i, {i, 1, 49}], a]
```

```
Out[23]:= {7, 9, 24, 32, 46}
```

■ ΘΕΜΑ 4

```
In[24]:= Clear[g]
```

```
In[25]:= g[n_Integer] :=  
  (a1 = Range[n]; While[Length[a1] ≠ 2, a1 = Drop[a1, {1, Length[a1], 3}]]; a1)
```

```
In[27]:= g[20]
```

```
Out[27]= {12, 18}
```

■ Thema 5

a)

```
In[28]:= f[x_, y_] := If[x + y < 3, x + y, x + y - 3]
```

```
In[29]:= MatrixForm[Table[f[i, j], {i, 0, 2}, {j, 0, 2}]]
```

```
Out[29]/MatrixForm=
```

$$\begin{pmatrix} 0 & 1 & 2 \\ 1 & 2 & 0 \\ 2 & 0 & 1 \end{pmatrix}$$

b)

```
In[30]:= g[x_, y_] := If[x * y ≠ 4, Mod[x * y, 4], 1]
```

```
In[31]:= MatrixForm[Table[g[i, j], {i, 0, 2}, {j, 0, 2}]]
```

```
Out[31]/MatrixForm=
```

$$\begin{pmatrix} 0 & 0 & 0 \\ 0 & 1 & 2 \\ 0 & 2 & 1 \end{pmatrix}$$

c)

```
In[33]:= Inner[g, {{2, 1}, {2, 0}}, {{1, 2}, {1, 1}}, f]
```

```
Out[33]=  $\begin{pmatrix} 0 & 2 \\ 2 & 1 \end{pmatrix}$ 
```