Plaintext Herbert Yardley

h	e	r	b	e	r	t	y	a	r	d	l	e	y
8	5	18	2	5	8	20	25	1	18	4	12	5	25

$$\begin{bmatrix}3 & 7\\ 5 & 12\end{bmatrix}\begin{bmatrix}8\\ 5\end{bmatrix}\begin{matrix}\text{h}\\ \text{e}\end{matrix}=\begin{bmatrix}59\\ 100\end{bmatrix}=\begin{bmatrix}7\\ 22\end{bmatrix}\begin{matrix}\text{G}\\ \text{V}\end{matrix} \quad \text{mod}\,26$$

$$\begin{aligned}3\times 8+7\times 5 &= 59 = 7\\ 5\times 8+12\times 5 &= 100 = 22\end{aligned} \quad \text{mod}\,26$$

$$\begin{bmatrix}3 & 7\\ 5 & 12\end{bmatrix}\begin{bmatrix}8 & 18 & 5 & 20 & 1 & 4 & 5\\ 5 & 2 & 18 & 25 & 18 & 12 & 25\end{bmatrix}=\begin{bmatrix}7 & 16 & 11 & 1 & 25 & 18 & 8\\ 22 & 10 & 7 & 10 & 13 & 8 & 13\end{bmatrix} \quad \text{mod}\,26$$

Ciphertext GV PJ KG AJ YM RH HM

Calculator commands

mod([3, 7; 5, 12]*[8; 5], 26)

mod([3, 7; 5, 12]*[8, 18, 5, 20, 1, 4, 5; 5, 2, 18, 25, 18, 12, 25], 26)

Mathematica commands

In[1]:=

```
Mod[{{3, 7}, {5, 12}}.{{8}, {5}}, 26]
```

Out[1]=

```
{{7}, {22}}
```

In[4]:=

```
Mod[{{3, 7}, {5, 12}}.
  {{8, 18, 5, 20, 1, 4, 5},
   {5, 2, 18, 25, 18, 12, 25}}, 26]
```

Out[4]=

```
{{7, 16, 11, 1, 25, 18, 8},
 {22, 10, 7, 10, 13, 8, 13}}
```