

```
(* Bsp 10 *)
Det[ $\begin{pmatrix} 4 & 7 & 5 \\ 3 & -2 & 8 \\ 4 & 0 & 0 \end{pmatrix}$ ]
Det[ $\begin{pmatrix} 4 & 0 & 5 \\ -2 & 1 & 1 \\ 3 & 7 & 0 \end{pmatrix}$ ]
```

264

-113

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(* Bsp 11 *)
a =  $\begin{pmatrix} 3 & -1 & 0 \\ 0 & 4 & 2 \\ 3 & 0 & 1 \end{pmatrix}$ ;
b =  $\begin{pmatrix} 1 & 1 & 1 \\ 0 & 0 & 3 \\ -1 & 1 & 0 \end{pmatrix}$ ;
Inverse[a] // MatrixForm
Inverse[b] // MatrixForm
```

$$\begin{pmatrix} \frac{2}{3} & \frac{1}{6} & -\frac{1}{3} \\ 1 & \frac{1}{2} & -1 \\ -2 & -\frac{1}{2} & 2 \end{pmatrix}$$

$$\begin{pmatrix} \frac{1}{2} & -\frac{1}{6} & -\frac{1}{2} \\ \frac{1}{2} & -\frac{1}{6} & \frac{1}{2} \\ 0 & \frac{1}{3} & 0 \end{pmatrix}$$

```
(* Bsp 12 *)
s = ( 0.10 0.30 0.60 );
t =  $\begin{pmatrix} 0.60 & 0.10 & 0.30 \\ 0.03 & 0.72 & 0.25 \\ 0.10 & 0.35 & 0.55 \end{pmatrix}$ ;
s.t // MatrixForm
s.t.t // MatrixForm
( 0.129 0.436 0.435 )
( 0.13398 0.47907 0.38695 )
```

```
(* Bsp 13 *)
l =  $\begin{pmatrix} 0.8 & 2 \\ 0.6 & 0 \end{pmatrix}$ ;
x =  $\begin{pmatrix} 100 \\ 0 \end{pmatrix}$ ;
l.x // MatrixForm
l.l.l.l.l.l.x // MatrixForm
( 80. )
( 60. )
( 624.128 )
( 249.216 )
```

(* Bsp 1 *)

$a = \{1, 3, -1, 5\};$

$b = \{4, 4, 2, 5\};$

$c = \{3, 1, 3, 0\};$

$a + b + c$

$a + b - c$

$a - b + c$

$a - b - c$

$\{8, 8, 4, 10\}$

$\{2, 6, -2, 10\}$

$\{0, 0, 0, 0\}$

$\{-6, -2, -6, 0\}$

(* Bsp 2 *)

$a = \begin{pmatrix} 3 & -2 & 1 \\ 0 & 5 & 4 \end{pmatrix};$

$b = \begin{pmatrix} -2 & 2 & 0 \\ 5 & 1 & 1 \end{pmatrix};$

$a + b$ // MatrixForm

$a - b$ // MatrixForm

$a + 2b$ // MatrixForm

$3a - b$ // MatrixForm

$\begin{pmatrix} 1 & 0 & 1 \\ 5 & 6 & 5 \end{pmatrix}$

$\begin{pmatrix} 5 & -4 & 1 \\ -5 & 4 & 3 \end{pmatrix}$

$\begin{pmatrix} -1 & 2 & 1 \\ 10 & 7 & 6 \end{pmatrix}$

$\begin{pmatrix} 11 & -8 & 3 \\ -5 & 14 & 11 \end{pmatrix}$

(* Bsp 3 *)

$\lambda = 5;$

$\mu = 7;$

$a = \begin{pmatrix} 4 & 3 \\ 5 & 1 \end{pmatrix};$

$b = \begin{pmatrix} 0 & 3 \\ 4 & 7 \end{pmatrix};$

(* a *)

$(\lambda + \mu) a == \lambda a + \mu a$

(* b *)

$\lambda (a + b) == \lambda a + \lambda b$

(* c *)

$\lambda (\mu a) == (\lambda \mu) a$

True

True

True

(* Bsp 4 *)

f = (0 1 2 3 4 5);

$$q = \begin{pmatrix} 23 \\ 17 \\ 8 \\ 6 \\ 8 \\ 2 \end{pmatrix};$$

f.q

{{93}}

(* Bsp 6 *)

$$m = \begin{pmatrix} 2 & 1 \\ 0 & -1 \end{pmatrix};$$

$$n = \begin{pmatrix} 0 & 3 \\ 5 & 2 \end{pmatrix};$$

m.n // MatrixForm

n.m // MatrixForm

$$\begin{pmatrix} 5 & 8 \\ -5 & -2 \end{pmatrix}$$

$$\begin{pmatrix} 0 & -3 \\ 10 & 3 \end{pmatrix}$$

(* Bsp 7 *)

$$a = \begin{pmatrix} \sqrt{2}/2 & -1/2 & -1/2 \\ \sqrt{2}/2 & 1/2 & 1/2 \\ 0 & \sqrt{2}/2 & -\sqrt{2}/2 \end{pmatrix};$$

a.Transpose[a] // MatrixForm

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

(* Bsp 9 *)

(* a *)

RowReduce[$\begin{pmatrix} 6 & 5 & 8 \\ 5 & 7 & 13 \end{pmatrix}$] // MatrixForm

(* b *)

RowReduce[$\begin{pmatrix} -2 & 3 & 2r \\ 8 & -13 & 5s \end{pmatrix}$] // MatrixForm

$$\begin{pmatrix} 1 & 0 & -\frac{9}{17} \\ 0 & 1 & \frac{38}{17} \end{pmatrix} \begin{pmatrix} 1 & 0 & \frac{1}{2}(-26r - 15s) \\ 0 & 1 & -8r - 5s \end{pmatrix}$$

(* Bsp 14 *)

a = 4;

b = 1;

c = 3;

Clear[x];

Solve[(((a - x) * (c - x) - b^2) == 0), x]

$$\left\{ \left\{ x \rightarrow \frac{1}{2} (7 - \sqrt{5}) \right\}, \left\{ x \rightarrow \frac{1}{2} (7 + \sqrt{5}) \right\} \right\}$$

(* Bsp 16 *)

$$a = \begin{pmatrix} 3 & 1 \\ 5 & 3 \end{pmatrix};$$

$$b = \begin{pmatrix} 2 \\ 1 \end{pmatrix};$$

Inverse[a] . b // MatrixForm

$$\begin{pmatrix} \frac{5}{4} \\ -\frac{7}{4} \end{pmatrix}$$

(* Bsp 17 *)

$$\text{RowReduce}\left[\begin{pmatrix} 2 & -5 & 1 & 2 \\ 1 & 2 & -2 & 1 \\ 3 & -4 & -3 & 5 \end{pmatrix}\right] // \text{MatrixForm}$$

$$\begin{pmatrix} 1 & 0 & 0 & \frac{7}{23} \\ 0 & 1 & 0 & -\frac{10}{23} \\ 0 & 0 & 1 & -\frac{18}{23} \end{pmatrix}$$
Bsp 5)

$$a) \begin{pmatrix} a_1 \\ a_2 \\ a_3 \\ a_4 \end{pmatrix}, \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{pmatrix} \quad b) \begin{pmatrix} 1 \\ 2 \\ 3 \\ \vdots \\ n \end{pmatrix}, \begin{pmatrix} p_1^0 \\ p_1 \\ p_2 \\ \vdots \\ p_{n-1} \end{pmatrix} \quad c) \begin{pmatrix} a \\ b \end{pmatrix} \cdot \begin{pmatrix} \cos \beta \\ \sin \mu \end{pmatrix}$$

Bsp 8)

$$u = 8$$

$$v = -7$$

Bsp 15)

$$R = \frac{c}{a+b+c}, \quad Q = \frac{b+c}{a+b+c}$$