

$$\begin{aligned}
 1. \quad & (5 \quad 2) \begin{pmatrix} 6 \\ 8 \end{pmatrix} \\
 & = 30 + 16 \\
 & = 46
 \end{aligned}$$

$$\begin{aligned}
 2. \quad & (3 \quad 10) \begin{pmatrix} 1 \\ 7 \end{pmatrix} \\
 & = 3 + 70 \\
 & = 73
 \end{aligned}$$

$$\begin{aligned}
 3. \quad & (1 \quad -2 \quad 4) \begin{pmatrix} 2 \\ 3 \\ 3 \end{pmatrix} \\
 & = 2 + -6 + 12 \\
 & = 8
 \end{aligned}$$

$$\begin{aligned}
 4. \quad & (1 \quad 5) \begin{pmatrix} -5 \\ 1 \end{pmatrix} \\
 & = -5 + 5 \\
 & = 0
 \end{aligned}$$

$$\left\langle \begin{pmatrix} 1 \\ 5 \end{pmatrix} \begin{pmatrix} -5 \\ 1 \end{pmatrix} \right\rangle \equiv 0$$

$$\begin{aligned}
 5. \quad & (3 \quad 6 \quad 2) \begin{pmatrix} 1 \\ 4 \\ 3 \end{pmatrix} \\
 & = 3 + 12 + 6 \\
 & = 21
 \end{aligned}$$

$$6. \quad \begin{pmatrix} 5 \\ 5 \end{pmatrix} = x \begin{pmatrix} 1 \\ 2 \end{pmatrix} + y \begin{pmatrix} 3 \\ 1 \end{pmatrix}$$

$$5 = x + 3y$$

$$5 = 2x + y$$

$$\begin{array}{r}
 x + 3y = 5 \quad | \cdot 2 | \\
 2x + y = 5 \quad | \cdot 1 | \\
 \hline
 2x + 6y = 10 \\
 2x + y = 5 \quad - \\
 \hline
 5y = 5 \\
 y = 1
 \end{array}$$

$$5 = 2x + y$$

$$5 = 2x + 1$$

$$5 - 1 = 2x$$

$$4 = 2x$$

$$x = 2$$

$$x = 2; y = 1$$

$$7. \quad \begin{pmatrix} -7 \\ 16 \end{pmatrix} = x \begin{pmatrix} 1 \\ 2 \end{pmatrix} + y \begin{pmatrix} 3 \\ 1 \end{pmatrix}$$

$$-7 = x + 3y$$

$$16 = 2x + y$$

$$\begin{array}{r}
-7 = x + 3y \cdot 2 \\
16 = 2x + y \cdot 1 \\
\hline
-14 = 2x + 6y \\
16 = 2x + y \quad - \\
\hline
-30 = 5y \\
-\frac{30}{5} = y \\
-6 = y \\
-x = -18 + 7 \\
\cancel{x} = \cancel{-11} \\
x = 11 \\
x = 11; y = -6
\end{array}$$

$$\begin{aligned}
8. & \begin{pmatrix} 2 & 3 \\ 1 & 4 \end{pmatrix} \begin{pmatrix} 3 \\ -2 \end{pmatrix} \\
&= \begin{pmatrix} (2 \cdot 3) + (3 \cdot -2) \\ (1 \cdot 3) + (4 \cdot -2) \end{pmatrix} \\
&= \begin{pmatrix} 6 + -6 \\ 3 + -8 \end{pmatrix} \\
&= \begin{pmatrix} 0 \\ -5 \end{pmatrix}
\end{aligned}$$

$$\begin{aligned}
9. & \begin{pmatrix} 1 & 4 \\ 0 & 5 \end{pmatrix} \begin{pmatrix} 1 \\ 1 \end{pmatrix} \\
&= \begin{pmatrix} (1 \cdot 1) + (4 \cdot 1) \\ (1 \cdot 0) + (5 \cdot 1) \end{pmatrix} \\
&= \begin{pmatrix} 1 + 4 \\ 0 + 5 \end{pmatrix} \\
&= \begin{pmatrix} 5 \\ 5 \end{pmatrix}
\end{aligned}$$

$$\begin{aligned}
10. & \begin{pmatrix} -2 & 6 \\ 9 & 4 \end{pmatrix} \begin{pmatrix} 3 & 3 \\ -5 & 1 \end{pmatrix} \\
&= \begin{pmatrix} (-2 \cdot 3 + 6 \cdot -5) & (-2 \cdot 3 + 6 \cdot 1) \\ (9 \cdot 3 + 4 \cdot -5) & (9 \cdot 3 + 4 \cdot 1) \end{pmatrix} \\
&= \begin{pmatrix} -36 & 0 \\ 7 & 31 \end{pmatrix}
\end{aligned}$$