

3.6 EXERCISES

HOMEWORK KEY

 = **WORKED-OUT SOLUTIONS**
on p. WS1 for Exs. 13, 23, and 41

 = **TAKS PRACTICE AND REASONING**
Exs. 9, 21, 35, 41, 44, 46, and 47

SKILL PRACTICE

- VOCABULARY** Copy and complete: The product of matrices A and B is defined provided the number of ? in A is equal to the number of ? in B .
- WRITING** Suppose A and B are two matrices and AB is defined. *Explain* how to find the element in the first row and first column of AB .

EXAMPLE 1

on p. 195
for Exs. 3–9

MATRIX PRODUCTS State whether the product AB is defined. If so, give the dimensions of AB .

- $A: 2 \times 2, B: 2 \times 2$
- $A: 1 \times 2, B: 2 \times 3$
- $A: 3 \times 4, B: 4 \times 2$
- $A: 4 \times 3, B: 2 \times 3$
- $A: 2 \times 1, B: 2 \times 2$
- $A: 2 \times 1, B: 1 \times 5$
- TAKS REASONING** If A is a 2×3 matrix and B is a 3×2 matrix, what are the dimensions of AB ?
 A 2×2 B 3×3 C 3×2 D 2×3

EXAMPLE 2

on p. 196
for Exs. 10–21

MULTIPLYING MATRICES Find the product. If the product is not defined, state the reason.

10. $\begin{bmatrix} 3 & -1 \\ & \end{bmatrix} \begin{bmatrix} 5 \\ 7 \end{bmatrix}$

11. $\begin{bmatrix} 1 \\ 4 \end{bmatrix} \begin{bmatrix} -2 & 1 \end{bmatrix}$

12. $\begin{bmatrix} -1 & 0 \\ 5 & 4 \end{bmatrix} \begin{bmatrix} 4 & -6 \end{bmatrix}$

13. $\begin{bmatrix} 9 & -3 \\ 0 & 2 \end{bmatrix} \begin{bmatrix} 0 & 1 \\ 4 & -2 \end{bmatrix}$

14. $\begin{bmatrix} 5 & 0 \\ -4 & 1 \end{bmatrix} \begin{bmatrix} -3 & 2 \\ 6 & 2 \end{bmatrix}$

15. $\begin{bmatrix} 5 & 2 \\ 0 & -4 \\ 1 & 6 \end{bmatrix} \begin{bmatrix} 3 & 7 \\ -2 & 0 \end{bmatrix}$

16. $\begin{bmatrix} 0 & -4 \\ 2 & 5 \\ 4 & 0 \end{bmatrix} \begin{bmatrix} 2 & 8 \\ 3 & 0 \\ -5 & -2 \end{bmatrix}$

17. $\begin{bmatrix} 1 & 3 & 0 \\ 2 & 12 & -4 \end{bmatrix} \begin{bmatrix} 9 & 1 \\ 4 & -3 \\ -2 & 4 \end{bmatrix}$

18. $\begin{bmatrix} 2 & 5 \\ -1 & 4 \\ 3 & -7 \end{bmatrix} \begin{bmatrix} 0 & 1 & 5 \\ -3 & 10 & -4 \end{bmatrix}$

ERROR ANALYSIS Describe and correct the error in finding the element in the first row and first column of the matrix product.

19. $\begin{bmatrix} 3 & -1 \\ 6 & 2 \end{bmatrix} \begin{bmatrix} 7 & 0 \\ 1 & -6 \end{bmatrix} = \begin{bmatrix} 3(7) + (-1)(0) \\ \end{bmatrix} = \begin{bmatrix} 21 \\ \end{bmatrix}$

20. $\begin{bmatrix} 2 & 5 \\ 1 & 7 \end{bmatrix} \begin{bmatrix} 4 & -8 \\ 3 & -1 \end{bmatrix} = \begin{bmatrix} 2(4) + 1(-8) \\ \end{bmatrix} = \begin{bmatrix} 0 \\ \end{bmatrix}$

21. **TAKS REASONING** What is the product of $\begin{bmatrix} 1 & -4 \\ 3 & -2 \end{bmatrix}$ and $\begin{bmatrix} 4 & -1 \\ 0 & -3 \end{bmatrix}$?

A $\begin{bmatrix} -4 & 12 \\ 3 & -3 \end{bmatrix}$

B $\begin{bmatrix} 4 & 11 \\ 12 & 3 \end{bmatrix}$

C $\begin{bmatrix} -4 & 11 \\ 12 & -3 \end{bmatrix}$

D $\begin{bmatrix} 4 & -11 \\ 0 & 3 \end{bmatrix}$