Name_____

Matrix Inverses and Determinants

Date_____ Period____

Evaluate each determinant.

1) $\begin{vmatrix} -1 & 2 \\ 1 & -4 \end{vmatrix}$

2) $\begin{vmatrix} 3 & 5 \\ -5 & -2 \end{vmatrix}$

3) $\begin{vmatrix} -4 & 4 \\ -5 & -3 \end{vmatrix}$

4) $\begin{vmatrix} -2 & 3 \\ 0 & 5 \end{vmatrix}$

5) $\begin{vmatrix} -5 & 2 & 1 \\ 1 & 0 & 0 \\ 0 & 4 & 0 \end{vmatrix}$

6) $\begin{vmatrix} -5 & -4 & 1 \\ -3 & 0 & 5 \\ -1 & 0 & 3 \end{vmatrix}$

7) $\begin{vmatrix} 3 & 3 & 1 \\ -3 & -1 & -3 \\ -4 & -3 & 1 \end{vmatrix}$

8) $\begin{vmatrix} -2 & 1 & -2 \\ 0 & 5 & -5 \\ 0 & 2 & -5 \end{vmatrix}$

For each matrix state if an inverse exists.

9) $\begin{bmatrix} 10 & -1 \\ 0 & 0 \end{bmatrix}$

10) $\begin{bmatrix} -10 & 5 \\ -2 & -1 \end{bmatrix}$

Find the inverse of each matrix.

11) $\begin{bmatrix} -3 & 1 \\ 9 & -1 \end{bmatrix}$

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

13) $\begin{bmatrix} -4 & 0 \\ -8 & -1 \end{bmatrix}$

14) $\begin{bmatrix} 3 & -1 \\ -2 & 4 \end{bmatrix}$

For each matrix state if an inverse exists.

15) $\begin{bmatrix} 2 & -2 & 5 \\ -2 & 3 & -2 \\ 3 & -6 & -4 \end{bmatrix}$

16) $\begin{bmatrix} 2 & -1 & 3 \\ 1 & -1 & -3 \\ -2 & 0 & -4 \end{bmatrix}$

Find the inverse of each matrix.

17) $\begin{bmatrix} -2 & 5 & -2 \\ -2 & 2 & 0 \\ -3 & -2 & 2 \end{bmatrix}$

18) $\begin{bmatrix} 1 & 1 & -2 \\ -3 & -2 & 5 \\ -6 & 4 & 4 \end{bmatrix}$

Critical thinking questions:

19) For what value(s) of x does the matrix M have an inverse?

$$M = \begin{bmatrix} x & 1 \\ 2 & x+1 \end{bmatrix}$$

20) Give an example of a 3×3 matrix that has a determinant of 1.

Name_____

Matrix Inverses and Determinants

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Evaluate each determinant.

1) $\begin{vmatrix} -1 & 2 \\ 1 & -4 \end{vmatrix}$

   2

2) $\begin{vmatrix} 3 & 5 \\ -5 & -2 \end{vmatrix}$

   19

3) $\begin{vmatrix} -4 & 4 \\ -5 & -3 \end{vmatrix}$

   32

4) $\begin{vmatrix} -2 & 3 \\ 0 & 5 \end{vmatrix}$

   −10

5) $\begin{vmatrix} -5 & 2 & 1 \\ 1 & 0 & 0 \\ 0 & 4 & 0 \end{vmatrix}$

   4

6) $\begin{vmatrix} -5 & -4 & 1 \\ -3 & 0 & 5 \\ -1 & 0 & 3 \end{vmatrix}$

   −16

7) $\begin{vmatrix} 3 & 3 & 1 \\ -3 & -1 & -3 \\ -4 & -3 & 1 \end{vmatrix}$

   20

8) $\begin{vmatrix} -2 & 1 & -2 \\ 0 & 5 & -5 \\ 0 & 2 & -5 \end{vmatrix}$

   30

For each matrix state if an inverse exists.

9) $\begin{bmatrix} 10 & -1 \\ 0 & 0 \end{bmatrix}$

   No

10) $\begin{bmatrix} -10 & 5 \\ -2 & -1 \end{bmatrix}$

   Yes

Find the inverse of each matrix.

11) $\begin{bmatrix} -3 & 1 \\ 9 & -1 \end{bmatrix}$

$-\dfrac{1}{6} \cdot \begin{bmatrix} -1 & -1 \\ -9 & -3 \end{bmatrix}$

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

$-\dfrac{1}{3} \cdot \begin{bmatrix} -3 & 3 \\ 4 & -3 \end{bmatrix}$

13) $\begin{bmatrix} -4 & 0 \\ -8 & -1 \end{bmatrix}$

$\dfrac{1}{4} \cdot \begin{bmatrix} -1 & 0 \\ 8 & -4 \end{bmatrix}$

14) $\begin{bmatrix} 3 & -1 \\ -2 & 4 \end{bmatrix}$

$\dfrac{1}{10} \cdot \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$

For each matrix state if an inverse exists.

15) $\begin{bmatrix} 2 & -2 & 5 \\ -2 & 3 & -2 \\ 3 & -6 & -4 \end{bmatrix}$

Yes

16) $\begin{bmatrix} 2 & -1 & 3 \\ 1 & -1 & -3 \\ -2 & 0 & -4 \end{bmatrix}$

Yes

Find the inverse of each matrix.

17) $\begin{bmatrix} -2 & 5 & -2 \\ -2 & 2 & 0 \\ -3 & -2 & 2 \end{bmatrix}$

$-\dfrac{1}{8} \cdot \begin{bmatrix} 4 & -6 & 4 \\ 4 & -10 & 4 \\ 10 & -19 & 6 \end{bmatrix}$

18) $\begin{bmatrix} 1 & 1 & -2 \\ -3 & -2 & 5 \\ -6 & 4 & 4 \end{bmatrix}$

$\dfrac{1}{2} \cdot \begin{bmatrix} -28 & -12 & 1 \\ -18 & -8 & 1 \\ -24 & -10 & 1 \end{bmatrix}$

Critical thinking questions:

19) For what value(s) of x does the matrix M have an inverse?

$$M = \begin{bmatrix} x & 1 \\ 2 & x+1 \end{bmatrix}$$

All values except 1 and -2

20) Give an example of a 3×3 matrix that has a determinant of 1.

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