

Name \_\_\_\_\_ period \_\_\_\_\_ date \_\_\_\_\_

**Find the value of each determinant by hand. Show work.**

1.  $\begin{vmatrix} 6 & 4 \\ 1 & 3 \end{vmatrix}$

2.  $\begin{vmatrix} -3 & -1 \\ 7 & 2 \end{vmatrix}$

3.  $\begin{vmatrix} -8 & -2 \\ -5 & 3 \end{vmatrix}$

4.  $\begin{vmatrix} 3 & 4 & 2 \\ 1 & -1 & 5 \\ 1 & 2 & -2 \end{vmatrix}$

5.  $\begin{vmatrix} 3 & -9 & 4 \\ 1 & 4 & 0 \\ 8 & -3 & 1 \end{vmatrix}$

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

**Solve for  $x$ .**

7.  $\begin{vmatrix} x & x \\ 4 & 3 \end{vmatrix} = 5$

8.  $\begin{vmatrix} x & 1 \\ 3 & x \end{vmatrix} = -2$

9.  $\begin{vmatrix} x & 1 & 1 \\ 4 & 3 & 2 \\ -1 & 2 & 5 \end{vmatrix} = 2$

Solve each system of equations using Cramer's Rule if it is applicable. If Cramer's Rule is not applicable, say so. For  $2 \times 2$  systems, do all work by hand. For  $3 \times 3$  systems, you may evaluate the determinants using a calculator, but you must still write out the determinants and show all other work.

$$10. \begin{cases} x + 2y = 5 \\ x - y = 3 \end{cases}$$

$$11. \begin{cases} x + 3y = 5 \\ 2x - 3y = -8 \end{cases}$$

$$12. \begin{cases} -x + 2y = 5 \\ 4x - 8y = 6 \end{cases}$$

$$13. \begin{cases} 3x - 2y = 0 \\ 5x + 10y = 4 \end{cases}$$

$$14. \begin{cases} 2x + 3y = 6 \\ x - y = \frac{1}{2} \end{cases}$$

$$15. \begin{cases} x + y - z = 6 \\ 3x - 2y + z = -5 \\ x + 3y - 2z = 14 \end{cases}$$

$$16. \begin{cases} x+2y-z=-3 \\ 2x-4y+z=-7 \\ -2x+2y-3z=4 \end{cases}$$

$$17. \begin{cases} x-2y+3z=1 \\ 3x+y-2z=0 \\ 2x-4y+6z=2 \end{cases}$$

$$18. \begin{cases} x+4y-3z=0 \\ 3x-y+3z=0 \\ x+y+6z=0 \end{cases}$$

Use the properties of determinants to find the value of each determinant given that  $\begin{vmatrix} x & y & z \\ u & v & w \\ 1 & 2 & 3 \end{vmatrix} = 4$

$$19. \begin{vmatrix} 1 & 2 & 3 \\ u & v & w \\ x & y & z \end{vmatrix}$$

$$20. \begin{vmatrix} x & y & z \\ u & v & w \\ 2 & 4 & 6 \end{vmatrix}$$

$$21. \begin{vmatrix} x & y & z \\ -3 & -6 & -9 \\ u & v & w \end{vmatrix}$$

$$22. \begin{vmatrix} 1 & 2 & 3 \\ x-u & y-v & z-w \\ u & v & w \end{vmatrix}$$

$$23. \begin{vmatrix} 1 & 2 & 3 \\ x-3 & y-6 & z-9 \\ 2u & 2v & 2w \end{vmatrix}$$

$$24. \begin{vmatrix} 1 & 2 & 3 \\ 2x & 2y & 2z \\ u-1 & v-2 & w-3 \end{vmatrix}$$