NAME Key DATE PERIOD

Chapter 3 Practice Test *(continued)*

A printing company sells small packages of personalized stationery for $7 each, medium packages for $12 each, and large packages for $15 each. Yesterday, the company sold 9 packages of stationery, collecting a total of $86. Three times as many medium packages were sold as large packages.

11. Let s represent the number of small packages, m the number of medium packages, and ℓ, the number of large packages. Write a system of three equations that represents the number of packages sold.

12. Find the number of each size package sold.

For Questions 13-16, use the matrices to find the following.

$P = \begin{vmatrix} 4 & 1 \\ 2 & 0 \end{vmatrix}$ $Q = \begin{vmatrix} 1 & 6 \\ 0 & 2 \end{vmatrix}$ $R = \begin{vmatrix} 0 & \frac{1}{2} \\ 1 & -2 \end{vmatrix}$ $S = \begin{vmatrix} 6 & -4 & 9 \\ 3 & -1 & -5 \end{vmatrix}$

13. the first row of $2P + 2R$
A [8 3] **B** [4 3] **C** [6 –4] **D** not possible

14. the first row of SP
F [12 –4 –20] **G** [–23 21] **H** [53 –27] **J** not possible

15. the inverse of matrix R
A P **B** Q **C** T **D** not possible

16. the determinant of Q
F 8 **G** 4 **H** 2 **J** 4

17. Evaluate $\begin{vmatrix} 2 & 0 & 1 \\ 3 & 1 & 2 \\ 1 & -2 & 5 \end{vmatrix}$ using diagonals.
A –2 **B** 7 **C** 11 **D** –1

18. Cramer's Rule is used to solve the system of equations $2m + 3n = 11$ and $3m - 5n = 6$. Which determinant represents the numerator for m?
F $\begin{vmatrix} 11 & 2 \\ 6 & 3 \end{vmatrix}$ **G** $\begin{vmatrix} 2 & 3 \\ 3 & -5 \end{vmatrix}$ **H** $\begin{vmatrix} 2 & 11 \\ 3 & 6 \end{vmatrix}$ **J** $\begin{vmatrix} 11 & 3 \\ 6 & -5 \end{vmatrix}$

19. Which product would be used to solve the matrix equation $\begin{vmatrix} 4 & 6 \\ 0 & 1 \end{vmatrix} \cdot \begin{vmatrix} m \\ n \end{vmatrix} = \begin{vmatrix} 4 \\ 0 \end{vmatrix}$ by using inverse matrices?
A $\begin{vmatrix} 4 & 6 \\ 0 & 1 \end{vmatrix} \cdot \begin{vmatrix} 4 \\ 0 \end{vmatrix}$ **B** $\frac{1}{4}\begin{vmatrix} 1 & -6 \\ 0 & 4 \end{vmatrix} \cdot \begin{vmatrix} 4 \\ 0 \end{vmatrix}$ **C** $\frac{1}{4}\begin{vmatrix} 4 & 6 \\ 0 & 1 \end{vmatrix} \cdot \begin{vmatrix} 4 \\ 0 \end{vmatrix}$ **D** $4\begin{vmatrix} 1 & -6 \\ 0 & 4 \end{vmatrix} \cdot \begin{vmatrix} 4 \\ 0 \end{vmatrix}$

Bonus Find the value of $\begin{vmatrix} 0 & 1 & 0 \\ a & b & c \\ c & a & b \end{vmatrix}$ dunno...

11.	X
12.	X
13.	A
14.	D
15.	A
16.	H
17.	C
18.	J
19.	B
B:	?

NAME Key DATE PERIOD

Chapter 3 Practice Test

SCORE

Write the letter for the correct answer in the blank at the right of each question.

1. The system of equations $2y - 8x = -6$ and $y = 4x - 3$ has
A exactly one solution. **C** infinitely many solutions.
B no solution. **D** exactly two solutions.

1. C

Choose the correct description of each system of equations.
F consistent and independent **H** consistent and dependent
G inconsistent **J** ~~inconsistent and~~ dependent ← never true

2. $4x + 2y = -6$
$2x - y = 8$

3. $3x + y = 3$
$x - 2y = 4$

2. F

3. F

4. The ~~first~~ second equation of the system is multiplied by 5. By what number would you multiply the second equation to eliminate the y variable by adding?

$6x - 5y = 21$
$4x + 7y = 15$

A 7 **B** –7 **C** 2 **D** –2

4. A

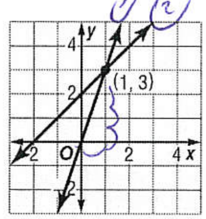
5. The first equation of the system is multiplied by 4. By what number would you multiply the second equation to eliminate the x variable by adding?

$2x + 5y = 16$
$8x - 4y = 10$

F 5 **G** –1 **H** 1 **J** –2

5. G

6. Which system of equations is graphed?



① $b = 0$
$m = \frac{3}{1}$

② $b = 1$
$m = \frac{1}{1}$

A $y - \frac{1}{3}x = 0$
$x - y = -2$

C $y - 3x = 0$
$x - y = 2$

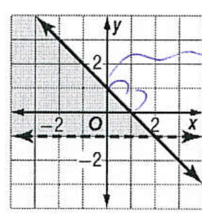
B $y - 3x = 0$
$x - y = -2$ → $y = 3x$, $y = x + 2$

$-x - y = -y$
$-y = -x - 2$

D $y - \frac{1}{3}x = 0$
$x - y = 2$

6. B

7. Which system of inequalities is graphed?



$m = \frac{1}{-1}$
-1

F $y > -1$
$y \geq -x + 1$

H $y > -1$
$y \leq -x + 1$

G $y \geq -1$
$y \geq -x + 1$

J $y > -1$
$y < -x + 1$

7. H

For questions 8-10, use the system of inequalities $y \geq 0$, $x \geq 0$, and $y \leq -2x + 4$.

8. Find the coordinates of the vertices of the feasible region.
A (0, 0), (–2, 0), (0, –4) **C** (0, 0), (4, 0), (0, 2)
B (0, 0), (2, 0), (0, 4) **D** (0, 0), (–4, 0), (0, 2)

8. H

9. Find the minimum value of $f(x, y) = 3x + y$ for the feasible region.
F 6 **G** 4 **H** 2 **J** 0

9. J

10. Find the maximum value of $f(x, y) = 3x + y$ for the feasible region.
A 2 **B** 4 **C** 6 **D** 12

10. C

① $2y - 8x = -6 \Rightarrow 2(4x-3) - 8x = -6$

substitute! $y = 4x - 3$

$8x - 6 - 8x = -6$

$-6 = -6$ true

infinitely many solutions

② $2x + 2y = -6$
$2x - y = 8$

$\Rightarrow$ $x \cdot -1$

$$\begin{aligned} 2x + 2y &= -6 \\ -2x + y &= -8 \\ \hline 3y &= -14 \end{aligned}$$

$\frac{3y}{3} = \frac{-14}{3}$

$y = \frac{-14}{3}$

$2x - \left(-\frac{14}{3}\right) = 8$

$2x + \frac{14}{3} = 8$

$\frac{2x}{2} = \frac{10}{3} \cdot \frac{1}{2}$

$x = \frac{10}{6}$

$\left(\frac{5}{3}, \frac{-14}{3}\right)$ one solution

$\Rightarrow$ consistent and independent

③ $3x + y = 3$ $\times 2$
$x - 2y = 4$

$$\Rightarrow \begin{aligned} 6x + 2y &= 6 \\ x - 2y &= 4 \\ \hline 7x &= 10 \end{aligned}$$

$\frac{7x}{7} = \frac{10}{7}$ $\quad \frac{21}{7}$

$x = \frac{10}{7}$

$3\left(\frac{10}{7}\right) + y = 3$

$\frac{30}{7} + y = 3$

$y = -9/7$

$\left(\frac{10}{7}, -\frac{9}{7}\right)$

one solution

$\rightarrow$ consistent and independent

(4)

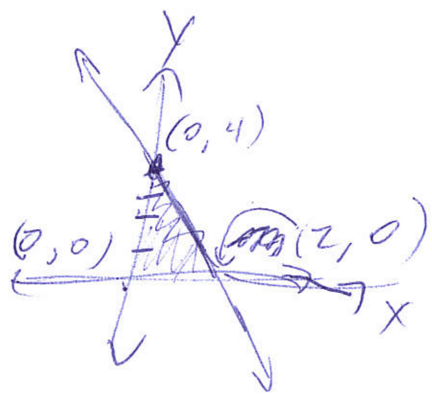
$$\begin{aligned} 6x - 5y &= 21 \\ 4x + 1y &= 15 \end{aligned} \Rightarrow \begin{matrix} \times 7 \\ \times 5 \end{matrix} \quad \begin{aligned} 42x - 35y &= 147 \\ 20x + 35y &= 75 \end{aligned}$$

(5)

$$\begin{aligned} 2x + 5y &= 16 \\ 8x - 4y &= 10 \end{aligned} \Rightarrow \begin{matrix} \times 4 \\ \times -1 \end{matrix} \quad \begin{aligned} 8x + 20y &= 64 \\ -8x + 4y &= -10 \end{aligned}$$

$$24y = 54$$

(8)



(9) + (10)

$f(0,0) = 3(0) + (0) = 0$ Min

$f(2,0) = 3(2) + (0) = 6$ Max

$f(0,4) = 3(0) + (4) = 4$

(11) + (12) skip!

13

$2P + 2R$

$$2\begin{vmatrix} 4 & 1 \\ 2 & 0 \end{vmatrix} + 2\begin{vmatrix} 0 & \frac{1}{2} \\ 1 & -2 \end{vmatrix}$$

1st row

$$\begin{vmatrix} 8 & 2 \\ 4 & 0 \end{vmatrix} + \begin{vmatrix} 0 & 1 \\ 2 & -4 \end{vmatrix} = \begin{vmatrix} 8 & 3 \\ 6 & -4 \end{vmatrix}$$

14

$5P$

$$\begin{vmatrix} 6 & -4 & 9 \\ 3 & -1 & -5 \end{vmatrix} \cdot \begin{vmatrix} 4 & 1 \\ 2 & 0 \\ ? & \end{vmatrix}$$ Not possible

15

Inverse

$$R = \begin{vmatrix} 0 & \frac{1}{2} \\ 1 & -2 \end{vmatrix} \qquad \frac{1}{|R|}\begin{vmatrix} -2 & -\frac{1}{2} \\ -1 & 0 \end{vmatrix}$$

$$|R| = (-2)(0) - (-1)(-\tfrac{1}{2}) = -\tfrac{1}{2}$$

$$= \frac{1}{-\frac{1}{2}}\begin{vmatrix} -2 & -\frac{1}{2} \\ -1 & 0 \end{vmatrix} = -2\begin{vmatrix} -2 & -\frac{1}{2} \\ -1 & 0 \end{vmatrix} = \begin{vmatrix} 4 & 1 \\ 2 & 0 \end{vmatrix}$$

$$= P$$

(16) $|Q| = \begin{vmatrix} 1 & 6 \\ 0 & 2 \end{vmatrix} = (1)(2) - (0)(6)$

$= 2 - 0 = 2$

(17) $\left|\begin{matrix} 2 & 0 & 1 \\ 3 & 1 & 2 \\ 1 & -2 & 5 \end{matrix}\right|\begin{matrix} 2 & 0 \\ 3 & 1 \\ 1 & -2 \end{matrix}$

$2 \times 1 \times 5 = 10$
$0 \times 2 \times 1 = 0$
$1 \times 3 \times -2 = -6$
$\cancel{3}\ 4$

$= 1$
$= -8$
$= 0$
-7

$4 - (-7) = 11$

(18) $2m + 3n = 11$
$3m - 5n = 6$

$$m = \frac{\begin{vmatrix} 11 & 3 \\ 6 & -5 \end{vmatrix}}{\begin{vmatrix} 2 & 3 \\ 3 & -5 \end{vmatrix}}$$

(19) $\begin{vmatrix} 4 & 6 \\ 0 & 1 \end{vmatrix}\begin{vmatrix} m \\ n \end{vmatrix} = \begin{vmatrix} 4 \\ 0 \end{vmatrix}$

inverse of matrix

$= \frac{1}{(4)(1) - (0)(6)} \begin{vmatrix} 4 & -6 \\ 0 & 1 \end{vmatrix}$

$= \frac{1}{4} \begin{vmatrix} 1 & -6 \\ 0 & 4 \end{vmatrix}$ ← multiply both sides w/ this!

$\frac{1}{4}\begin{vmatrix} 1 & -6 \\ 0 & 4 \end{vmatrix}\begin{vmatrix} 4 & 6 \\ 0 & 1 \end{vmatrix}\begin{vmatrix} m \\ n \end{vmatrix} = \begin{vmatrix} 4 \\ 0 \end{vmatrix}\frac{1}{4}\begin{vmatrix} 1 & -6 \\ 0 & 4 \end{vmatrix}\begin{vmatrix} 4 \\ 0 \end{vmatrix}$

$\begin{vmatrix} m \\ n \end{vmatrix} = \frac{1}{4}\begin{vmatrix} 1 & -6 \\ 0 & 4 \end{vmatrix}\begin{vmatrix} 4 \\ 0 \end{vmatrix}$