Revision Worksheet

Grade 10 Advanced Mathematics (2019-2020)
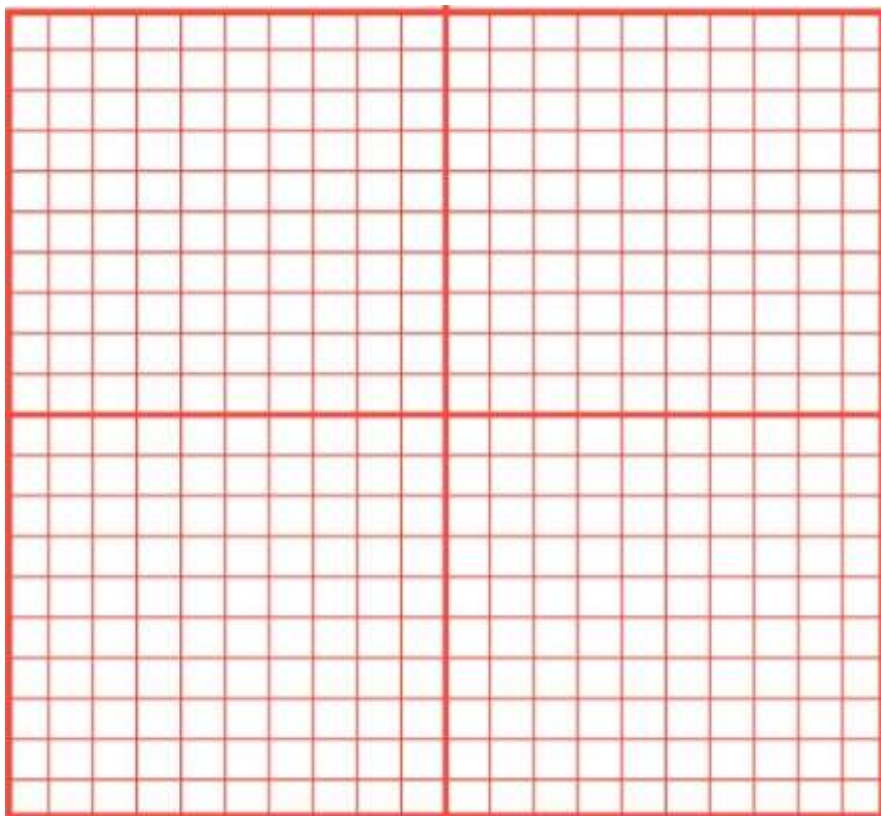
Chapter 1 – Linear Systems and Matrices

Instructions: Read all questions carefully. Answer all questions.

Chapter 1.1

1) Solve the system of equations by graphing.
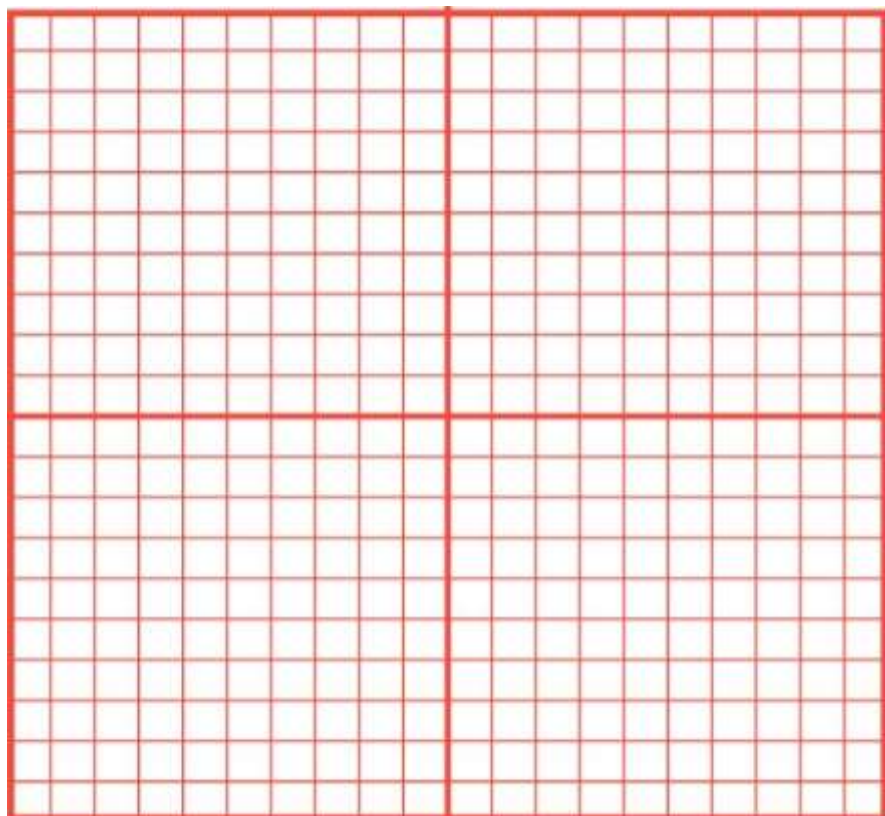
$$2x - y = -1$$
$$2y + 5x = -16$$

2) Solve the system of equations by graphing.

$$x + \frac{8}{3}y = 12$$
$$\frac{1}{2}x + \frac{4}{3}y = 6$$

3) Solve each system of equations by using either using substitution or elimination.

a) $a - 3b = -22$

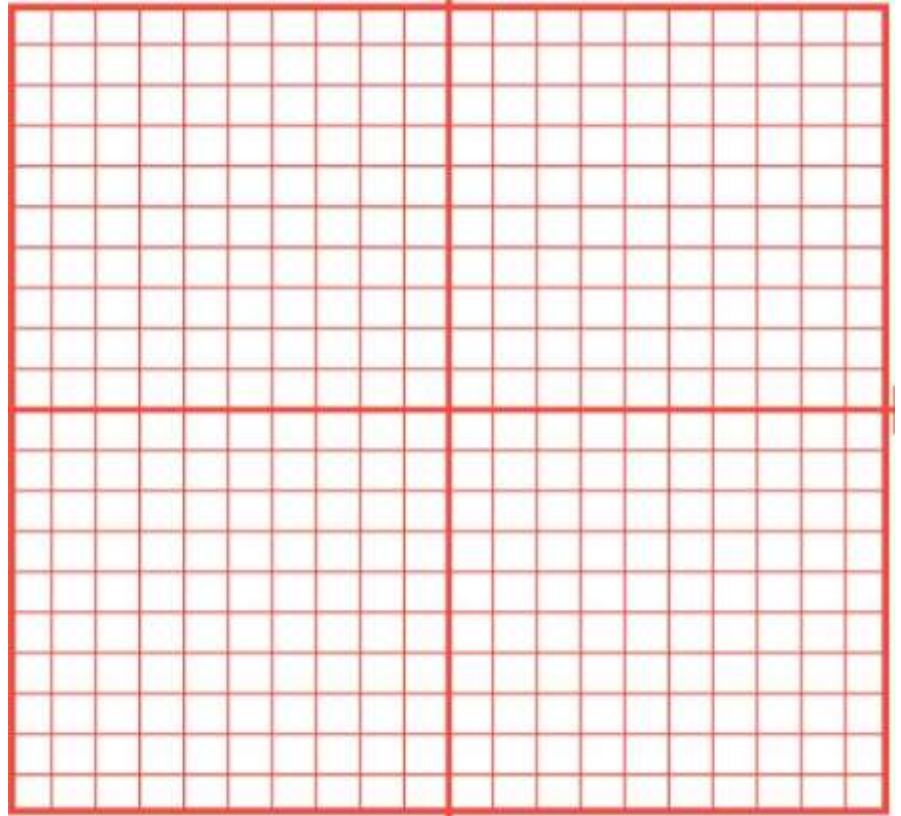$4a + 2b = -4$

b) $6x - 4y = 30$

$12x + 5y = -18$

4) Hidaya has AED 10 coupon and a 15% discount coupon for her favourite store. The store has a policy that only one coupon may be used per purchase. When is it best for Hidaya to use the AED 10 coupon and when is it best for her to use the 15% discount coupon?

5) Solve the system of inequalities by graphing.
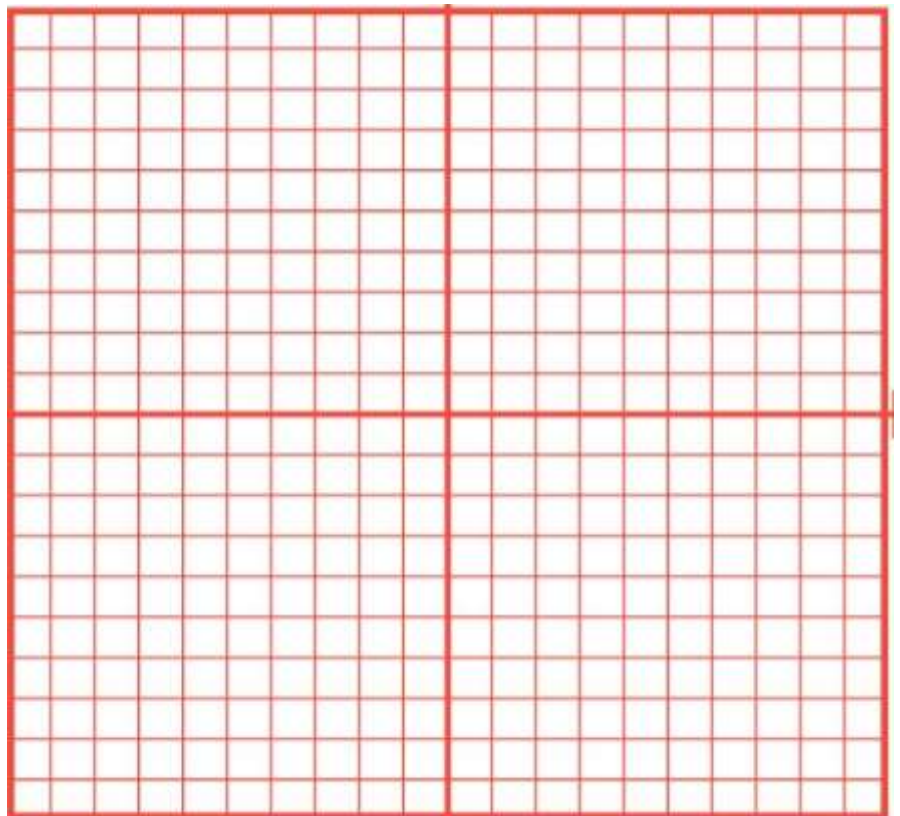
$$y > 3x - 5$$
$$y \leq 4$$

6) Solve the system of inequalities by graphing.

$$5y < 2x + 10$$
$$y - 4x > 8$$

7) Hessa wants to bake cookies and cupcakes for a bake sale. She can bake 15 cookies at a time and 12 cupcakes at a time. She needs to make at least 120 baked goods, but no more than 360, and she wants to have at least three times as many cookies as cupcakes. What combination of batches of each could Hessa make?

Chapter 1.3

8) The manager of travel agency is printing brochures and fliers to advertise special discounts on vacation spots during the summer months. Each brochure costs AED 0.08 to print, and each flier costs AED 0.04 to print. A brochure requires 3 pages and a flier requires 2 pages. The manager does not want to use more than 600 pages and she needs at least 50 brochures and 150 fliers. How many of each should she print to minimize the cost?

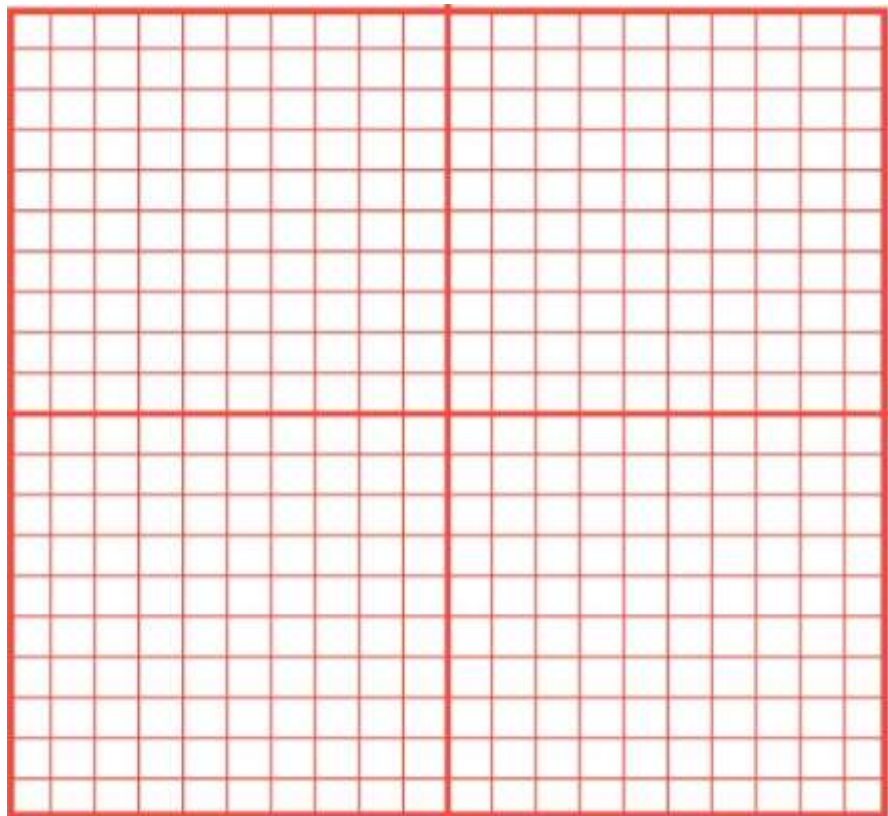**9)** Graph the system of inequalities. Name the coordinates of the vertices of the feasible region. Find the maximum and minimum values of the given function for this region.

$3x + 6y \leq 36$

$2y + 12 \geq 3x$

$x \geq -8$

f(x, y) = 10x − 6y

Chapter 1.4

10) Solve the system of equations.

$$-5x + y - 4z = 60$$
$$2x + 4y + 3z = -12$$
$$6x - 3y - 2z = -52$$

11) Nabila downloaded some television shows. A sitcom uses 0.3 GB of memory, a drama 0.6 GB and a talk show 0.6 GB. She downloaded 7 programs totaling 3.6 GB. There were twice as many episodes of the drama as the sitcom. A) Write a system of equations for the number of episodes of each type of show. B) How many episodes of each show did she download?

Chapter 1.5

12) What type of a matrix is the following matrix:

$$\begin{bmatrix} 2 & 9 & 3 \\ 4 & 8 & 1 \\ 7 & 24 & 5 \end{bmatrix}$$

a) Row matrix **b)** Column matrix

c) Square matrix **d)** Zero matrix

13) What type of a matrix is the following matrix:

$$\begin{bmatrix} 1 & 8 & 3 \end{bmatrix}$$

a) Row matrix **b)** Zero matrix

c) Square matrix **d)** Identity matrix

14) What type of a matrix is the following matrix:

$$\begin{bmatrix} 4 \\ 7 \\ 2 \end{bmatrix}$$

a) Row matrix

b) Column matrix

c) Zero Matrix

d) Identity matrix

15) What type of a matrix is the following matrix:

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

a) Row matrix

b) Column matrix

c) Zero Matrix

d) Identity matrix

16)

$$A = \begin{bmatrix} 3 & 1 & 6 \\ 0 & 7 & 2 \end{bmatrix} \qquad\qquad B = \begin{bmatrix} 3 & 1 & 6 \\ 0 & 7 & 2 \end{bmatrix}$$

$$C = \begin{bmatrix} 3 & 1 \\ 0 & 6 \\ 7 & 2 \end{bmatrix} \qquad\qquad D = \begin{bmatrix} 3 & 1 & 0 \\ 6 & 7 & 2 \end{bmatrix}$$

a) Are the matrices A and B equal? Why?

b) Are the matrices C and D equal? Why?

17) State the dimensions of matrix A:

$$A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 12 & 3 & 4 & 1 \\ 13 & 14 & 1 & 2 \end{bmatrix}$$

a) 2×3

b) 3×2

c) 3×4

d) 4×3

18) Given that the following matrices are equal, find the values of x, y and z.

$$\begin{bmatrix} x+3 & -1 \\ 4 & 5 \end{bmatrix} = \begin{bmatrix} 6 & y \\ z-3 & 5 \end{bmatrix}$$

Chapter 1.6

19) Perform the indicated operations. If the matrix does not exist write impossible.

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

20) Perform the indicated operations. If the matrix does not exist write impossible.

$$-5\left(\begin{bmatrix} 0 & -2 & 5 \end{bmatrix} + \begin{bmatrix} 2 & 0 & 2 \end{bmatrix}\right)$$

21) Find

$$\begin{bmatrix} 2 & 6 \\ -6 & 4 \end{bmatrix} \cdot \left(\begin{bmatrix} 5 & 3 \\ -6 & 2 \end{bmatrix} + \begin{bmatrix} 1 & 2 \\ 2 & 0 \end{bmatrix}\right)$$

Find each product.

22)
$$\begin{bmatrix} 6 \\ -3 \end{bmatrix} \cdot \begin{bmatrix} -5 & 4 \end{bmatrix}$$

23)
$$\begin{bmatrix} 0 & 5 \\ -3 & 1 \\ -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} -4 & 4 \\ -2 & -4 \end{bmatrix}$$

24)
$$\begin{bmatrix} -2 & -6 \\ -4 & 3 \\ 5 & 0 \\ 4 & -6 \end{bmatrix} \cdot \begin{bmatrix} 2 & -2 & 2 \\ -2 & 0 & -3 \end{bmatrix}$$

Chapter 1.8

Find the value of each determinant.

25)
$$\begin{vmatrix} 5 & 3 & 3 \\ -4 & -5 & 1 \\ 5 & 3 & 0 \end{vmatrix}$$

26)
$$\begin{vmatrix} 8 & -6 \\ -10 & 9 \end{vmatrix}$$

Use Cramer's Rule to solve each system of equations.

27) $-x + 5y = 2$
$x - 2y = -2$

28) $-2x - 5y + 4z = 21$
$-5x - 5y + z = 21$
$-4y - 4z = 8$

29) Mr.Osama's art class took a bus trip to an art museum. The bus averaged 65 km per hour on the highway and 25 km per hour in the city. The art museum is 375 km away form the school, and it took the class 7 hours to get there. Use Cramer's Rule to find how many hours the bus was on the highway and how many hours it was driving in the city?

Chapter 1.9

Find the inverse of each matrix, if it exists.

30) $\begin{bmatrix} -9 & -9 \\ -2 & -2 \end{bmatrix}$

31) $\begin{bmatrix} 1 & -1 \\ -6 & -3 \end{bmatrix}$

Use a matrix equation to solve each system of equations.

32) $\begin{bmatrix} 3 & 1 \\ 5 & 3 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 3 \\ 6 \end{bmatrix}$

33) Solve using matrix equation.

$x + y = 4$

$-4x + y = 9$