SEKOLAH BUKIT SION – HIGH SCHOOL

CHAPTER TEST: LINEAR PROGRAMMING

NAME		DATE	
CLASS		TEACHER	**MR EMAN**

ANSWER ALL QUESTIONS. PROVIDE NECESSARY WORKING.

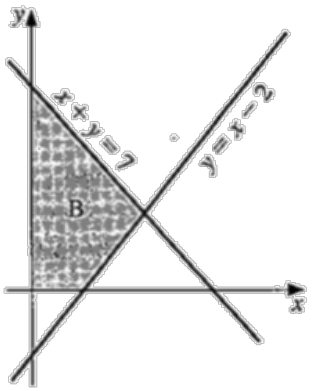
1. The shaded region **B** is formed by the lines as shown in the figure below.

Write down **three** points which are **NOT** found in **B.**

A (0,0) *D* (1, -1)

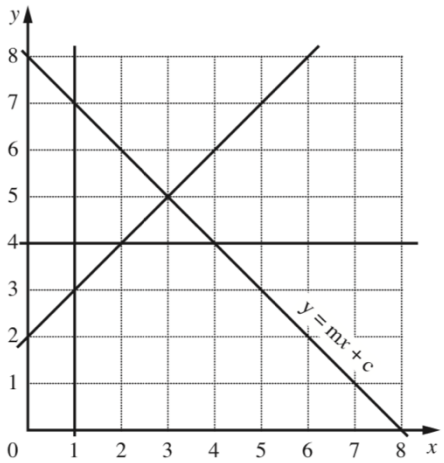
B (4, 4) *E* (4.5, 2)

C (2, 4.5) *F* (-1, 2)



Answer : ..... [2]

2.



(a) One of the lines in the diagram is labelled $y = mx + c$.
Find the values of m and c.

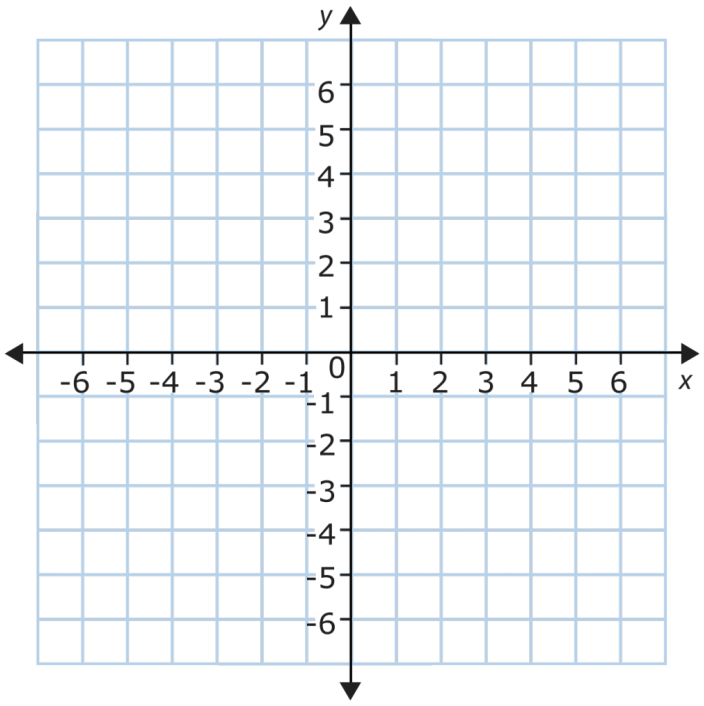
Answer: m = _____ c = _____ [2]

(b) After shading the **unwanted** regions on the diagram, mark (×) the **three** points with **integer coordinates** that satisfy the inequalities

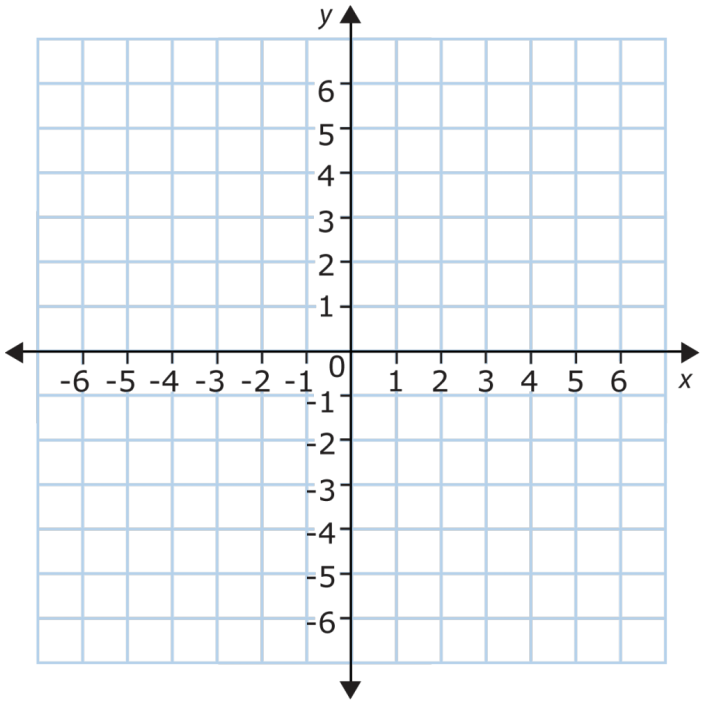
$x > 1$ $y \leq mx + c$ $y \geq x + 2$ and $y > 4$ [4]

3. Find the region where all the points satisfy each inequality.

(a) $y < \frac{3}{2}x - 4$ [3]

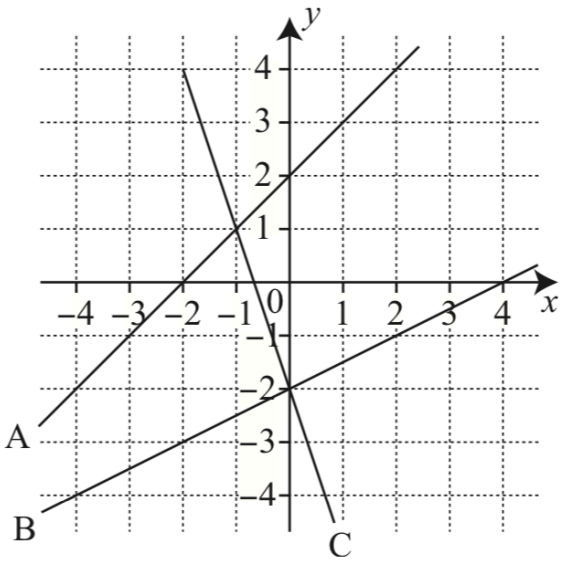


(b) $\frac{2}{3}x + \frac{1}{2}y \geq 1$ [3]



4.

(a) The **region R is enclosed** by the lines A, B, C and the y-axis.



(i) Label in the graph the region **R**. [2]

(ii) Write down 3 inequalities that describe **R**.

Answer : ..... [1]

..... [1]

..... [1]

..... [1]

(b) Using integer values of x and y only, find the point that gives the

(i) maximum value of $x + 2y$

Answer : ..... [2]

(ii) minimum value of $3x - y$

Answer : ..... [2]

5. **By shading the unwanted region**, use 2cm to represent 1 unit on both axes to show the region which satisfies all inequalities below. Mark the region of solutions with **R**.

$4x - 3y < 12$ $3x + 5y \geq 15$ $x \geq 2$ $1 < y < 5$ [4]

6. A taxi company has "super" taxis and "mini" taxis.
One morning, a group of 45 people need taxis.

(a) For this group the taxi company uses x "super" taxis and y "mini" taxis.
A "super" taxi can carry 5 passengers while a "mini" taxi can carry 3 passengers.
Write down an inequality to show this information.

Answer : …… [1]

(b) There are 12 available taxis.
Write down an inequality to show this information.

Answer : …… [1]

(c) The taxi company always uses at least 4 "mini' taxis.
Write down an inequality to show this information.

Answer : …… [1]

(d) By shading the unwanted regions. use a graph paper with 2 cm to represent 1 unit on both axes. Graph all three inequalities of **part (a), (b) and (c).** [4]

(e) The cost of renting a "super" taxi is \$20 while the cost of a "mini" taxi is \$10.
The company wants to provide the **cheapest** possible way for this group of people.
Find the **two ways** in which this can be done.

Answer : …… [2]

(f) The taxi company decides to use 11 taxis for this group.
(i) They charge \$30 for a "super" taxi and \$16 for a "mini" taxi.
Find the **two** possible **total** charges.

Answer : …… [2]

(ii) Find the **largest possible profit** the company can make, using 11 taxis.

Answer : …… [1]

7. A toy company makes two types of toys: toy soldiers and trains.

Each toy is produced in two stages, first it is constructed in a carpentry shop, and then it is sent to a finishing shop, where it is varnished, waxed and polished.

To make one toy soldier it takes 1 hour in the carpentry shop and 2 hours for finishing.

To make one train takes 1 hour in the carpentry shop and 1 hour for finishing.

There are 80 hours available each week in the carpentry shop and 100 hours for finishing.

Due to decreased demand for toy soldiers, the company plans to make and sell at most 40 toy soldiers; the number of trains is not restricted in any way.

(a) Construct 3 inequalities from the restrictions above.

Answer : ..... [1]

..... [1]

..... [1]

(b) By shading the unwanted regions. use a graph paper with 2 cm to represent 10 units on both axes. Graph all three inequalities of **part (a), (b) and (c).** [4]

(c) A toy soldier costs \$10 for raw materials and \$14 for labor; while a train costs \$9 for raw materials and \$10 for labor;

Each toy soldier is sold \$27 while each train is sold at \$21.
Assuming that all toys produced will be sold, find the number of toy soldiers and the respective number of trains that must be produced in order to get the **most profit.**

Answer : ..... [3]

**** END OF TEST ****