UNIT 21 :

Linear Programming

Level 1

[1] Which of the following inequalities represented the shaded region?

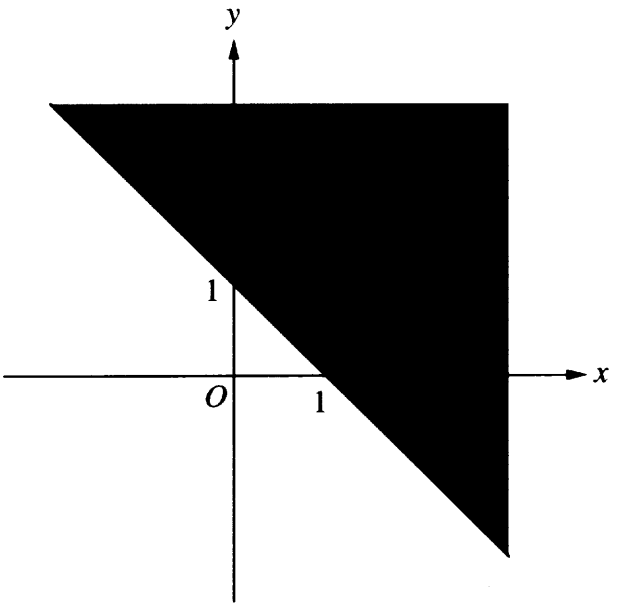
A $x+y \geq 1$

B $x+y>1$

C $x+y<1$

D $x-y>1$

E $x-y \leq 1$



[2] Which of the following inequalities represented the shaded region?

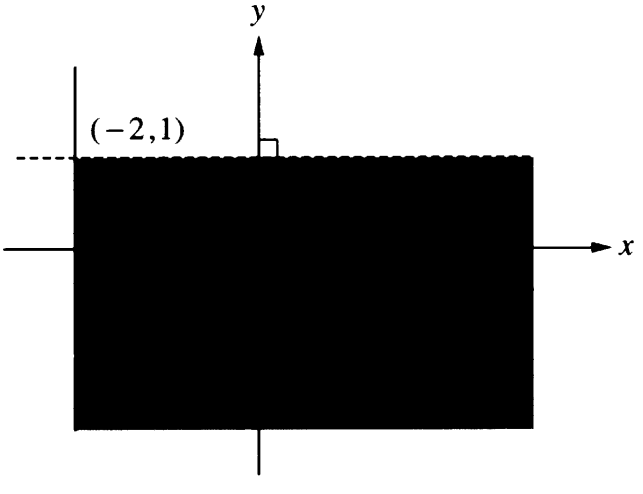
A $x>1,\ y>-2$

B $x \geq 1,\ y \geq -2$

C $x>-2,\ y \leq 1$

D $x \geq -2,\ y \leq 1$

E $x \geq -2,\ y<1$



[3] Find the maximum value of $x+y$, where (x,y) is any point in the shaded region (including the boundary).

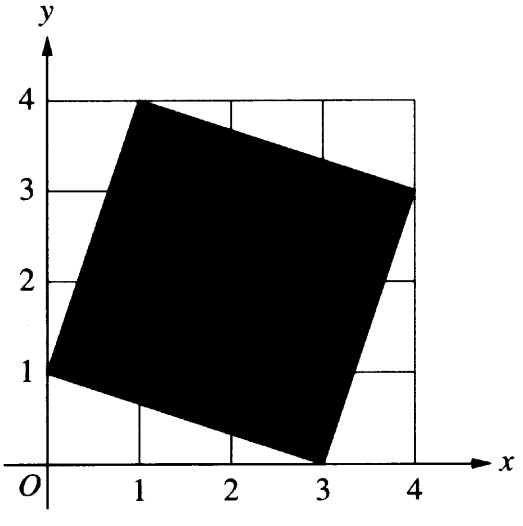
A 1

B 3

C 5

D 7

E 9



[4] In the figure, (x, y) is a point in the shaded region (including the boundary). Which of the following is/are true?

(1) $x \le -1$

(2) $y \le 1$

(3) $x - y \le 0$

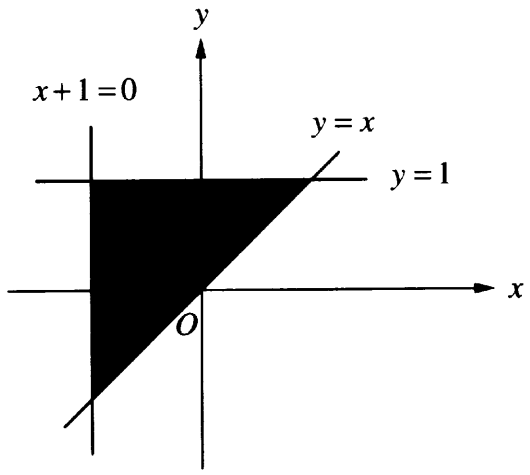
A (1) only

B (3) only

C (1) and (2) only

D (2) and (3) only

E (1), (2) and (3)



[5] Which of the following shaded regions represents the solution of the system

$$\begin{cases} x + y \le 2 \\ x - y + 1 \le 0 \\ x \ge 0,\ y \ge 0 \end{cases}?$$

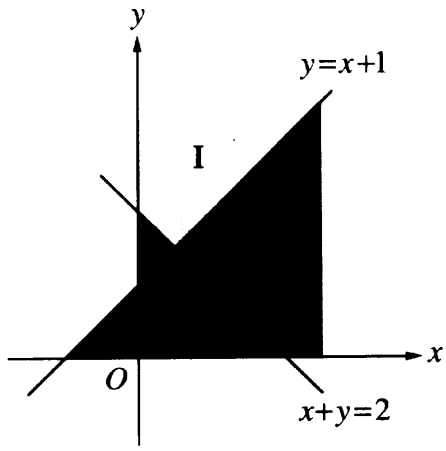
A I

B II

C III

D IV

E V



[6] In the figure, (x, y) is a point in the shaded region (including the boundary). The greatest value of $4x + 3y$ occurs at

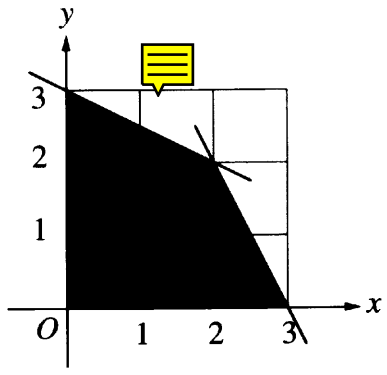
A $x = 0$

B $x = 1$

C $x = 2$

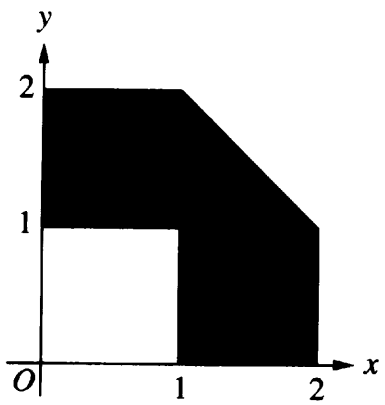
D $x = 3$

E Cannot be determined.

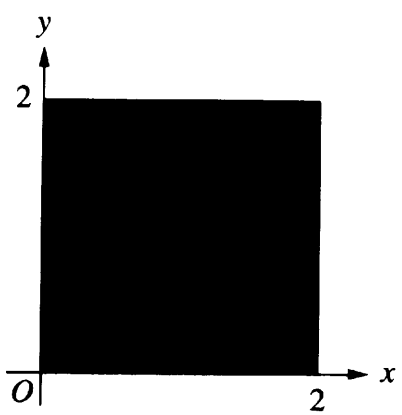


[7] Which of the following shaded regions represents the solution of $\begin{cases} x \geq 0,\ y \geq 0 \\ x \leq 2,\ y \leq 2 \\ x + y \leq 3 \end{cases}$?

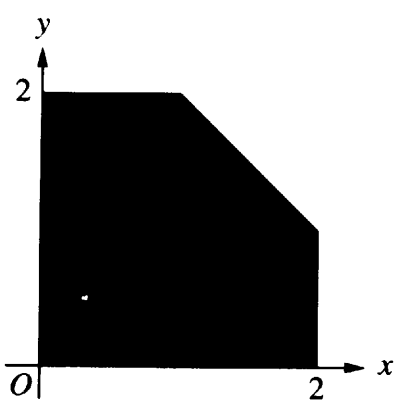
A



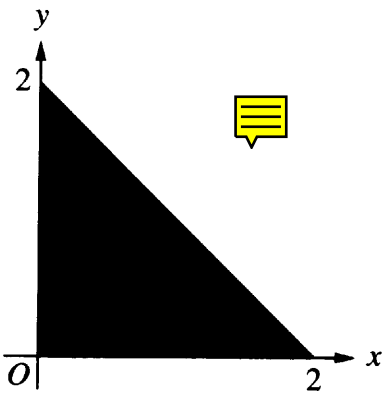
B



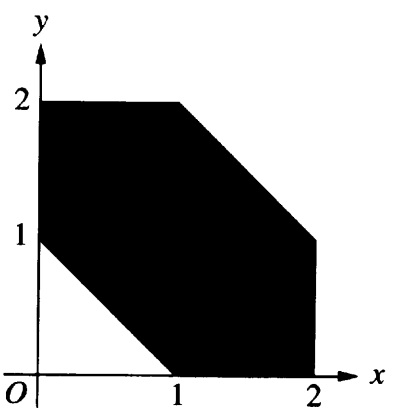
C



D



E



Level 2

[8] Which of the following systems of inequalities represents the shaded region?

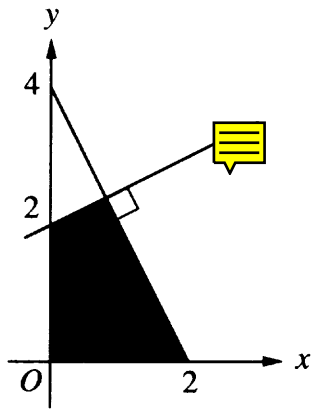
A $\begin{cases} x \geq 0,\ y \geq 0 \\ x-2y+4 \leq 0 \\ 2x+y-4 \leq 0 \end{cases}$

B $\begin{cases} x \geq 0,\ y \geq 0 \\ x-2y+4 \geq 0 \\ 2x+y-4 \leq 0 \end{cases}$

C $\begin{cases} x \geq 0,\ y \geq 0 \\ x-2y+4 \leq 0 \\ 2x+y-4 \geq 0 \end{cases}$

D $\begin{cases} x \geq 0,\ y \geq 0 \\ x-2y+4 \geq 0 \\ 2x+y-4 \geq 0 \end{cases}$

E $\begin{cases} x \geq 0,\ y \geq 0 \\ x-2y-4 \leq 0 \\ 2x+y-4 \leq 0 \end{cases}$



[9] How many points (x, y) (x, y being integers) satisfy the inequalities $x+2y \leq 5$, $3x+y \leq 5$, $x \geq 0$ and $y \geq 0$?

A 5 B 6 C 7 D 8 E 9

[10] Find the maximum value of $2x-y$ if (x, y) is a point in the shaded region (including the boundary), and x, y are integers.

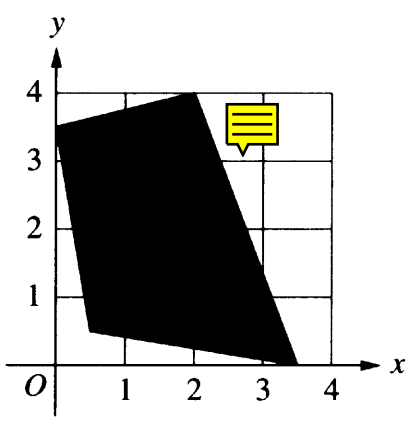
A 2

B 3

C 4

D 5

E 6



[11] (x, y) is a point in the region $PQRS$ (including the boundary). The least value of $x - 2y$ occurs at

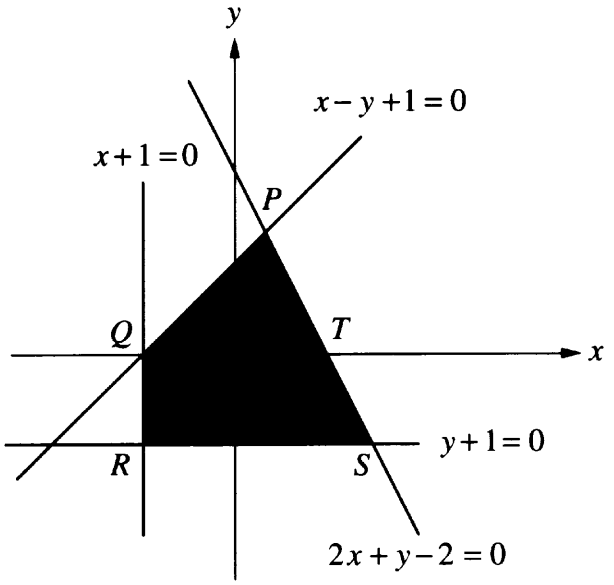
A P

B Q

C R

D S

E T



[12] The maximum value of $x + ky$ occurs at P, where (x, y) is a point in the shaded region (including the boundary). Find the range of values of k.

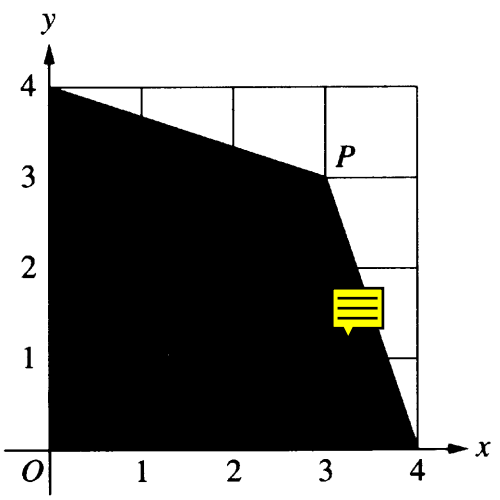
A $\frac{1}{4} < k < 4$

B $-4 < k < -\frac{1}{4}$

C $\frac{1}{3} < k < 3$

D $-3 < k < -\frac{1}{3}$

E $-\frac{3}{4} < k < \frac{4}{3}$



[13] A cinema has 200 seats (each person occupies a seat). For a particular show, each adult ticket costs \$100, each child ticket costs \$50. To ensure that the total income of the show is not less than \$15 000, which of the following is not a constraint on x (number of adults) and y (number of children)?

A x is an integer.

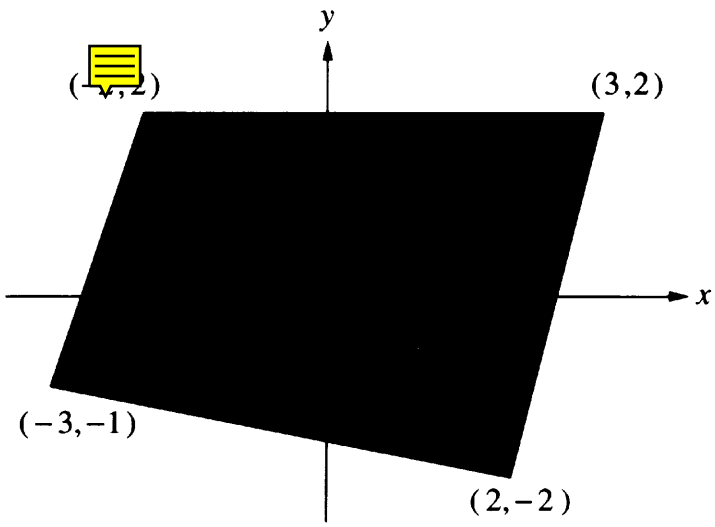
B $y \geq 0$

C $x + y \leq 200$

D $2x + y \geq 300$

E $x \geq y$

[14] Which of the following systems of inequalities represents the shaded region?



A $\begin{cases} y \le 2 \\ 3x - y + 8 \ge 0 \\ x + 5y + 8 \ge 0 \\ 4x - y - 10 \le 0 \end{cases}$

B $\begin{cases} y \le 2 \\ 3x - y + 8 \le 0 \\ x + 5y + 8 \le 0 \\ 4x - y - 10 \ge 0 \end{cases}$

C $\begin{cases} y \le 2 \\ 3x - y - 10 \le 0 \\ x + 5y + 8 \ge 0 \\ 4x - y - 10 \le 0 \end{cases}$

D $\begin{cases} y \le 2 \\ 3x - y - 10 \le 0 \\ x + 5y + 8 \le 0 \\ 4x - y - 10 \ge 0 \end{cases}$

E $\begin{cases} y \le 2 \\ 3x - y + 8 \ge 0 \\ x + 5y - 10 \le 0 \\ 4x - y + 6 \ge 0 \end{cases}$

[15] Which of the following inequalities can be taken away from $\begin{cases} x \ge 0,\ y \ge 0 \\ x + y \le 4 \\ x \le y - 1 \\ 2x \ge y - 1 \end{cases}$ so that the solution of the system remains unchanged?

A $x \ge 0$

B $x \ge 0,\ y \ge 0$

C $x + y \le 4$

D $x \le y - 1$

E $2x \ge y - 1$