Sketch the set of feasible solutions. Write “empty region” if there are no feasible solutions.

On the graph, give the coordinates of all extreme points.
For 6, 10: label the lines with their condition numbers

Make a table listing the values of the objective function on the extreme points. In the table, circle or shade the rows with the maximum or minimum value or values.

On the graph circle the extreme point (set of points) which gives this maximum or minimum value.

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5(6). Maximize \( z = 3x + y \) subject to:
1: \(-3x + y \geq 6\)
2: \(3x + 5y \leq 15\)
\(x \geq 0, \ y \geq 0\)

7(6). Maximize \( z = 2x + 5y \) subject to:
1: \(2x + y \geq 2\)
2: \(x + y \leq 8\)
3: \(x + y \geq 3\)
4: \(2x + y \leq 12\)
\(x \geq 0, \ y \geq 0\)

Note: one of the inequalities in problem 10 is superfluous.

The polygon should have 5 edges. Also draw the gradient vector.
Maximize \( w = 2x + 4y + 3z \) subject to:

\[
\begin{align*}
& x + y + z \leq 12 \\
& x + 3y + 3z \leq 24 \quad x \geq 0, \ y \geq 0, \ z \geq 0 \\
& 3x + 6y + 4z \leq 90
\end{align*}
\]
5(6). Maximize $z = 3x + y$ subject to:
1: $-3x + y \geq 6$
2: $3x + 5y \leq 12$
$x \geq 0, y \geq 0$

$\emptyset$

7(6). Maximize $z = 2x + 5y$ subject to:
1: $2x + y \geq 2$
2: $x + y \leq 8$
3: $x + y \geq 3$
4: $2x + y \leq 12$
$x \geq 0, y \geq 0$

9(6). Maximize $w = 2x + 4y + 3z$ subject to:
1: $x + y + z \leq 12$
2: $x + 3y + 3z \leq 24$
3: $3x + 6y + 4z \leq 90$
$x \geq 0, y \geq 0, z \geq 0$