# 6.4 - Optimization: Creating a Model

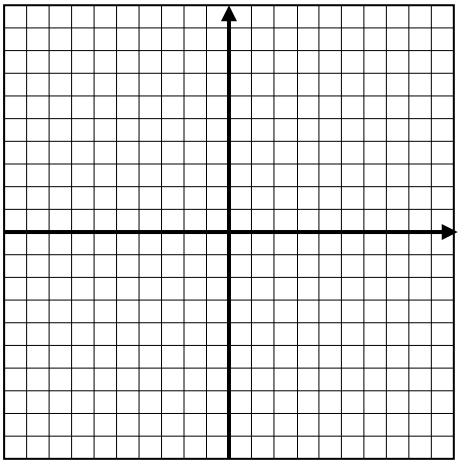
Technique for finding a maximum or minimum value of a function of several variables subject to a set of constraints

## Example 1:

Three teams are travelling to a basketball tournament in cars and minivans.

- Each team has no more than 2 coaches and 14 athletes.
- Each car can take 4 team members, and each minivan can take 6 team members.
- No more than 4 minivans and 12 cars are available.

The school wants to know the combinations or cars and minivans that will require the minimum and maximum number of vehicles. Create a model to represent this situation.



**Vocabulary:**

Optimization problem: _____

Constraint: _____

Objective Function: _____

Feasible region: _____

Minimum: _____

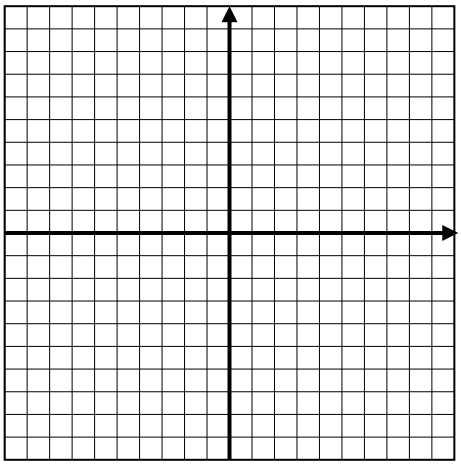
Maximum:_____

**Example 2**:

A refinery produces oil and gas.

- At least 2L of gas is produced for each litre of oil.
- The refinery can produce up to 9 million litres of oil and 6 million litres of gas each day.
- Gasoline is projected to sell of $1.10 per litre. Oil is projected to sell for $1.75 per litre.

The company needs to determine the daily combination of gas and oil that must be produced to maximize revenue. Create a model to represent the situation.



## Example 3: YOUR TURN!

A toy company manufactures two types of toy vehicles: racing cars and sport-utility vehicles.

- Because the supply of materials is limited, no more than 40 racing cars and 60 sport-utility vehicles can be made each day.
- However, the company can make 70 or more vehicles, in total, each day.
- It costs $8 to make a racing car and $12 to make a sport-utility vehicle.

The company wants to know what combinations will result in the minimum and maximum costs. Create a model to represent the situation.