**The Gardner – with extras (excellence practice)**

- complete this in your exercise book

Susan is doing some gardening for entry into a competition.

She has 120 hours over the next few weeks that she can spend gardening.

It takes 0.4 hours to plant a tree and 0.2 hours to plant a flower bed.

She only has 40kg of soil. It takes 0.1kg of soil to plant a tree and 0.1 kg of soil to plant a flower bed.

She only has 140 square meters of space for planting. A tree takes up 0.2 square meters and a flower bed takes 0.4 square meters.

The judges score for garden is based on the formula S = 10t + 8f , because they score 10 points for a well planted tree and 8 for a well planted garden.

Determine how many trees and how many flower beds Susan should plant to maximise the score from the judges.

1.Form equations

2. Draw graphs from equations - find out how high the scale should go by finding intercepts first

3. Shade the feasible region

4. Identify the coordinates of the optimal points

5. Calculate which is the maximum

and give the answer in context:

*“Susan should plant \_\_\_\_ trees and \_\_\_ flower beds to get a maximum score of \_\_\_\_”*

**Extras (changes for excellence type problems):**

*Consider each of these a separate modification (i.e. go back to the original equations each time and modify only one at a time. You should draw a new set of graphs for each modification.)*

1. Susan has installed a water feature into her garden which changes the amount of space she has for planting and she now only has 100 square meters. How does this affect how many trees and how many flower beds she should plant? How does this affect her overall score from the judges?

2. Susan has got behind in her school work and so she has less time to spend on gardening. Her available time has been reduced to 80 hours. How does this affect how many trees and how many flower beds she should plant? How does this affect her overall score from the judges?

3. Susan has been given 20kg more soil. How does this affect how many trees and how many flower beds she should plant? How does this affect her overall score from the judges?

4. The judges have modified their scoring for this year and Susan thinks that they will now score 12 points for a well planted tree and 8 for a well planted garden. How does this affect how many trees and how many flower beds she should plant? How does this affect her overall score from the judges?