<u>Ace Machine Company</u>

Ace Machine Company produces machine parts called rods and pillars for the construction industry.
They want to maximise the profit they make from making rods and pillars. Producing these parts requires drilling, grinding and polishing.

- Market conditions mean that the company can sell at most 60 rods and 70 pillars.
- Each rod requires half an hour of drilling and each pillar requires one and a half hours of drilling. The company has 105 drilling hours available per week.
- The company can provide 90 hours of grinding per week, with both rods and pillars each requiring 1 hour of grinding.
- 70 hours of polishing are available per week. Rods require 1 hour of polishing and pillars half an hour of polishing.
- Rods bring in a profit of $300 each. Pillars are more profitable, bringing in a profit of $600 each.

Task 1:
Using the information above, make a recommendation for the number of rods and pillars Ace Machine Company should produce in order to maximise profits.

Task 2:
The construction industry has indicated that rods are bought in the ratio of 4:3 to pillars. The company wants to continue to maximise profits but also wants to bring their production in line with what the industry requires. To do this Ace have decided to produce rods and pillars at a ratio of between 5:2 and 4:5.
How will this change the maximum profit and what number of rods and pillars would Ace Machine Company now produce.

Task 3:
Excess overseas production of **pillars** means that the profit of producing these is likely to reduce. It is likely that the profit of rods to pillars is likely to change from 1:2 to 2:1. Assume that the cost of producing rods stays the same. Write the new profit equation and calculate the new maximum profit for Ace Machine Company.