1. The path of a cannonball fired from level ground is modelled as \( y = -5x^2 + 40x \), where \( x \) is the horizontal distance travelled by the cannonball, and \( y \) is the height of the cannonball above the ground, in metres. Afterwards, the cannon is elevated to 45 m off the ground. Assuming nothing else is changed, what is the maximum height above ground the cannonball attains?

2. A circle of radius 5 has its centre at the origin. Another circle, which is four times smaller in area, has its centre located at \((5,0)\). Find the points of intersection of the two circles.

3. Solve the following for \( a \): \( \frac{a}{a+1} + \frac{a+1}{a} = \frac{61}{30} \)

4. The 10 people at a party shook hands with each other exactly once, before the eleventh person arrived. The eleventh person shook hands with some of these 10 people. After all was said and done, a total of 52 handshakes took place. How many people did the eleventh person shake his hand with?

5. Eight identical spheres, each of diameter 10, fit tightly into a cube of side length 20 so that each sphere just touches three of the faces of the cube. Determine the largest radius of a different sphere that will fit in the centre, so that it is just touching all eight spheres.