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$$W = 450(9.81) = 4414.50 \text{ N}$$

From a free-body diagram of the lower pulley, vertical equilibrium equation gives the tension

$$\uparrow \Sigma F_y = 0: \quad 2T_1 - 4414.50 = 0$$

$$T_1 = 2207.25 \text{ N}$$

Then, from a free-body diagram of the upper pulley, moment equilibrium equation gives the force F

$$\curvearrowright \Sigma M_{axle} = 0: \quad 100T_1 - 90T_1 - 100F = 0$$

$$F = 221 \text{ N} \dots\dots\dots \text{Ans.}$$

