

## STA260 Alternative Solution (Tutorial 6 Question 2)

### Question 3 (Exercise 9.30)

Let  $Y_1, Y_2, \dots, Y_n$  be independent random variables, each with pdf:

$$f(y) = \begin{cases} 3y^2 & 0 \leq y \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

Show that  $\bar{Y}$  converges in probability to some constant and state which exact constant.

See  $\nabla \rightarrow$  use WLLN!

Pick  $Y_1$  since  $n \geq 1$ .

$$\mathbb{E}(Y_1) = \int_0^1 y \cdot 3y^2 dy = \int_0^1 3y^3 dy = \left. \frac{3y^4}{4} \right|_0^1 = 3/4$$

Thus by WLLN  $\bar{Y} \xrightarrow{P} 3/4$