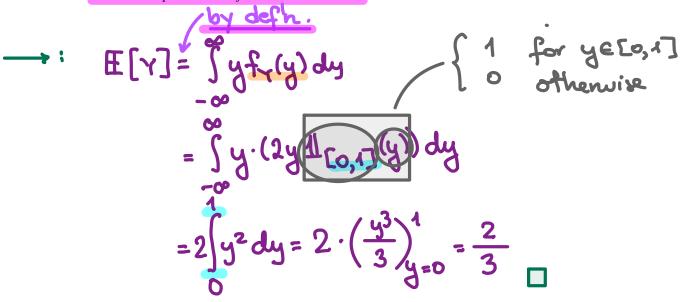
Expectation. In the discrete case: E[Y]:= Z y py(y) if it exists Defn. Let Y be a continuous random vaniable ω / pdf fr. We define the expected value of Y as $\mathbb{E}[Y] = \int y f_{Y}(y) dy$ oxists Task: Cauchy Distn.

Problem 5.3. Consider a continuous random variable Y whose probability density function is given by

$$f_Y(y) = 2y\mathbf{1}_{[0,1]}(y)$$

What is the expected value of this random variable?



Defin.
$$Var[Y] = E[(Y-\mu_{Y})^{2}]$$
 w/ $\mu_{Y} = E[Y]$
 $SD[X] = Var[Y]$
 $E[Y] = \frac{l+r}{2}$
 $Var[Y] = ?$
 $Var[Y] = ?$
 $Var[V] = \frac{Y-l}{r-l} \sim U(0,1)$
 $Var[V] = \frac{Y-l}{r-l} \sim U(0,1)$
 $Var[V] = \frac{Y-l}{r-l} \sim U(0,1)$
 $Var[V] = \frac{1}{2} = \frac{1}{4} = \frac{1}{42}$
 $Var[V] = \frac{1}{3} = \frac{1}{4} = \frac{1}{42}$
 $Var[Y] = Var[(r-l) \cup l]$
 $Var[Y] = Var[V] = \frac{1}{42}$
 $Var[Y] = Var[Y] = Var[Y] = \frac{1}{42}$

Example. You E(T), i.e., Y is exponential w/ parameter T $f_{r}(y) = \frac{1}{\tau} e^{-\frac{r}{\tau}} \cdot 1_{[0,\infty)}(y)$ $E[Y] = \int y f_{r}(y) dy$ = \(\frac{1}{\tau} \) \(\frac{9}{\tau} \) \(\fra = Joe tody $= T \int u e^{-u} du$ $= T \int u e^{-u} du$ $= \frac{\partial}{\partial u} = \frac{\partial u}{\partial v} = \frac{\partial u}{\partial u} =$