

$$E[V_1] = E\left[\sum_{i=1}^n a_i Y_i\right] \quad \times$$

$$= \sum_{i=1}^n a_i E[Y_i] \quad \times$$

$$= \sum_{i=1}^n a_i p_i$$

$$\int_{-\infty}^{\infty} \int_{-\infty}^{\infty} y_1 f_{Y_1, Y_2}(y_1, y_2) dy_1 dy_2$$

$$\int_{-\infty}^{\infty} \int_{-\infty}^{\infty} y_1 f_{Y_1}(y_1) f_{Y_2|Y_1}(y_2|y_1) dy_2 dy_1$$

$$= \int_{-\infty}^{\infty} y_1 f_{Y_1}(y_1) \underbrace{\left[\int_{-\infty}^{\infty} f_{Y_2|Y_1}(y_2|y_1) dy_2 \right]}_{=1} dy_1$$

$$E[g_1(Y_1)]$$

└

this is the only
random variable

⇒ use $f_{Y_1}(y_1)$
to compute the Exp

$$(a+b)^2 = a^2 + ab + ba + b^2$$

$$= a^2 + \underline{2ab} + b^2$$

$$(a+b+c)^2 = a^2 + b^2 + c^2 \\ + 2ab + 2ac + 2bc.$$

