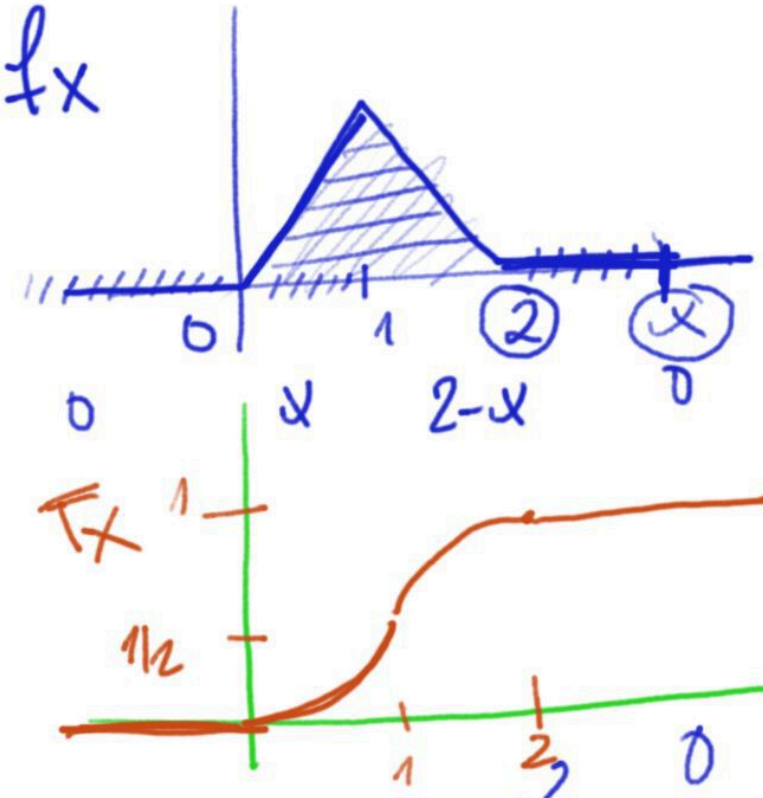
(4)

$$f_X(x) = \begin{cases} 0 & (-\infty, 0) \\ x & \langle 0, 1 \rangle \\ 2-x & \langle 1, 2 \rangle \\ 0 & \langle 2, \infty) \end{cases}$$



$$F_X(x) = \int_{-\infty}^{x} f_X(u)\,du$$

$$F_X(x) = \begin{cases} 0 & (-\infty, 0) \\ \frac{x^2}{2} & \langle 0, 1) \\ 2x - \frac{x^2}{2} - 1 & \langle 1, 2) \\ 1 & \langle 2, \infty) \end{cases}$$

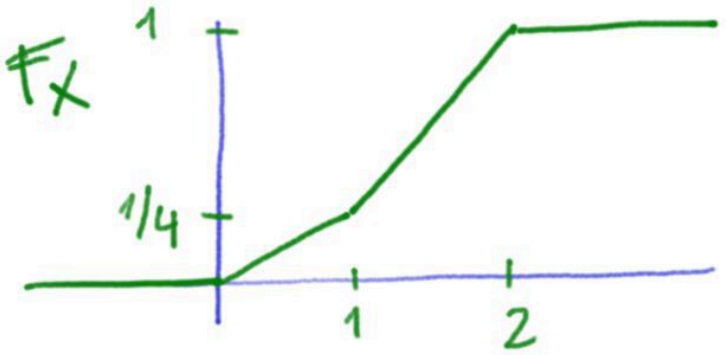
$$\int x\,dx = \frac{x^2}{2} + C$$

$$\int (2-x)\,dx = 2x - \frac{x^2}{2} + C$$

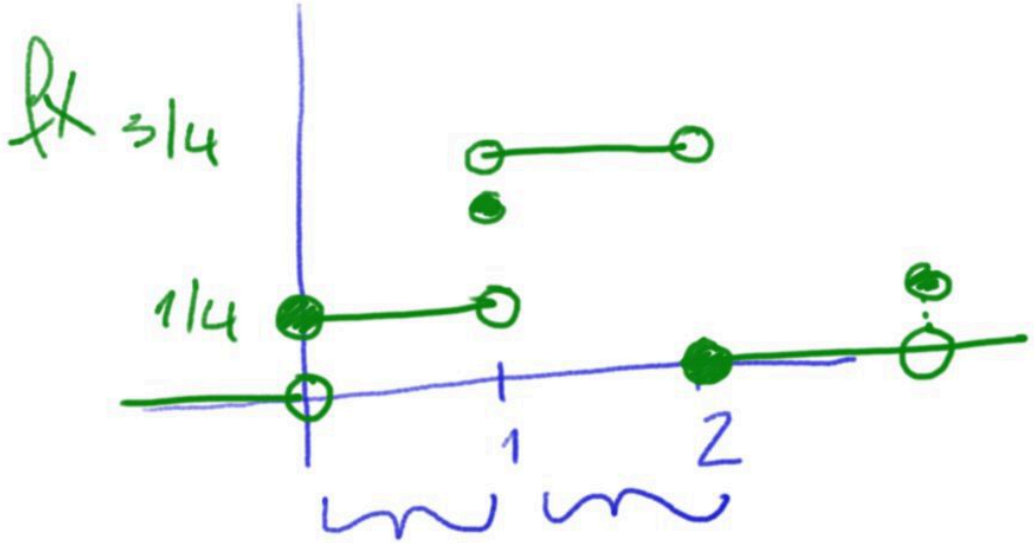
$$\frac{1^2}{2} = 2 - \frac{1^2}{2} + C = 2 - \frac{1}{2} - 1$$

⑤

$$F_X(x) = \begin{cases} 0 & (-\infty, 0) \\ x/4 & \langle 0, 1) \\ 3/4\,x - 1/2 & \langle 1, 2) \\ 1 & \langle 2, \infty) \end{cases}$$



$$f_X(x) = \begin{cases} 0 & (-\infty, 0) \\ 1/4 & \langle 0, 1 \rangle \\ 3/4 & (1, 2) \\ 0 & \langle 2, \infty) \end{cases}$$



$$X = \underset{(\frac{1}{4}, \frac{3}{4})}{Mix}(A, B)$$

⑥ 20×  & 5× 

$\check{C}$ $(\frac{4}{5})$ $\check{S}$ $(\frac{1}{5})$

$Z = \underset{(\frac{1}{5},\frac{4}{5})}{Mix}(\check{S}, \check{C})$

x	1	2	3	4	5	6
$P[\check{S}=x]$	1/6	1/6	1/6	1/6	1/6	1/6
$P[\check{C}=x]$	1/4	1/4	1/4	1/4	0	0
$P[Z=x]$	4/30	4/30	4/30	7/30	1/30	1/30 = 1

$$P[Z=x] = \frac{1}{5} P[\check{S}=x] + \frac{4}{5} P[\check{C}=x]$$

$$\frac{1}{5} \cdot \frac{1}{6} + \frac{4}{5} \cdot \frac{1}{4} = \frac{1}{30} + \frac{4}{20} = \frac{1}{30} + \frac{2}{10} = \frac{7}{30}$$

$$\frac{1}{5} \cdot \frac{1}{6} + \frac{4}{5} \cdot 0 = \frac{1}{30}$$

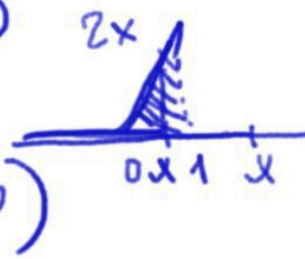
$$EZ = \frac{4}{30} \cdot 1 + \frac{4}{30} \cdot 2 + \frac{7}{30} \cdot 3 + \frac{4}{30} \cdot 4 + \frac{1}{30} 5 + \frac{1}{30} 6 = 2{,}4$$

$$E\check{S} = \frac{1+2+3+4+5+6}{6} = 3{,}5$$

(8) D:

x	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$
$P[D=x]$	$\frac{1}{8}$	$\frac{5}{8}$	$\frac{2}{8}$

S: $f_S(x) = \begin{cases} 0 & (-\infty, 0) \\ 2x & \langle 0, 1) \\ 0 & \langle 1, \infty) \end{cases}$



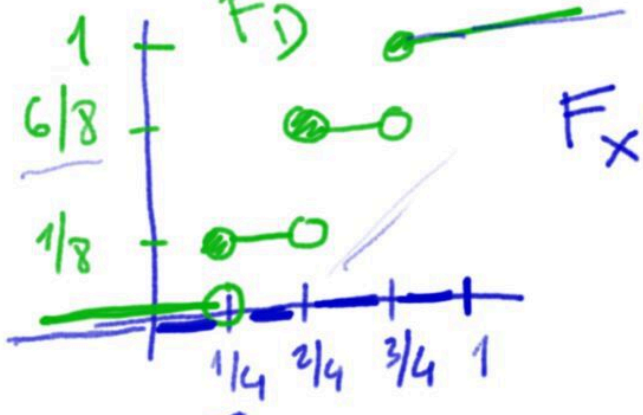
$X = Mix_{(70\%, 30\%)}(D, S)$

$F_D(x) = \begin{cases} 0 & (-\infty, \frac{1}{4}) \\ \frac{1}{8} & \langle \frac{1}{4}, \frac{2}{4}) \\ \frac{6}{8} & \langle \frac{2}{4}, \frac{3}{4}) \\ 1 & \langle \frac{3}{4}, \infty) \end{cases}$

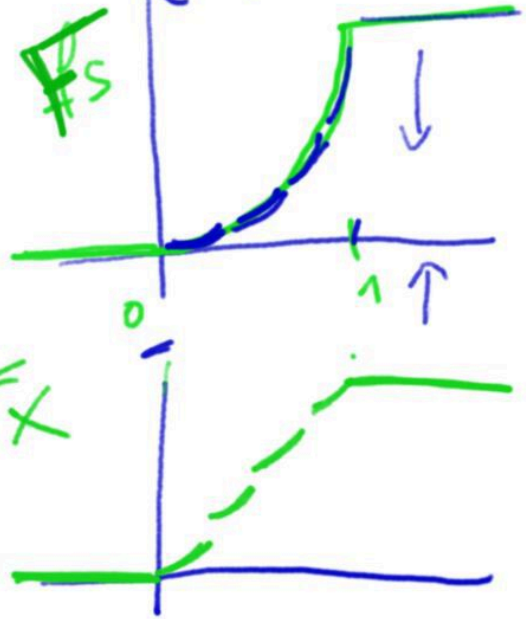
$F_X(x) = 0{,}7\,F_D(x) + 0{,}3\,F_S(x)$

$\int_0^x 2u\,du = [u^2]_0^x = x^2$

$F_S(x) = \begin{cases} 0 & (-\infty, 0) \\ x^2 & \langle 0, 1) \\ 1 & \langle 1, \infty) \end{cases}$

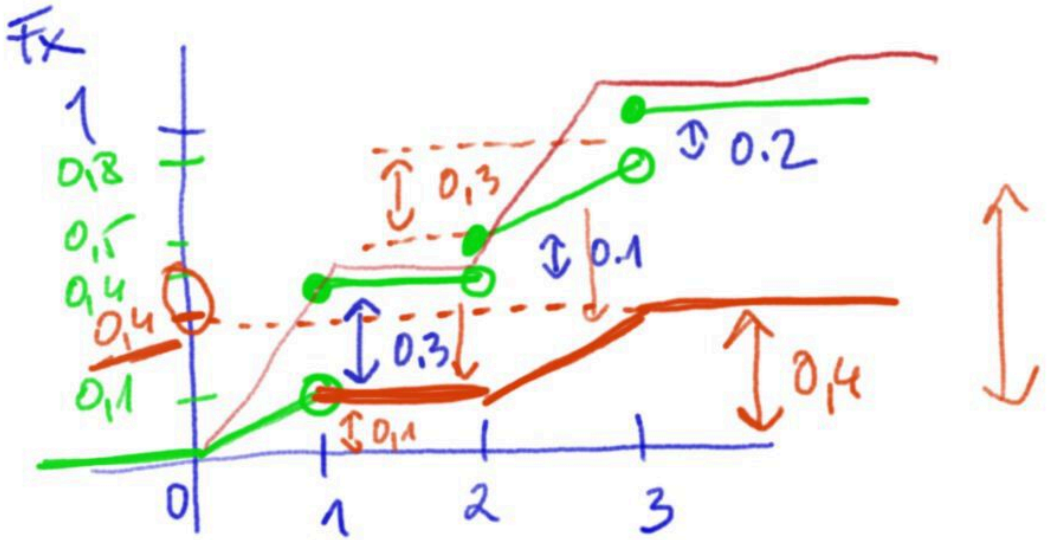


$F_X(x) = \begin{cases} 0 & (-\infty, 0) \\ 0{,}3x^2 & \langle 0, 1/4) \\ 0{,}3x^2 + 0{,}7 \cdot \frac{1}{8} & \langle 1/4, 2/4) \\ 0{,}3x^2 + 0{,}7 \cdot \frac{6}{8} & \langle 2/4, 3/4) \\ 0{,}3x^2 + 0{,}7 \cdot 1 & \langle 3/4, 1) \\ 1 & \langle 1, \infty) \end{cases}$



(9)

$$F_X(x) = \begin{cases} 0 & x \in (-\infty, 0) \\ 0.1x & \langle 0,1) \\ 0.4 - 0,3 & \langle 1,2) \\ 0.3x - 0.1 & \langle 2,3) \\ 1 & \langle 3,\infty) \end{cases}$$



$X = \text{Mix}_{(\alpha, 1-\alpha)}(D, S)$

$\alpha = 0.6$

x	1	2	3	
$P[D=x]$	$\frac{0,3}{0.6}$	$\frac{0.1}{0.6}$	$\frac{0.2}{0.6}$	$= \frac{0.6}{0.6}$
	1/2	1/6	1/3	

$$F_S(x) = \begin{cases} 0/0.4 = 0 & (-\infty, 0) \\ \frac{0,1x}{0.4} = \frac{x}{4} & \langle 0,1) \\ \frac{0,1}{0.4} = 0,4 = \frac{1}{4} & \langle 1,2) \\ \frac{0,3x - 0.5}{0.4} = \frac{3}{4}x - \frac{5}{4} & \langle 2,3) \\ \frac{0.4}{0.4} = 1 & \langle 3,\infty) \end{cases}$$