The following table shows the probability distribution of a discrete random variable ***X***.

X	-2	-1	0	1	3
P(X = x)	0.3	***a***	0.2	0.15	***b***

If ***X*** represents the return from a game. Find ***a*** and ***b*** if the game is **fair**.

We know that $\sum \boldsymbol{P} = \mathbf{1}$	
	$0.3 + a + 0.2 + 0.15 + b = 1$ $\boldsymbol{a + b = 0.35}$
A fair game means that **E(X) = 0**	
	$-2 \times 0.3 + (-1) \times a + 0 \times 0.2 + 1 \times 0.15 + 3 \times b = 0$ $-0.6 - a + 0.15 + 3b = 0$ $\boldsymbol{-a + 3b = 0.45}$
We can solve these two equations simultaneously	
$\boldsymbol{a + b =}$ $\boldsymbol{-a + 3b =}$	$\mathbf{0.35}$ $\mathbf{0.45}$
$\boldsymbol{4b =}$ $\boldsymbol{b =}$	$\mathbf{0.8}$ $\mathbf{0.2}$
$\boldsymbol{a =}$	$\mathbf{0.15}$