MITx: 6.041x Introduction to Probability - The Science of Uncertainty

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Exercise: Joint PMF calculation

(2/2 points)

The random variable V takes values in the set $\{0, 1\}$ and the random variable W takes values in the set $\{0, 1, 2\}$. Their joint PMF is of the form

$$p_{V,W}(v, w) = c \cdot (v + w),$$

where c is some constant, for v and w in their respective ranges, and is zero everywhere else.

a) Find the value of c.

$c =$ 1/9 **Answer:** 0.11111

b) Find $p_V(1)$.

$p_V(1) =$ 2/3 **Answer:** 0.66667

Answer:
a) The sum of the entries of the PMF is
$c \cdot (0+0) + c \cdot (0+1) + c \cdot (0+2) + c \cdot (1+0) + \ldots = 9c$. Since this sum must be equal to 1, we have $c = 1/9$.

b)

$$p_V(1) = \sum_{w=0}^{2} p_{V,W}(1, w) = p_{V,W}(1,0) + p_{V,W}(1,1) + p_{V,W}(1,2) = \frac{1}{9}(1+2+3) =$$

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