

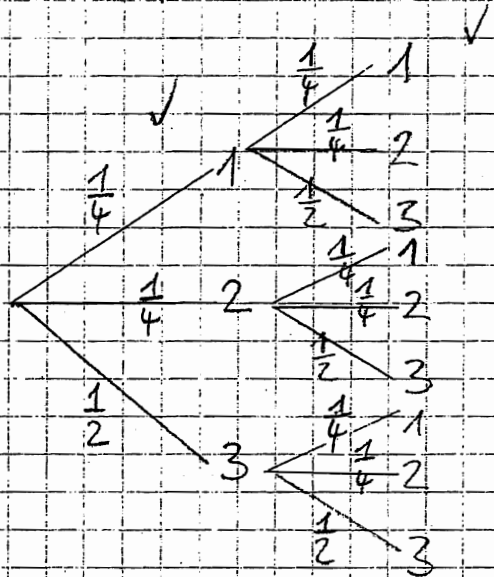
Lösung Stochastik / W. 12

A

1.1 $P(\{1\}) = \frac{1}{4}$ $P(\{2\}) = \frac{1}{4}$ $P(\{3\}) = \frac{1}{2}$ ✓

1

1.2



$P(1,1) = \frac{1}{16}$	2
$P(1,2) = \frac{1}{16}$	3
$P(1,3) = \frac{1}{8}$	4
$P(2,1) = \frac{1}{16}$	3
$P(2,2) = \frac{1}{16}$	4
$P(2,3) = \frac{1}{8}$	5
$P(3,1) = \frac{1}{8}$	4
$P(3,2) = \frac{1}{8}$	5
$P(3,3) = \frac{1}{4}$	6

6

$$P(X=2) = \frac{1}{16}$$

$$P(X=3) = \frac{1}{16} + \frac{1}{16} = \frac{2}{16}$$

$$P(X=4) = \frac{1}{8} + \frac{1}{16} + \frac{1}{8} = \frac{5}{16}$$

$$P(X=5) = \frac{1}{8} + \frac{1}{8} = \frac{4}{16}$$

$$P(X=6) = \frac{4}{16} = \frac{1}{4}$$

✓

1.3 $E(X) = \frac{1}{16} (2 + 6 + 20 + 20 + 24) = \frac{72}{16} = \frac{9}{2} = 4.5$ ✓

$$E(X^2) = \frac{1}{16} (4 + 18 + 80 + 100 + 144) = \frac{346}{16} = 21.625$$
 ✓

4

$$\text{Var}(X) = E(X^2) - \mu^2 = 21.625 - 4.5^2 = \frac{11}{8} = 1.375$$
 ✓

$$\sigma = \sqrt{1.375} \approx 1.1726$$
 ✓

1.4 $Y \hat{=}$ Gewinn des Spielers

$$E(Y) = \frac{1}{16} (-2 + 3 \cdot 2 - 4 \cdot 5 + 5 \cdot 4 - 6 \cdot 4) = \frac{-20}{16} = -1.25$$
 ✓

Spieler verliert im Durchschnitt 1,25 €

$$E(Y) \neq 0 \Rightarrow \text{nicht fair}$$
 ✓

4

5

$$2. a) \binom{12}{4} = 495 \checkmark$$

$$b) \binom{6}{1} \binom{6}{3} = 120 \checkmark$$

$$c) \binom{3}{3} \binom{3}{1} = 9 \checkmark$$