LÖSUNGEN

1a) $P(5) = \frac{1}{6}$

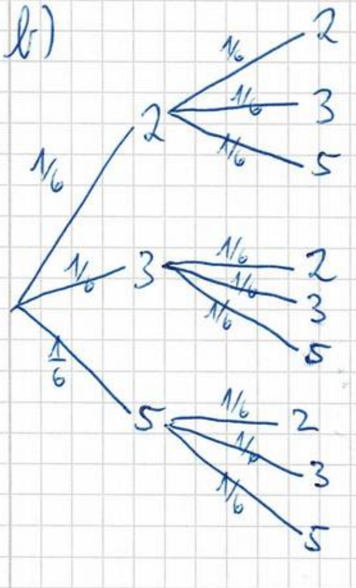
b) $P(\text{ungerade}) = \frac{3}{6} = \frac{1}{2}$

Ungerade Zahlen sind 1; 3 und 5

2a) $\xrightarrow{1/6} 1 \xrightarrow{1/6} 3$

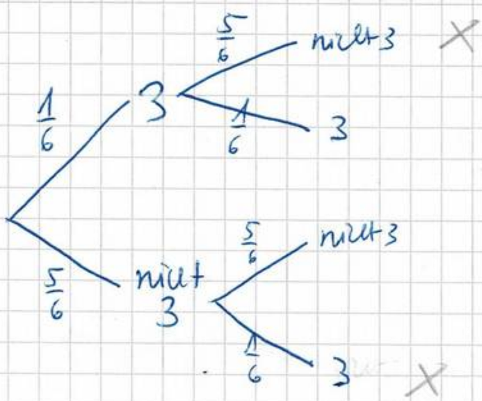
$P(1;3) = \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$

b)



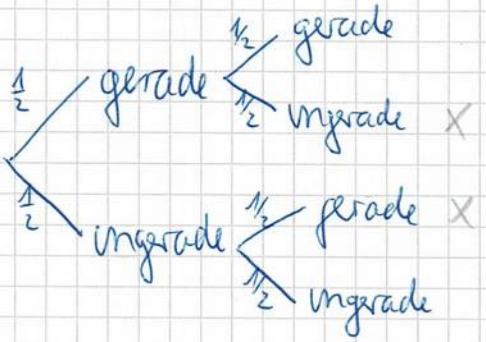
$P(\text{nur Primzahlen}) =$
$P(2;2) + P(2;3) + P(2;5)$
$+ P(3;2) + P(3;3) + P(3;5)$
$+ P(5;2) + P(5;3) + P(5;5)$
$= \frac{1}{6} \cdot \frac{1}{6} + \frac{1}{6} \cdot \frac{1}{6} + \dots + \frac{1}{6} \cdot \frac{1}{6}$
$= 9 \cdot \frac{1}{6} \cdot \frac{1}{6}$
$= \frac{9}{36}$
$= \frac{1}{4}$

c)



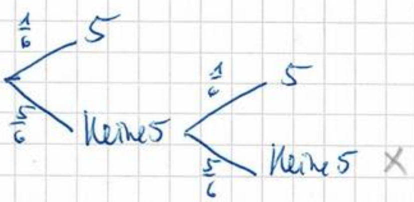
$$P(\text{genau 1-mal die 3}) = \frac{1}{6}\cdot\frac{5}{6} + \frac{5}{6}\cdot\frac{1}{6}$$
$$= \frac{5}{36} + \frac{5}{36}$$
$$= \frac{10}{36}$$
$$= \frac{5}{18}$$

d)

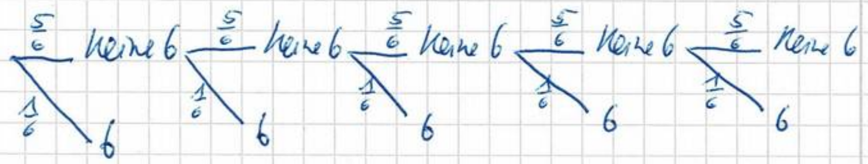


$$P(\text{genau 1-mal gerade}) = \frac{1}{2}\cdot\frac{1}{2} + \frac{1}{2}\cdot\frac{1}{2} = \frac{1}{4} + \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$$

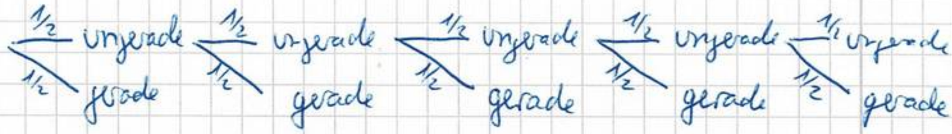
e)



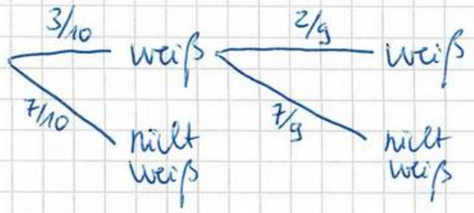
$$P(\text{keine } 5) = \frac{5}{6}\cdot\frac{5}{6} = \frac{25}{36}$$

3a) 

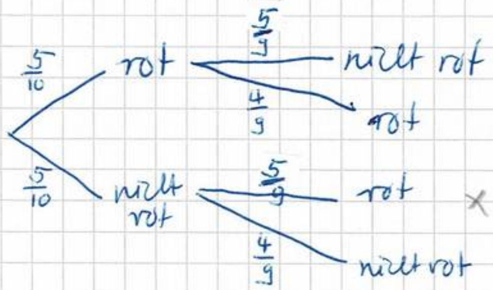
$P(\text{nie } 6) = \frac{5}{6} \cdot \frac{5}{6} \cdot \frac{5}{6} \cdot \frac{5}{6} \cdot \frac{5}{6} = \left(\frac{5}{6}\right)^5 = \frac{3125}{7776}$

b) 

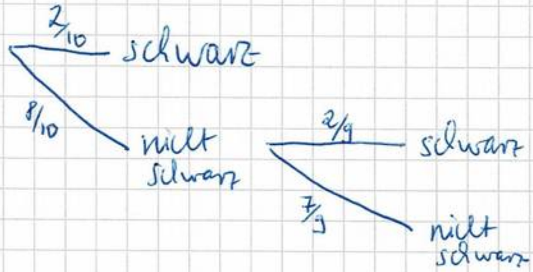
$P(\text{nie gerade}) = \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \left(\frac{1}{2}\right)^5 = \frac{1}{32}$

4a) 

$P(\text{beide weiß}) = \frac{3}{10} \cdot \frac{2}{9} = \frac{6}{90} = \frac{1}{15}$

b) 

$P(\text{genau eine rot}) = \frac{5}{10} \cdot \frac{5}{9} + \frac{5}{10} \cdot \frac{5}{9} = \frac{50}{90} = \frac{5}{9}$

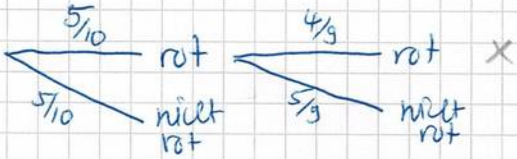
c) 

$P(\text{nie schwarz}) = \frac{8}{10} \cdot \frac{7}{9} = \frac{56}{90} = \frac{28}{45}$

d) $P(\text{genau eine rot}) = \frac{5}{9}$ (siehe Aufgabenteil b)

$P(\text{mindestens eine rot}) = P(\text{genau eine rot}) + P(\text{beide rot})$

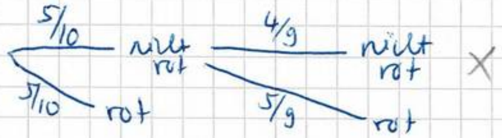
$P(\text{mindestens eine rot}) = \frac{5}{9} + P(\text{beide rot})$



$P(\text{beide rot}) = \frac{5}{10} \cdot \frac{4}{9} = \frac{20}{90} = \frac{2}{9}$

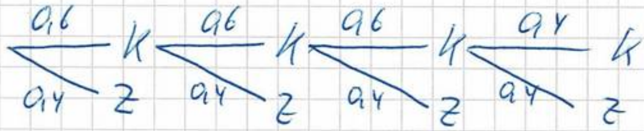
$\Rightarrow P(\text{mindestens eine rot}) = \frac{5}{9} + \frac{2}{9} = \frac{7}{9}$

e) $P(\text{beide rot}) = \frac{2}{9}$ (siehe Teil d)

f) 

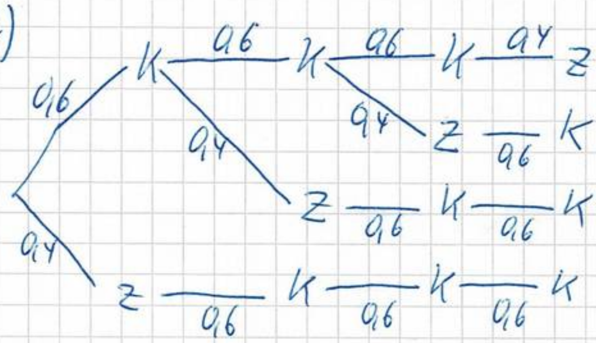
$P(\text{nie rot}) = \frac{5}{10} \cdot \frac{4}{9} = \frac{20}{90} = \frac{2}{9}$

5a)



$P(4\text{-mal } K) = 0{,}6 \cdot 0{,}6 \cdot 0{,}6 \cdot 0{,}6 = 0{,}6^4 = 0{,}1296$

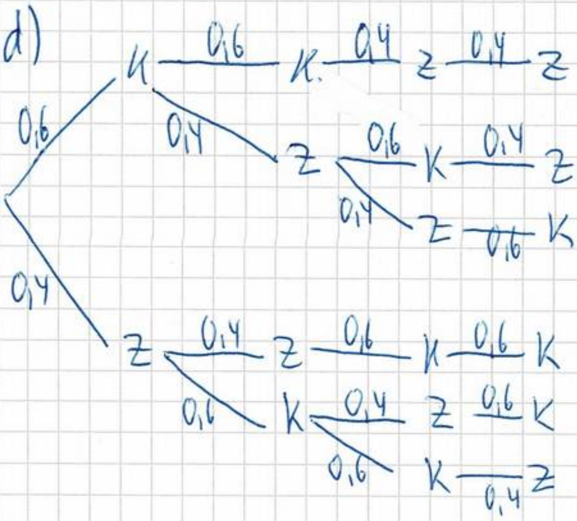
b)



$P(3\text{-mal } K) = 0{,}6 \cdot 0{,}6 \cdot 0{,}6 \cdot 0{,}4 + 0{,}6 \cdot 0{,}6 \cdot 0{,}4 \cdot 0{,}6$
$+ 0{,}6 \cdot 0{,}4 \cdot 0{,}6 \cdot 0{,}6 + 0{,}4 \cdot 0{,}6 \cdot 0{,}6 \cdot 0{,}6$
$= 4 \cdot 0{,}6^3 \cdot 0{,}4$
$= 0{,}3456$

c) $P(\text{mind. } 3\text{-mal } K) = P(4\text{-mal } K) + P(3\text{-mal } K)$
$= 0{,}1296 + 0{,}3456$
$= 0{,}4752$

d)

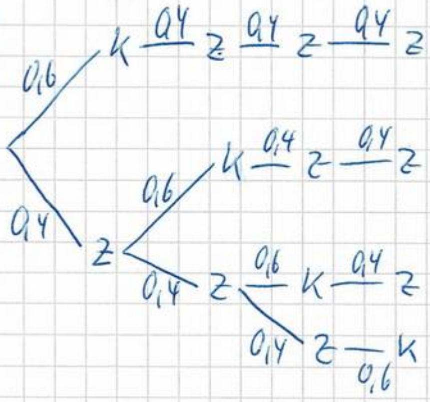


$P(2\text{-mal } K) =$
$0{,}6 \cdot 0{,}6 \cdot 0{,}4 \cdot 0{,}4 + 0{,}6 \cdot 0{,}4 \cdot 0{,}6 \cdot 0{,}4$
$+ 0{,}6 \cdot 0{,}4 \cdot 0{,}4 \cdot 0{,}6 + 0{,}4 \cdot 0{,}4 \cdot 0{,}6 \cdot 0{,}6$
$+ 0{,}4 \cdot 0{,}6 \cdot 0{,}4 \cdot 0{,}6 + 0{,}4 \cdot 0{,}6 \cdot 0{,}6 \cdot 0{,}4$
$= 6 \cdot 0{,}4^2 \cdot 0{,}6^2$
$= 0{,}3456$

e) $P(\text{mehr als 2-mal K}) = P(\text{3-mal K}) + P(\text{4-mal K})$

$= 0{,}3456 + 0{,}1296$

$= 0{,}4752$

f) 

$P(\text{1-mal K}) =$

$0{,}6 \cdot 0{,}4 \cdot 0{,}4 \cdot 0{,}4 + 0{,}4 \cdot 0{,}6 \cdot 0{,}4 \cdot 0{,}4$

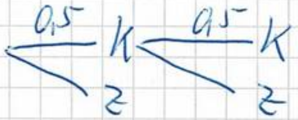
$+ 0{,}4 \cdot 0{,}4 \cdot 0{,}6 \cdot 0{,}4 + 0{,}4 \cdot 0{,}4 \cdot 0{,}4 \cdot 0{,}6$

$= 4 \cdot 0{,}6 \cdot 0{,}4^3$

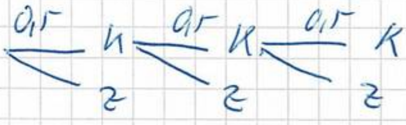
$= 0{,}1536$

g) $\xrightarrow{0{,}4} Z \xrightarrow{0{,}4} Z \xrightarrow{0{,}4} Z \xrightarrow{0{,}4} Z$

$P(\text{nie K}) = 0{,}4 \cdot 0{,}4 \cdot 0{,}4 \cdot 0{,}4 = 0{,}4^4 = 0{,}0256$

6a) 

$P(\text{nur K}) = 0{,}5 \cdot 0{,}5 = 0{,}25$

b) 

$P(\text{nur K}) = 0{,}5 \cdot 0{,}5 \cdot 0{,}5 = 0{,}125$

c) $\xrightarrow{0{,}5} K \xrightarrow{0{,}5} K \xrightarrow{0{,}5} K \xrightarrow{0{,}5} K$

$P(\text{nur K}) = 0{,}5 \cdot 0{,}5 \cdot 0{,}5 \cdot 0{,}5$

$= 0{,}0625$

d) Wir probieren aus:

1 5 Würfe

$\xrightarrow{0{,}5} K \xrightarrow{0{,}5} K \xrightarrow{0{,}5} K \xrightarrow{0{,}5} K \xrightarrow{0{,}5} K$

$P(\text{nur K}) = 0{,}5^5 = 0{,}03125$

(falsch)

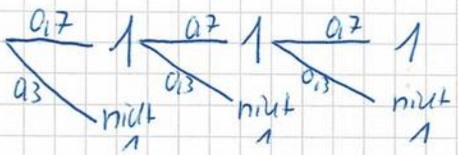
② 6 Würfe

$\xrightarrow{0,5} K \xrightarrow{0,5} K \xrightarrow{0,5} K \xrightarrow{0,5} K \xrightarrow{0,5} K \xrightarrow{0,5} K$

$P(\text{nur } K) = 0,5^6 = 0,015625$
$= 1,5625\ \%$

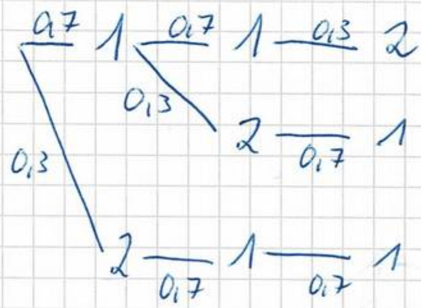
$\Rightarrow$ Es sind 6 Würfe

7a)



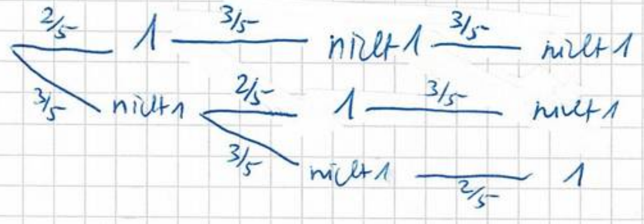
$P(\text{nur } 1) = 0,7 \cdot 0,7 \cdot 0,7 = 0,7^3 = 0,343$

b)



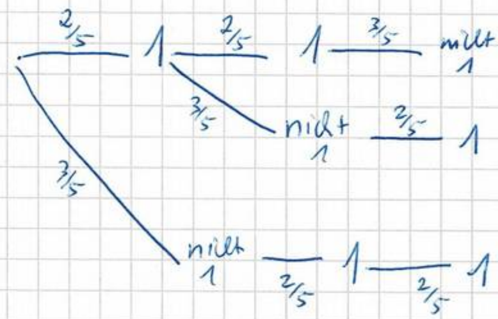
$P(1\text{-mal } 2) = 0,7 \cdot 0,7 \cdot 0,3 + 0,7 \cdot 0,3 \cdot 0,7 + 0,3 \cdot 0,7 \cdot 0,7$
$= 3 \cdot 0,3 \cdot 0,7^2 = 0,441$

8a)



$P(1\text{-mal } 1) = \frac{2}{5} \cdot \frac{3}{5} \cdot \frac{3}{5} + \frac{3}{5} \cdot \frac{2}{5} \cdot \frac{3}{5} + \frac{3}{5} \cdot \frac{3}{5} \cdot \frac{2}{5}$
$= 3 \cdot \frac{2}{5} \cdot \left(\frac{3}{5}\right)^2 = \frac{54}{125}$

b)



$P(2\text{-mal } 1) = \frac{2}{5} \cdot \frac{2}{5} \cdot \frac{3}{5} + \frac{2}{5} \cdot \frac{3}{5} \cdot \frac{2}{5} + \frac{3}{5} \cdot \frac{2}{5} \cdot \frac{2}{5}$

$= 3 \cdot \left(\frac{2}{5}\right)^2 \cdot \frac{3}{5} = \frac{36}{125}$

c) $P(\text{mind. } 1\text{-mal } 1) = P(1\text{-mal } 1) + P(2\text{-mal } 1) + P(3\text{-mal } 1)$

$= \frac{54}{125} + \frac{36}{125} + P(3\text{-mal } 1)$

3-mal 1: $\xrightarrow{2/5} 1 \xrightarrow{2/5} 1 \xrightarrow{2/5} 1$

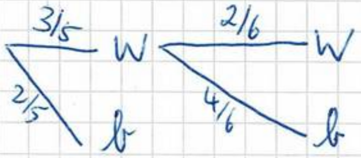
$P(3\text{-mal } 1) = \frac{2}{5} \cdot \frac{2}{5} \cdot \frac{2}{5} = \left(\frac{2}{5}\right)^3 = \frac{8}{125}$

$\Rightarrow P(\text{mind. } 1\text{-mal } 1) = \frac{54}{125} + \frac{36}{125} + \frac{8}{125} = \frac{98}{125}$

d) Ereignis: 3-mal Feld 2

$\xrightarrow{1/5} 2 \xrightarrow{1/5} 2 \xrightarrow{1/5} 2$

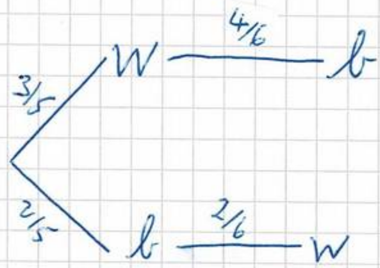
9a)



X

$P(2\text{-mal } w) = \frac{3}{5} \cdot \frac{2}{6} = \frac{6}{30} = \frac{1}{6}$

b)



$P(\text{1-mal } W) = \frac{3}{5} \cdot \frac{4}{6} + \frac{2}{5} \cdot \frac{2}{6} = \frac{12}{30} + \frac{4}{30} = \frac{16}{30} = \frac{8}{15}$

10) $x = 3/10$

$y = 3/9$

$z = 7/9$