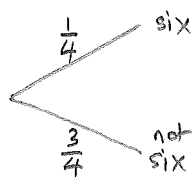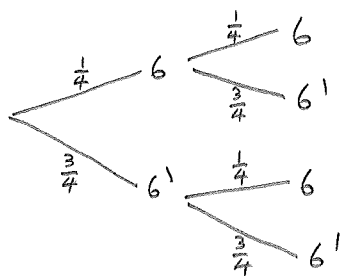1 a)

b)

$P(\text{exactly one } 6 \text{ obtained})$

$= P(6 \cap 6') + P(6' \cap 6)$

$= \frac{1}{4} \times \frac{3}{4} + \frac{3}{4} \times \frac{1}{4}$

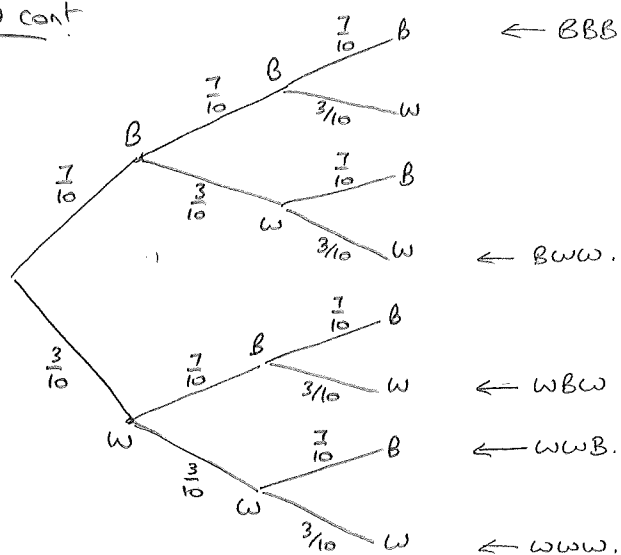$= 2 \times \frac{1}{4} \times \frac{3}{4}$

$= \frac{6}{16}$

$= \frac{3}{8}$

2.

score	1	2	3
probability	$\frac{4}{7}$	x	$\frac{1}{7}$

$\frac{4}{7} + x + \frac{1}{7} = 1$

$\Rightarrow \quad x = \frac{2}{7}$

3.

Tree diagram with branches:

BBB, BWW, WBW, WWB, WWW

a) P(BBB)

$$= \left(\frac{7}{10}\right)^3$$

$$= \frac{343}{1000}$$

b) P(WBW)

$$= \frac{3}{10} \times \frac{7}{10} \times \frac{3}{10}$$

$$= \frac{63}{1000}$$

c) P(WWB in any order)

$$= 3 \times \frac{63}{1000}$$

$$= \frac{189}{1000}$$

d) P(at least one B)

$$= 1 - P(WWW)$$

$$= 1 - \left(\frac{3}{10}\right)^3$$

$$= 1 - \frac{27}{1000}$$

$$= \frac{973}{1000}$$

Event that's mutually exclusive and exhaustive with "at least one black" is "three whites".