Walpole

3.2- 2 → paint blemishes

Sample Space	x
NNN	0
NNB	1
NBN	1
BNN	1
NBB	2
BNB	2
BBN	2
BBB	

Check ★

3.3-

Sample Space	w (A value of w of W)
HHH	3
HHT	1
HTH	1
THH	1
HTT	-1
THT	-1
TTH	-1
TTT	-3

3.4-

- Sample space = { HHH, TTTHHH, THTHHH, HTTHHH, TTHHH, HTHHH, THHH, HHTHHH }
- discrete

★

3.5 a) $c(4)$, $c(5)$, $c(8)$, $c(13)$

$4c + 5c + 8c + 13c = 1$

$30c = 1$

$c = \frac{1}{30}$

b) $c + 6c + 3c = 1$

$10c = 1$

$c = \frac{1}{10}$

3.6- a)

3.7-

3.8- head is twice likely to occur

$P(H) = \frac{2}{3}$, $P(T) = \frac{1}{3}$

Sample Space	w
HHH	3
HHT	1
HTH	1
THH	1
HTT	-1
THT	-1
TTH	-1
TTT	-3

$P(W=-3) = \left(\frac{1}{3}\right)^3 = \frac{1}{27}$

$P(W=-1) = \frac{3}{3^3}\left(\frac{1}{3}\right)^2 \times 3 = \frac{2}{9}$

$P(W=1) = \left(\frac{2}{3}\right)^2 \times \frac{1}{3} \times 3 = \frac{4}{9}$

$P(W=3) = \left(\frac{2}{3}\right)^3 = \frac{8}{27}$ ✓

w	-3	-1	1	3
P(W=w)	$\frac{1}{27}$	$\frac{2}{9}$	$\frac{4}{9}$	$\frac{8}{27}$

3.9-

3.10- $f(n) = \frac{1}{6}$ ✓

3.11-

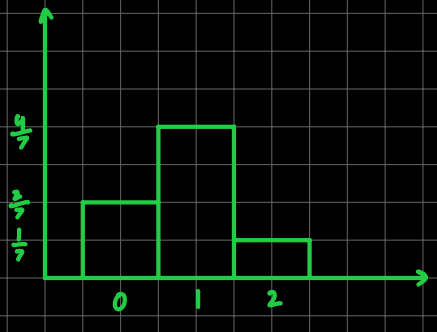
$P(X=0) = \frac{{}^2C_0 \times {}^5C_3}{{}^7C_3} = \frac{2}{7}$

$P(X=1) = \frac{{}^2C_1 \times {}^5C_2}{{}^7C_3} = \frac{4}{7}$

$P(X=2) = \frac{{}^2C_2 \times {}^5C_1}{{}^7C_3} = \frac{1}{7}$

n	0	1	2
P(X=n)	$\frac{2}{7}$	$\frac{4}{7}$	$\frac{1}{7}$

✓



3.12- a)

$P(T=5) = \frac{3}{4} - \frac{1}{2} = \frac{1}{4}$ ✓

b) $P(T>3) = 1 - \frac{1}{2} = \frac{1}{2}$ ✓

c) $P(1.4<T<6) = F(6) - F(1.4) = \frac{3}{4} - \frac{1}{4} = \frac{1}{2}$ ✓

d) $P(T \leq 5 \mid T \geq 2) = \frac{P(2 \leq T \leq 5)}{P(T \geq 2)} = \frac{\frac{3}{4} - \frac{1}{4}}{1 - \frac{1}{4}} = \frac{2}{3}$ ✓

3.13-

$$F(n) = \begin{cases} 0, & n<0 \\ 0.41, & 0 \leq n<1 \\ 0.78, & 1 \leq n<2 \\ 0.94, & 2 \leq n<3 \\ 0.99, & 3 \leq n<4 \\ 1, & n \geq 4 \end{cases}$$ ✓

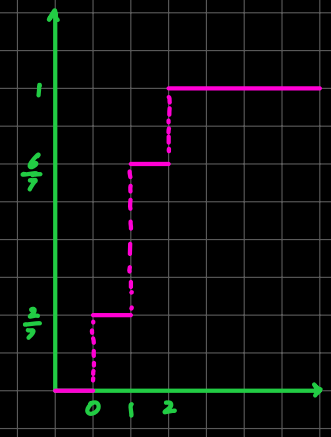
3.14-

3.15-

$$F(n) = \begin{cases} 0, & n<0 \\ 2/7, & 0 \leq n<1 \\ 6/7, & 1 \leq n<2 \\ 1, & n \geq 2 \end{cases}$$

a) $P(X>1) = \frac{6}{7} - \frac{2}{7} = \frac{4}{7}$ ✓

b) $P(0<X \leq 2) = 1 - \frac{2}{7} = \frac{5}{7}$ ✓



3.22- $52-13=39$

$$P(X=0)=\frac{{}^{13}C_0\times{}^{39}C_3}{{}^{52}C_3}=\frac{703}{1700}$$

$$P(X=1)=\frac{741}{1700}$$

$$P(X=2)=\frac{117}{850}$$

$$P(X=3)=\frac{11}{850}$$

x	0	1	2	3
$P(X=x)$	$\frac{703}{1700}$	$\frac{741}{1700}$	$\frac{117}{850}$	$\frac{11}{850}$

3.23-

$$F(w)=\begin{cases}0, & w<-3\\ 1/27, & -3\le w<-1\\ 7/27, & -1\le w<1\\ 19/27, & 1\le w<3\\ 1, & w\ge 3\end{cases}$$

a) $P(W>0)$

$=1-P(W\le 0)=1-\frac{7}{27}=\frac{20}{27}$ ✓

b) $P(-1\le W<3)=\frac{19}{27}-\frac{1}{27}=\frac{18^2}{27_3}=\frac{2}{3}$ ✓

3.24- 5- jazz
2- classical
3- rock

Formulae: $\frac{{}^5C_x\times{}^5C_{(4-x)}}{{}^{10}C_4}$

$P(X=0)=\frac{1}{42}$

$P(X=1)=\frac{5}{21}$

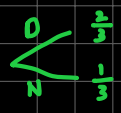
$P(X=2)=\frac{10}{21}$

$P(X=3)=\frac{5}{21}$

$P(X=4)=\frac{1}{42}$

x	0	1	2	3	4
$P(X=x)$	$\frac{1}{42}$	$\frac{5}{21}$	$\frac{10}{21}$	$\frac{5}{21}$	$\frac{1}{42}$

3.25- 1 dime = 10 ¢
1 nickel = 5 ¢



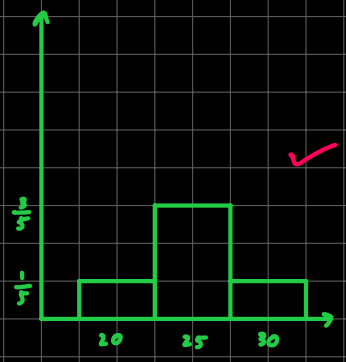
DDD, DDN, DNN

$$P(T=30)=\frac{{}^4C_3\times{}^2C_0}{{}^6C_3}=\frac{1}{5}$$

$P(T=25)=\frac{3}{5}$

$P(T=20)=\frac{1}{5}$ ✓

t	20	25	30
$P(T=t)$	$\frac{1}{5}$	$\frac{3}{5}$	$\frac{1}{5}$



✓

3.26-

$n=3$, $p=\frac{1}{3}$, $q=\frac{2}{3}$

$$P(X=0)={}^3C_0\times\left(\frac{1}{3}\right)^0\left(\frac{2}{3}\right)^3=\frac{8}{27}$$

$$P(X=1)={}^3C_1\left(\frac{1}{3}\right)^1\left(\frac{2}{3}\right)^2=\frac{4}{9}$$

$P(X=2)=\frac{2}{9}$

$P(X=3)=\frac{1}{27}$ ✓

x	0	1	2	3
$P(X=x)$	$\frac{8}{27}$	$\frac{4}{9}$	$\frac{2}{9}$	$\frac{1}{27}$