

Math 423 – Prof. Richard B. Goldstein – Walpole – 8th ed – Chapter 3 Answers

3.3 A table of sample space and assigned values of the random variable is shown next.

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

3.5 (a) $c = 1/30$ since $1 = \sum_{x=0}^3 c(x^2 + 4) = 30c$.

(b) $c = 1/10$ since

$$1 = \sum_{x=0}^2 c \binom{2}{x} \binom{3}{3-x} = c \left[\binom{2}{0} \binom{3}{3} + \binom{2}{1} \binom{3}{2} + \binom{2}{2} \binom{3}{1} \right] = 10c.$$

3.6 (a) $P(X > 200) = \int_{200}^{\infty} \frac{20000}{(x+100)^3} dx = -\frac{10000}{(x+100)^2} \Big|_{200}^{\infty} = \frac{1}{9}$.

(b) $P(80 < X < 200) = \int_{80}^{200} \frac{20000}{(x+100)^3} dx = -\frac{10000}{(x+100)^2} \Big|_{80}^{200} = \frac{1000}{9801} = 0.1020$.

3.21 (a) $1 = k \int_0^1 \sqrt{x} dx = \frac{2k}{3} x^{3/2} \Big|_0^1 = \frac{2k}{3}$. Therefore, $k = \frac{3}{2}$.

(b) $F(x) = \frac{3}{2} \int_0^x \sqrt{t} dt = t^{3/2} \Big|_0^x = x^{3/2}$.

$P(0.3 < X < 0.6) = F(0.6) - F(0.3) = (0.6)^{3/2} - (0.3)^{3/2} = 0.3004$.

3.25 Let T be the total value of the three coins. Let D and N stand for a dime and nickel, respectively. Since we are selecting without replacement, the sample space containing elements for which $t = 20, 25,$ and 30 cents corresponding to the selecting of 2 nickels and 1 dime, 1 nickel and 2 dimes, and 3 dimes. Therefore, $P(T = 20) = \frac{\binom{2}{2}\binom{4}{1}}{\binom{6}{3}} = \frac{1}{5},$

$$P(T = 25) = \frac{\binom{2}{1}\binom{4}{2}}{\binom{6}{3}} = \frac{3}{5},$$

$$P(T = 30) = \frac{\binom{4}{3}}{\binom{6}{3}} = \frac{1}{5},$$

and the probability distribution in tabular form is

t	20	25	30
$P(T = t)$	$1/5$	$3/5$	$1/5$

As a probability histogram

