

## Test I Key

1.a)

1\* 1, 2, 4, 4, 8

2\* 0, 2, 3, 9

1b) Quartiles  $Q_1 = 1.4$ ,  $Q_2 = 1.8$   $Q_3 = 2.2$

1.c)  $\bar{X} = 1.81$ ,  $s = 0.56$

2.a) odds of 4 to 1

2.b) (i)  $1/6$ , (ii) 18 pairs give an even sum—these pairs start  $(1, 1), (1, 3), (2, 2), (3, 1), \dots$ —and 6 of them are favorable. So prob =  $6/18 = 1/3$ .

The events are not independent: “even sum” is favorable for “both rolls the same” because answer (ii) is bigger than answer (i).

3.a) No. The number of arrangements is the multinomial coefficient  $\frac{12!}{4!6!2!} = 13,860$ .

3.b)  $420/\text{hour} = 7/\text{min} = 14/(2 \text{ min})$ . So  $X =$  number of hits between 12:00 and 12:02 is Poisson with parameter  $\lambda = 14$ . From Tables,  $P(X \leq 6) = 0.014$ .

4.a) # favorable =  $\binom{8}{4}[4 \text{ men}] + \binom{8}{3} \binom{10}{1}[3 \text{ men, 1 woman}] + \binom{8}{2} \binom{10}{2}[2 \text{ men, 2 women}] = 1890$ .

Total is  $\binom{18}{4} = 3060$ . So prob =  $\frac{1890}{3060} = \frac{21}{434} = .618$

4.b) (i) geometric distribution. prob =  $.9^4[4 \text{ hits}] \times .1[\text{first miss}] = .06561$ .

(ii) 10

(iii) Success is “miss target”. Success probability is  $p = .1$ . So  $X =$  number of shots thru first miss is geometric with parameter  $p = .1$ , and so  $E(X) = \frac{1}{p} = 10$ , giving the

answer to part (ii).

5. Let  $X$  be the amount per box. We want

$$P(X < 14.50) = .01$$

Standardize:

$$P\left(\frac{X - \mu}{.12} < \frac{14.50 - \mu}{.12}\right) = .01$$

From the Tables,  $-2.33$  is the number with  $P(Z < -2.33) = .01$ . Hence  $\frac{14.50 - \mu}{.12} = -2.33$  and, solving,  $\mu = 14.78$ .