Q-n 12 is 10 pt and 3/3/4

**12.**

**a.** Since there are 50 seats, the flight will accommodate all ticketed passengers who show up as long as there are no more than 50. $P(Y \le 50) = .05 + .10 + .12 + .14 + .25 + .17 = .83$.

**b.** This is the complement of part **a**: $P(Y > 50) = 1 - P(Y \le 50) = 1 - .83 = .17$.

**c.** If you're the first standby passenger, you need no more than 49 people to show up (so that there's space left for you). $P(Y \le 49) = .05 + .10 + .12 + .14 + .25 = .66$. On the other hand, if you're third on the standby list, you need no more than 47 people to show up (so that, even with the two standby passengers ahead of you, there's still room). $P(Y \le 47) = .05 + .10 + .12 = .27$.

Q-n 14 is 10 pt and 2/2/3/3

**14.**

**a.** As the hint indicates, the sum of the probabilities must equal 1. Applied here, we get $\sum_{y=1}^{5} p(y) = k[1+2+3+4+5] = 15k = 1 \Rightarrow k = \frac{1}{15}$. In other words, the probabilities of the five $y$-values are $\frac{1}{15}, \frac{2}{15}, \frac{3}{15}, \frac{4}{15}, \frac{5}{15}$.

**b.** $P(Y \le 3) = P(Y = 1, 2, 3) = \frac{1}{15} + \frac{2}{15} + \frac{3}{15} = \frac{6}{15} = .4$.

**c.** $P(2 \le Y \le 4) = P(Y = 2, 3, 4) = \frac{2}{15} + \frac{3}{15} + \frac{4}{15} = \frac{9}{15} = .6$.

**d.** Do the probabilities total 1? Let's check: $\sum_{y=1}^{5}\left(\frac{y^2}{50}\right) = \frac{1}{50}[1+4+9+16+25] = \frac{55}{50} \ne 1$. No, that formula cannot be a pmf.

Q-n 30 is 10 pt and 4/6

**30.**

**a.** $E(Y) = \sum_{y=0}^{3} y \cdot p(y) = 0(.60) + 1(.25) + 2(.10) + 3(.05) = .60$.

**b.** $E(100Y^2) = \sum_{y=0}^{3} 100y^2 \cdot p(y) = 0(.60) + 100(.25) + 400(.10) + 900(.05) = \$110$.

Q-n 31 is 10 pt; 3 pts for V(Y), 3 pts for the standard deviation and 4 pts for the last question.

**31.** From the table in Exercise 12, $E(Y) = 45(.05) + 46(.10) + \ldots + 55(.01) = 48.84$; similarly, $E(Y^2) = 45^2(.05) + 46^2(.10) + \ldots + 55^2(.01) = 2389.84$; thus $V(Y) = E(Y^2) - [E(Y)]^2 = 2389.84 - (48.84)^2 = 4.4944$ and $\sigma_Y = \sqrt{4.4944} = 2.12$.

One standard deviation from the mean value of $Y$ gives $48.84 \pm 2.12 = 46.72$ to $50.96$. So, the probability $Y$ is within one standard deviation of its mean value equals $P(46.72 < Y < 50.96) = P(Y = 47, 48, 49, 50) = .12 + .14 + .25 + .17 = .68$.

Q-n 46 is 10pt and 2/2/3/3

**46.**

**a.** $b(3;8,.35) = \binom{8}{3}(.35)^3(.65)^5 = .279.$

**b.** $b(5;8,.6) = \binom{8}{5}(.6)^5(.4)^3 = .279.$

**c.** $P(3 \le X \le 5) = b(3;7,.6) + b(4;7,.6) + b(5;7,.6) = .745.$

**d.** $P(1 \le X) = 1 - P(X = 0) = 1 - \binom{9}{0}(.1)^0(.9)^9 = 1 - (.9)^9 = .613.$

Q-n 48 is 10 pt and 1/1/2/3/3.

**48.** $X \sim \text{Bin}(25, .05)$

**a.** $P(X \le 3) = B(3;25,.05) = .966$, while $P(X < 3) = P(X \le 2) = B(2;25,.05) = .873.$

**b.** $P(X \ge 4) = 1 - P(X \le 3) = 1 - B(3;25,.05) = .1 - .966 = .034.$

**c.** $P(1 \le X \le 3) = P(X \le 3) - P(X \le 0) = .966 - .277 = .689.$

**d.** $E(X) = np = (25)(.05) = 1.25$, $\sigma_X = \sqrt{np(1-p)} = \sqrt{25(.05)(.95)} = 1.09.$