

# ACTEX Five Practice Exams for P/1

## Errata 4<sup>th</sup> Printing 6/7/11

Following are corrected problems and solutions for insertion into this manual.

### Question 2-21

The distribution for the question is  $P(X = n) = \binom{r-1}{n-1} p^n (1-p)^{r-n}$

### Question 2-30

Suppose  $P(A) = 0.30$ ,  $P(B) = 0.45$ , and  $P(A \cap B) = 0.35$ .

Calculate  $P(A \cup B)$ .

- A) 0.10
- B) 0.14
- C) 0.25
- D) 0.40
- E) 0.65

### Question 3-19

The distribution for the question is  $P(X = n) = \binom{r-1}{n-1} p^n (1-p)^{r-n}$

### Question 5-16

The random variable should be  $P(X = k) = \frac{1}{14}(4 - k)^2$  for  $k = 1, 2, 3, 4$ .

Answer options should be

- A) 139
- B) 153
- C) 167
- D) 180
- E) 194

### Question 5-24

The distribution for the question is  $P(X = n) = \frac{p^n - 1}{p - 1} p^n (1 - p)^{n-1}$

### Question 2-30 Solution

Replace last 3 lines with

$$\text{D } P(A \cap B) = 0.30 + 0.45 - 1 + 0.35$$

$$\text{D } P(A \cap B) = 0.10$$

Answer: A

### Question 5-16 Solution

Let  $X$  be the random variable representing the total benefit payment. The standard

deviation of  $X$  is equal to  $(\text{Var}(X))^{\frac{1}{2}} = (E(X^2) - E(X)^2)^{\frac{1}{2}}$ . First we will find  $E(X)$ .

$$E(X) = \sum_{k=1}^2 \frac{125}{7} k(4-k)^2 + \sum_{k=3}^4 \frac{1}{14} (200+150k)(4-k)^2 = \frac{2125}{7} + \frac{325}{7} = 350$$

$$E(X^2) = \sum_{k=1}^2 \frac{31250}{7} k^2(4-k)^2 + \sum_{k=3}^4 \frac{1}{14} (200+150k)^2 (4-k)^2 = \frac{781250}{7} + \frac{211250}{7} =$$

141,786

$$\text{Thus, } \text{Var}(X) = E(X^2) - (E(X))^2 = 141,786 - (350)^2 = 19,286$$

And so the standard deviation is the square root of this, or 138.873.

Answer: A