

Decal HW #5 Due 3/10

82. An insurance company issues 1250 vision care insurance policies. The number of claims filed by a policyholder under a vision care insurance policy during one year is a Poisson random variable with mean 2. Assume the numbers of claims filed by distinct policyholders are independent of one another. What is the approximate probability that there is a total of between 2450 and 2600 claims during a one-year period?

- (A) 0.68      (B) 0.82      (C) 0.87      (D) 0.95      (E) 1.00

83. A company manufactures a brand of light bulb with a lifetime in months that is normally distributed with mean 3 and variance 1. A consumer buys a number of these bulbs with the intention of replacing them successively as they burn out. The light bulbs have independent lifetimes. What is the smallest number of bulbs to be purchased so that the succession of light bulbs produces light for at least 40 months with probability at least 0.9772?

- (A) 14      (B) 16      (C) 20      (D) 40      (E) 55

2. The probability that a visit to a primary care physician's (PCP) office results in neither lab work nor referral to a specialist is 35%. Of those coming to a PCP's office, 30% are referred to specialists and 40% require lab work. Determine the probability that a visit to a PCP's office results in both lab work and referral to a specialist.

- (A) 0.05      (B) 0.12      (C) 0.18      (D) 0.25      (E) 0.35

21. Upon arrival at a hospital's emergency room, patients are categorized according to their condition as critical, serious, or stable. In the past year:

- (i) 10% of the emergency room patients were critical;
- (ii) 30% of the emergency room patients were serious;
- (iii) the rest of the emergency room patients were stable;
- (iv) 40% of the critical patients died;
- (v) 10% of the serious patients died; and
- (vi) 1% of the stable patients died.

Given that a patient survived, what is the probability that the patient was categorized as serious upon arrival?

- (A) 0.06      (B) 0.29      (C) 0.30      (D) 0.39      (E) 0.64

55. An insurance company's monthly claims are modeled by a continuous, positive random variable  $X$ , whose probability density function is proportional to  $(1 + x)^{-4}$ , where  $0 < x < \infty$ . Determine the company's expected monthly claims.

- (A) 1/6      (B) 1/3      (C) 1/2      (D) 1      (E) 3