King Fahd University of Petroleum & Minerals
Department of Mathematics & Statistics
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Quiz #2

Name: *ID:* *Serial:*

Q 1: A hole is drilled in a sheet-metal component, and then a shaft is inserted through the hole. The shaft clearance is equal to the difference between the radius of the hole and the radius of the shaft. Let the random variable X denote the clearance, in millimeters. The probability density function of X is

$$f(x) = 1.25(1 - x^4), \quad 0 < x < 1$$

1. Components with clearances larger than 0.8 mm must be scrapped. What proportion of components are scrapped?

2. Find the mean distance of shaft clearance.

3. What is the amount of variability of shaft clearance?

4. Find the proportion of the Components with clearances within two standard deviation. How does this result compare to the Empirical rule?

Q 2: A radioactive mass emits particles according to a Poisson process at a mean rate of 15 particles per minute. At some point, a clock is started. What is the probability that more than 5 seconds will elapse before the next emission?

Q 3: A husband and wife are buying a life insurance policy. Based on their health and age, they predict the man has a 90% of living at least 5 more years, and 95% for the woman. The 5-year insurance policy will pay $10,000 if one spouse dies during the period of insurance and $15,000 if both die during the period. What is a fair price for this policy?
