**Bivariate normal distribution**

**Marginal distribution of X**

**Conditional probability density function of**

**Mean and variance of conditional distribution**

**Moment generating function of bi-variate normal distribution**

Substituting from (1) into (2) gives

**Question:**  Let X and Y have a bivariate normal distribution with parameters

**Solution:**

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Find the shortest interval for which 0.90 is the conditional probability that Y is in this interval, given X = 22.

**Solution:**

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**Solution:**