Solusi

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Electrical Engineering Department
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EL0205-19 Probability and Statistic
Midterm Exam
Duration: 100 minutes (Closed book, open 1 sheet)

Student ID: **Name:**

Q1. The following are the ages (in years) of 12 students:
20 18 22 20 22 24 25 27 19 20 24 23
Find the mean, variance, standard deviation of these students.

Mean 22
Var : 6.67
Std : 2.58

Q2. Suppose the life span of a smartphone manufactured by Samsung has a normal distribution with a mean of 4 years months and a standard deviation of 6 months. Samsung company guarantees that any smartphone that starts malfunctioning within 40 months of the purchase will be replaced by a new one. About what percentage of Samsung smartphone are expected to be replaced?

for $x = 40$

$z = \frac{x-\mu}{\sigma} = \frac{40-48}{6} = -1.33$

$P(x<40) = P(z<-1.33)$
$= 0.0918$
about 9.18%

Q3. Pertamina has 4 jobs vacation for their recent open requitment. The company has received applications from 10 candidates who seem to be equally qualified. The company manager has decided to call only 4 of these candidates for an interview. If she randomly selects 4 candidates from the 10, how many total selections are possible?

$n = 10, \quad x = 4$

$10C_4 = \frac{10!}{4!(10-4)!} = \frac{10 \times 9 \times 8 \times 7 \times 6!}{4! \, 6!} = 210$

Q4. Assume that the weights of all packages of a certain brand of cookies are normally distributed with a mean of 30 ounces and a standard deviation of .5 ounce. Find the probability that the mean weight of a random sample of 20 packages of this brand of cookies will be between 30.0 and 31.0 ounces.

for $x = 30 \rightarrow z = \frac{30-30}{0.5} = 0$

for $x = 31.0 \rightarrow z = \frac{31-30}{0.5} = 2$

$P(30 < \bar{x} < 31) = P(0 < z < 2)$
$= P(z<2) - P(z<0)$
$= 0.9772 - 0.5 = 0.4772$

Q5. Gojek is one of the largest on-demand multi-service platform in Indonesia as well as in Southeast Asia. It is known from the past data that 90 from 100 its customer give 5-star rating for its service. Suppose there are 5 person of your friend use Gojek service today.

(a) Find the probability that **one of these 5 person** will not give 5-star rating for Gojek.

(b) Find the probability that **at most two of these 5 person** will not give 5-star rating for Gojek.

$P(x) = {}_nC_x \, p^x \, q^{n-x}$

n = number of services = 5
p = P(give not 5 stars) = 0.1
q = P(not give 5 stars) = 0.9

a) $P(x=1) = {}_5C_4 \, p^1 q^4$
$= {}_5C_4 (0.1)^1 (0.9)^4$
$= \frac{5!}{4!1!} (0.1)^1 (0.9)^4$
$= 0.3281$

b) at most two
$P(x \le 2) = P(x=0) + P(x=1) + P(x=2)$
$= {}_5C_0 (0.1)^0 (0.9)^5 + {}_5C_1 (0.1)^1 (0.9)^4 + {}_5C_2 (0.1)^2 (0.9)^3$
$= 0.5905 + 0.3281 + 0.0486$
$= 0.9672$