

CAT 2: STATISTICS.

- a) The random variable Z has the following probability distribution.

z	2	3	5	7	11
$P(Z = z)$	$\frac{1}{6}$	$\frac{1}{3}$	$\frac{1}{4}$	x	y

If $E(Z) = 4\frac{2}{3}$ find the values of x and y

- b) Suppose $Z \sim N(0,1)$ compute $P(0.96 \leq Z \leq 1.32)$ and $P(|z| \geq 1.96)$ Also find the value of t such that $P(|Z| > t) = 0.1772$

- c) Bearings, used in automotive application, are known to have a nominal inside diameter which is normally distributed with mean 1.5 inches and a standard deviation of 0.01 inch.
- Find the probability that a randomly selected bearing will have an inside diameter of between 1.475 and 1.535 inches
 - A random sample of 25 bearings is selected, what is the probability that the average inside diameter of these bearings is greater than 1.4975 inches.

- d) Consider the following events

A is the event of odd ~~odd~~ numbers less than five.

B is the event of even numbers

C is the event of odd numbers greater than five.

Identify the mutually exclusive events.

- e) A fertilizer mixing machine is set to give 12 kg of nitrate for every 100kg bag of fertilizer. Ten 100kg bags are examined. The percentages of nitrate are as follows: 11, 14, 13, 12, 13, 12, 13, 14, 11, 12. Is there reason to believe that the machine is defective at 5% level of significance?