R Code Samples for Statistics Experiments

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# 1. Diagrams and Graphs
data <- c(10, 20, 30, 40)
names(data) <- c("A", "B", "C", "D")
barplot(data, main="Bar Plot", col="skyblue")
pie(data, main="Pie Chart", col=rainbow(length(data)))

# 2. Measures of Central Tendency
x <- c(2, 4, 6, 4, 8, 4, 10)
mean(x)
median(x)
Mode <- function(x) {
  ux <- unique(x)
  ux[which.max(tabulate(match(x, ux)))]
}
Mode(x)

# 3. Measures of Dispersion
x <- c(5, 10, 15, 20, 25)
diff(range(x))
var(x)
sd(x)

# 4. Moments, Skewness, and Kurtosis
library(moments)
x <- c(2, 3, 5, 7, 11, 13)
moment(x, order=2)
skewness(x)
kurtosis(x)

# 5. Fitting of Curve
x <- c(1, 2, 3, 4, 5)
y <- c(2, 4, 6, 8, 10)
model <- lm(y ~ x)
summary(model)
plot(x, y, main="Linear Fit", col="blue")
abline(model, col="red")

# 6. Probability
p_A <- 0.3
p_B <- 0.5
p_A + p_B - (p_A * p_B)

# 7. Random Variables and Mathematical Expectation
x <- c(0, 1, 2, 3)
p <- c(0.1, 0.3, 0.4, 0.2)
sum(x * p)

# 8. Bivariate Distribution
X <- c(1, 2)
Y <- c(1, 2)
joint_prob <- matrix(c(0.1, 0.2, 0.3, 0.4), nrow=2, byrow=TRUE)
rownames(joint_prob) <- paste("X=", X)
```

```
colnames(joint_prob) <- paste("Y=", Y)
joint_prob

# 9. Discrete Probability Distribution
n <- 10
p <- 0.5
x <- 0:n
prob <- dbinom(x, size=n, prob=p)
plot(x, prob, type="h", main="Binomial Distribution", col="blue")

# 10. Continuous Probability Distribution
x <- seq(-3, 3, by=0.1)
y <- dnorm(x, mean=0, sd=1)
plot(x, y, type="l", main="Standard Normal Distribution", col="green")
```