

Module #1 Hand In assignment.

Question 1

(a) Mean beer consumption for each group.

$$19-25: = \cancel{577} \frac{\sum x}{n} = \frac{1550}{5} = \underline{\underline{310}}$$

$$26-32: = \frac{1860}{6} = 310.$$

$$33-39: = \frac{1350}{5} = 270.$$

$$40-46: = \frac{1500}{6} = 250.$$

(b) Median beer consumption for each group

$$19-25 \Rightarrow 280.$$

$$26-32 \Rightarrow \frac{100}{2} = 50$$

$$33-39 \Rightarrow 600.$$

$$40-46 = \frac{100}{2} = 50.$$

(c) Mode.

$$\underline{\underline{100.}}$$

(d) The best group to sell beer is 26-32 years. This is because it contains most beer consumers.

Question 2.

(a) Weighted average capital

Component	M.V	Cost of capital	weight	wc
Bonds	2000,000	6%	0.4	2.4%
Preferred stock	500,000	8%	0.1	0.8%
Common stock	<u>2,500,000</u>	12%	0.5	<u>6.0%</u>
	5,000,000			9.2%

= 9.2 WACC

(b) Component	M.V	Cost of capital	weight	weighted cost.
~~Bonds~~	~~500,000~~	~~0.0364~~		
Bonds	2000,000	6%	0.364	2.184%
Preferred stock	500,000	8%	0.091	0.728%
Common	<u>3,000,000</u>	12%	0.545	<u>6.540%</u>
	5,500,000			9.452%

= 9.452% WACC

(c) let x be the amount issued for bonds to fund new project.

$$9\% = \frac{(2000000 + x) \times 6\% + 500000 \times 8\% + (2500000 \times 12\%)}{5000000 + x}$$

$$45000000 + 9x = 12000000 + 6x + 4000000 + 8000000$$

$$\frac{3x}{3} = \frac{1000000}{3}$$

$$= \$ 333,333.33$$

let y = interest rate change.

$$(d) \quad 8.75 = \frac{2000000 \times 6\% + 600000 \times y\% + 500000 \times 8 + 250000 \times 12}{5600000}$$

$$49000000 = 12000000 + 600000y + 4000000 + 3000000$$

$$600000y = 3000000$$

$$y = 5\%$$

Question 3.

$$\frac{2400 \times 20 + 2400 \times 24 + 2400 \times 25 + 2400 \times 30}{20 + 24 + 25 + 30}$$

$$\frac{48000 + 57600 + 60000 + 72000}{99}$$

$$= \frac{237600}{99} = \$2400$$

Question 4

(a) Mean.

$$\text{mean} = \frac{85000}{5} = 17,000$$

$$\text{median: } 8,000, 12,000, 18,000, 22,000, 25,000 \\ = 18,000$$

mode: No mode.

Re Min

$$\text{Mean:} = \frac{85,000}{5} = 17,000$$

$$\text{Median: } 15,000, 16,000, 16,000, 18,000, 20,000$$

$$= 16,000$$

$$\text{Mode: } 16,000$$

$$(b) \text{ Range for Mutton} = 25,000 - 8,000 = \underline{17,000}$$

$$\text{Range for Re Min} = 20,000 - 15,000 = \underline{5,000}$$

$$(c) \text{ Variance} = \frac{\sum (X - \bar{X})^2}{N}$$
$$= \frac{1,000,000 + 9,000,000 + 1,000,000 + 4,000,000 + 1,000,000}{5}$$

$$= \frac{16,000,000}{5} = 3,200,000$$

$$S = \sqrt{3,200,000} = 1788.85$$

(d) Sample standard deviation for Mutton:

$$= \frac{25,000,000 + 1,000,000 + 25,000,000 + 81,000,000 + 84,000,000}{4}$$

$$\sqrt{49,000,000}$$

$$= \underline{\underline{7,000}}$$

Sample standard deviation for Re Min:

$$= \sqrt{\frac{16,000,000}{4}} = \sqrt{4,000,000}$$
$$= \underline{\underline{2,000}}$$

Question 5.

Mean for Bombardier: 6.

$$\text{Std " " " } = \sqrt{\frac{1+4+4+1}{6}} = 1.29.$$

$$\text{C.V of Bombardier} = \frac{1.29}{6} \times 100 = 21.52\%.$$

~~Mean for~~

$$\text{Mean for Bank of Montreal} = 57.833.$$

$$\text{Std for Bank of Montreal} = 2.148.$$

$$\text{C.V of Bank of Montreal} = 3.66\%.$$

Bombardier stock is riskier.

Question 6.

$$(a) \quad Z = \frac{X - \mu}{\sigma}$$

$$\cancel{P} \left(\frac{8-5}{1.5} \right) - \cancel{P} \left(\frac{2-5}{1.5} \right)$$

$$Z(2) - Z(1-2)$$

$$Z(2) = 0.9772$$

$$Z(-2) = 1 - Z(2) = 1 - 0.9772 = 0.0228$$

$$= 0.9772 - 0.0228 =$$

$$= 0.9544$$

(b) Between 0.5% and 9.5%

$$\frac{9.5 - 5}{1.5} = 3 \quad z(3) = 0.9987$$

$$\frac{0.5 - 5}{1.5} = -3 \quad z(-3) = 1 - 0.9987 = 0.0013.$$

$$0.9987 - 0.0013 = 0.9974.$$

(c) Between 6.5% and 2%.

$$\frac{6.5 - 5}{1.5} = 1 \quad z(1) = 0.8413.$$

$$\frac{2 - 5}{1.5} = -2 \quad z(-2) = 1 - z(2) = 0.0539.$$

$$0.8413 - 0.0539 = 0.7874.$$

(d) less than 2%.

$$\frac{2 - 5}{1.5} = -2$$

$$z(-2) = 1 - z(2) = 0.0539$$

$$= 0.0539$$

(e) More than 8%.

$$= P(X > 8) = 1 - P(X \leq 8)$$

$$P(X \leq 8) = P\left(z \leq \frac{8 - 5}{1.5}\right) = z(2) = 0.9772.$$

$$1 - 0.9772 = 0.0228.$$

$$\therefore 820 \times 0.0228 = 18.696 \approx \underline{\underline{19 \text{ batches}}}.$$

Question 7

$$\mu = 10, \quad \sigma = 3.$$

(a) 16 drinks.
 $= P(X = 16)$

$$= \frac{16 - 10}{3} = \frac{6}{3} = 2.$$

$$z\text{-score is } \underline{\underline{2.}}$$

(b) Between 4 and 16 drinks.
 $= P(4 \leq X \leq 16)$

$$\frac{16 - 10}{3} = 2 \quad z(2) = 0.9772.$$

$$\frac{4 - 10}{3} = -2. \quad z(-2) = 1 - 0.9772 = 0.0228$$

$$\therefore 0.9772 - 0.0228 = 0.9544 = 95.44\%$$

(c) $\frac{14 - 10}{3} = \frac{4 - 10}{3} = \frac{-6}{3} = -1$

$$z(-1) = 1 - z(1) = 1 - 0.9987 = 0.0013.$$

$$\frac{19 - 10}{3} = \frac{9}{3} = 3, \quad z(3) = 0.9987$$

$$0.9987 - 0.0013 = 0.9974 = 99.74\%$$

(d) Yes. Because the $P(1 \leq X < 19)$ is greater than $P(4 \leq X \leq 16)$

(c) ~~Maximum~~ Minimum n.o of drinks student must consume to be an outlier:

$$(z) = 1$$

$$P\left(z \leq \frac{x - 10}{3}\right) \leq 1.$$

$$\frac{x - 10}{3} = 3.62.$$

$$x - 10 = 10.86$$

$$x = 20.86 \approx 20 \text{ drinks.}$$