

Problem Set #2 Solutions

1. CPI percentage growth forecasts: 3.0, 3.1, 3.4, 3.4, 3.5, 3.6, 3.7, 3.7, 3.7, 3.9

a. Compute the sample mean $\bar{x} = \sum \frac{x_i}{n} = \frac{35}{10} = 3.5$

b. Compute the sample median = middlemost observation: $\frac{3.5+3.6}{2} = 3.55$

c. Mode = most frequently occurring observation = 3.7

2. Total: 61.0 and 61.0

Average rate of return: 12.2 % and 12.2%.

Standard deviation: 0.63 and 3.12.

Notice that each asset has the same average rate of return 12.2%. However, once Sheila obtains the standard deviations, it becomes apparent that asset B is a more risky investment.

3.

Mean = 75, variance = 25

a. Use Chebychev's theorem. +/- 2 standard deviations: proportion must be at least $100[1 - (1/k^2)]\% = 100[1 - (1/2^2)]\% = \text{at least } 75\%$

b. Use the empirical rule. +/- 2 standard deviations: Approximately 95% of the observations are within 2 standard deviations from the mean

4. a. compute the sample covariance

x_i	y_i	$(x_i - \bar{x})$	$(x_i - \bar{x})^2$	$(y_i - \bar{y})$	$(y_i - \bar{y})^2$	$(x_i - \bar{x})(y_i - \bar{y})$
6	80	-2	4	30	900	-60
7	60	-1	1	10	100	-10
8	70	0	0	20	400	0
9	40	1	1	-10	100	-10
<u>10</u>	<u>0</u>	<u>2</u>	<u>4</u>	<u>-50</u>	<u>2500</u>	<u>-100</u>
40	250	0	10	0	4000	-180
$\bar{x} = 8.00$	$\bar{y} = 50.00$		$s_x^2 = 2.5$		$s_y^2 = 1000$	$\text{Cov}(x,y) = -45$

			$s_x = 1.5811$		$s_y = 31.623$	
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$$\text{Cov}(x, y) = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{n-1} = \frac{-180}{4} = -45$$

b. compute the sample correlation coefficient

$$r_{xy} = \frac{\text{Cov}(x, y)}{s_x s_y} = \frac{-45}{(1.58114)(31.6228)} = -.90. \text{ Strong negative relationship between price and quantity sold.}$$