## **Exam I Solutions**

## Part 1: Multiple Choice

Total Points: 65 (5 points per question)

TEST A	TEST B
1. C	1. C
2. C	2. C
3. C	3. A
4. A	4. B
5. C	5. E
6. B or E	6. B or E
7. B	7. C
8. D	8. D
9. C	9. B
10. B	10. B
11. D	11. C
12. B	12. C
13. E	13. D

## Part 2: Written Section

Total Points: 36 (6 points per section)

Regression Problem using data from different countries

(A)  $b = r \times \frac{s_{PHYS}}{s_{TV}} = 0.0735 \times \frac{6219.80}{106.66} = 4.29$  $a = PH\bar{Y}S - (b \times T\bar{V}) = 2925.90 - 4.29 \times 38.88 = 2759.11$  $PH\bar{Y}S = 2759.11 + 4.29x$ 

(B) For every 1 person per TV increase in a country, there is an increase of 4.29 (approximately 4) people per physician.

(C)  $P\hat{H}YS = 2759.11 + 4.29(29) = 2883.52$ residuals =  $PHYS - P\hat{H}YS = 3096 - 2883.52 = 212.48$ The observed value is greater than the predicted value so the observed value lies above the regression line. **Z-score Problem** with hiring data normally distributed:  $X \sim Normal(\bar{X} = 90, s^2 = 18^2)$ 

\*Test A = (A), Test B = (B)\*  $P(X > X^*) = 1 - P(X \le X^*) = .10 \rightarrow P(X \le X^*) = .90$ so need to find Z\* where  $P(Z \le Z^*) = .90$ Use Z-table to find that  $Z^* = 1.28$  $\frac{X^* - \bar{X}}{s} = Z^* \rightarrow \frac{X^* - 90}{18} = 1.28 \rightarrow X^* = 113.04$ The cut-off time is approximately 113 minutes.

\*Test A = (B), Test B = (A)\*  $P(X \le 100) = P(\frac{X-\bar{X}}{s} \le \frac{100-\bar{X}}{s}) = P(Z \le 0.56) = .7123$ 71.23% of candidates are automatically hired.

(C)  $P(45 \le X \le 120) = P(X \le 120) - P(X \le 45) =$  $P(Z \le \frac{120-90}{18}) - P(Z \le \frac{45-90}{18}) = P(Z \le 1.67) - P(Z \le -2.5) = .9525 -$ .0062 = .9463

94.63% of new hires learn the computer system within 45-120 minutes.