

EXAM I SOLUTIONS

Part 1: Multiple Choice (3 points each)

Test A	Test B
1.B	1.B
2.B	2.B
3.E	3.E
4.C	4.A
5.A	5.E
6.A	6.C
7.B	7.A
8.E	8.A
9.E	9.B
10.A	10.E
11.B	11.D
12.D	12.B
13.D	13.A
14.B	14.D
15.A	15.B
16.D	16.A
17.B	17.C
18.A	18.E
19.C	19.B
20.E	20.B
21.B	21.D

Part 2: Written Answers

SAT scores

(A)

$$A \sim N(1000, 200) \rightarrow P(A < 800) = P(Z < -1) = .1587$$

$$B \sim N(900, 200) \rightarrow P(B < 800) = P(Z < -.5) = .3085$$

Economic level B has a larger proportion not admitted.

(B)

Assume there are 100 students total. Since they are evenly divided between the two economic levels there are 50 students from economic level A and 50 students from economic level B. Use the proportion not admitted to find the number of students not admitted from each 50 student groups.

For group A: $50(.1587) = 7.935$ are not admitted

For group B: $50(.3085) = 15.425$ are not admitted

Total not admitted = $7.935 + 15.425 = 23.36$

Out of the 23.36 not admitted, 15.425 are from group B. The proportion of group B that make up the not admitted students is $\frac{15.425}{23.36} = 66\%$.

(C)

If the cutoff was 600 then

$$P(A < 600) = P(Z < -2) = .0228$$

$$P(B < 600) = P(Z < -1.5) = .0668$$

If we use the same scenario from part (B): For group A: $50(.0228) = 1.14$ are not admitted

For group B: $50(.0668) = 3.34$ are not admitted

Total not admitted = $1.14 + 3.34 = 4.48$

Out of the 4.48 not admitted, 3.34 are from group B. Now, The proportion of group B that make up the not admitted students is $\frac{3.34}{4.48} = 75\%$.

Now, the proportion of group B students that make up the not admitted student's is higher so lowering the cutoff point would not help/increase the number of group B students admitted, it would actually decrease this number because it would allow for more group A students to be admitted.

Video games

(A)

response = visual skills

explanatory = video game playing in previous six months

(B) this is an observational study

(C) no blocking

(D) possible answers:

- money/income could affect the ability to buy video games and health/visual skills
- education could affect the interest in video games/computers and health/visual skills
- age could affect the interest in video games and health/visual skills