

Manual Calculations Controlling for Sex

(A) Overall percentage of survival for each class = $\frac{\text{Survived}}{\text{Sum}}$

Looking at the class table:

$$1^{\text{st}} \text{ class: } \frac{263}{325} = 0.6246$$

$$3^{\text{rd}} \text{ class: } \frac{178}{706} = 0.2521$$

$$2^{\text{nd}} \text{ class: } \frac{118}{285} = 0.414$$

$$\text{Crew: } \frac{212}{885} = 0.2395$$

(B) Looking at the class and sex table:

	Female	Male	→	Female	Male	
1 st	$\frac{141}{145}$	$\frac{62}{180}$		1 st	0.9724 0.344	these are our survival proportions
2 nd	$\frac{93}{106}$	$\frac{25}{179}$		2 nd	0.8774 0.1397	
3 rd	$\frac{90}{196}$	$\frac{88}{510}$		3 rd	0.4592 0.1725	
Crew	$\frac{20}{23}$	$\frac{192}{862}$		Crew	0.8696 0.2227	

(C) Looking at the sex table there are 470 females and 1731 males.

Total passengers: $470 + 1731 = 2201$

Female proportion: $\frac{470}{2201} = 0.2135$] these are our weights

Male proportion: $\frac{1731}{2201} = 0.7685$]

(D)

Weighted average = sum of (survival proportion)(weight) for each sex

$$1^{\text{st}} \text{ class: } 0.9724(0.2135) + 0.344(0.7865) = 0.4782$$

0.6246

$$2^{\text{nd}} \text{ class: } 0.8774(0.2135) + 0.1397(0.7865) = 0.2972$$

0.4140

from part A

$$3^{\text{rd}} \text{ class: } 0.4592(0.2135) + 0.1725(0.7865) = 0.2338$$

0.2521

$$\text{Crew: } 0.8696(0.2135) + 0.2227(0.7865) = 0.3609$$

0.2395

compare to

Extra Practice Problem - Here class is the confounder

(A)

Looking at the sex table there are 470 females and 1731 males. We are interested in those that survived.

$$\text{Female proportion: } \frac{344}{470} = 0.7319$$

$$\text{Male proportion: } \frac{367}{1731} = 0.2120$$

(B)

	1 st	2 nd	3 rd	Crew		1 st	2 nd	3 rd	Crew
Female	$\frac{141}{145}$	$\frac{93}{106}$	$\frac{90}{196}$	$\frac{20}{23}$	Female	0.9724	0.8774	0.4592	0.8696
Male	$\frac{62}{180}$	$\frac{25}{179}$	$\frac{88}{510}$	$\frac{192}{862}$	Male	0.344	0.1397	0.1725	0.2227

(C)

total percentage of passengers by class = $\frac{\text{total in class}}{\text{total passengers}}$

Looking at the class table:

$$1^{\text{st}} \text{ class: } \frac{325}{2201} = 0.1476$$

$$3^{\text{rd}} \text{ class: } \frac{706}{2201} = 0.3207$$

$$2^{\text{nd}} \text{ class: } \frac{285}{2201} = 0.1294$$

$$\text{Crew: } \frac{885}{2201} = 0.402$$

⑦

weighted average = sum of (overall proportion of each class)(percent for group at each class)

$$\text{Female: } (0.1476)(0.9724) + (0.1294)(0.8774) + (0.3207)(0.4592) + (0.402)(0.869) = 0.754$$

$$\text{Male: } (0.1476)(0.344) + (0.1294)(0.1397) + (0.3207)(0.1725) + (0.402)(0.2227) = 0.214$$

compare these numbers to what was found in part A