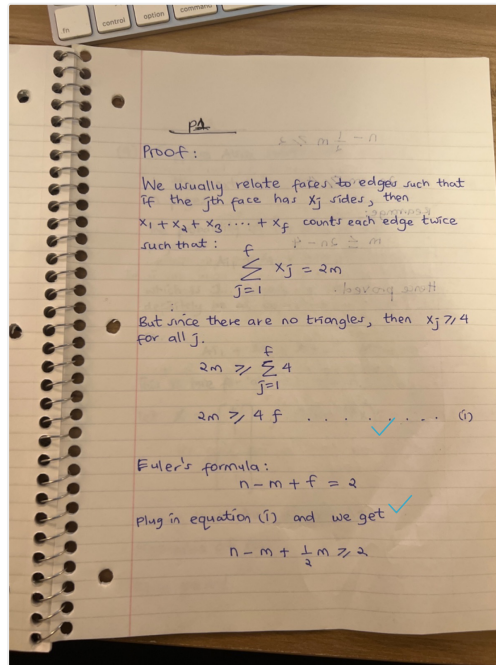
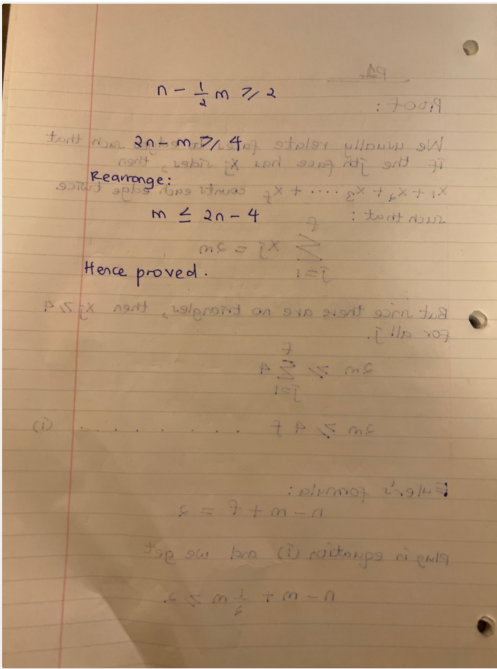


**Q1****5 / 5**

See [PS7.pdf]

([https://canvas.northwestern.edu/files/15108068/download?download\\_frd=1](https://canvas.northwestern.edu/files/15108068/download?download_frd=1)) for Question 1 about planar graphs.

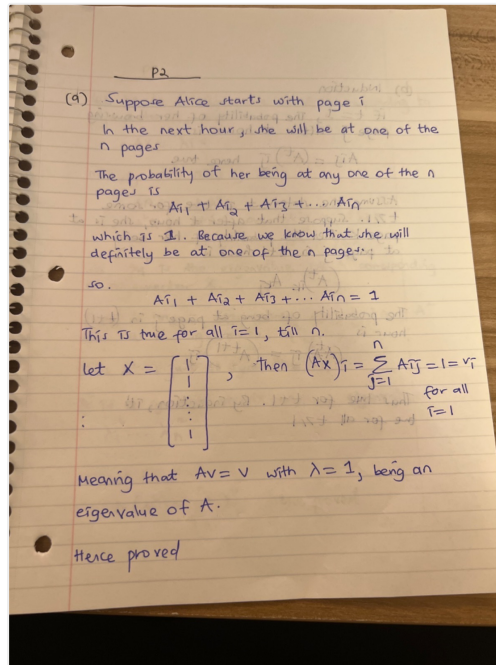




**Q2****3 / 5**

See [PS7.pdf]

([https://canvas.northwestern.edu/files/15108068/download?download\\_frd=1](https://canvas.northwestern.edu/files/15108068/download?download_frd=1)) for Question 2 website visits.



(b) Induction

if  $t=1$ , The probability of her browsing page  $j$  after  $t$  hours is  $(A^1)_{ij}$

$A_{ij} = (A^1)_{ij}$  hence true

Assume the statement is true for some  $t \geq 1$ . Suppose that after  $t$  hours, she is at page  $k$ . Then the probability of her being at page  $j$  in  $t+1$  hours is

$(A^{t+1})_{ij} = \sum_k (A^t)_{ik} A_{kj}$

The probability of being at hour is  $(A^t)_{ik}$

$(A^{t+1})_{ij} = \sum_k (A^t)_{ik} A_{kj}$

Thus true for  $t+1$ . By induction true for all  $t \geq 1$

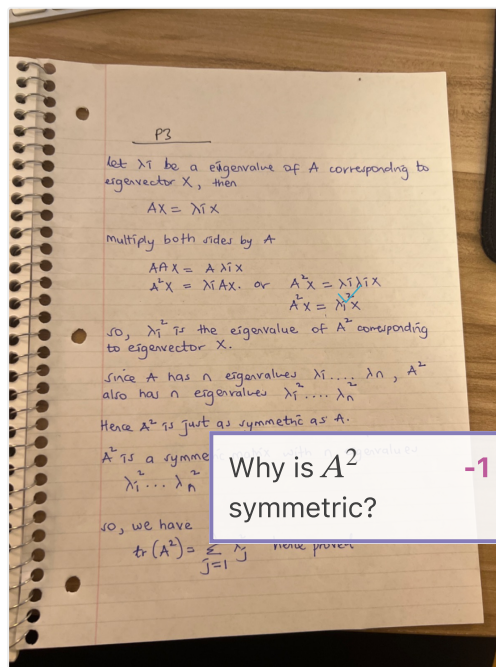
Missing explanation based on conditional probability for  $A_x$  being the next hour's distribution

3

**Q3****4 / 5**

See [PS7.pdf]

([https://canvas.northwestern.edu/files/15108068/download?download\\_frd=1](https://canvas.northwestern.edu/files/15108068/download?download_frd=1)) for Question 3 about trace and eigenvalues.



Why is  $A^2$   
symmetric?

-1



**Q4****0 / 5**

See [PS7.pdf]

([https://canvas.northwestern.edu/files/15108068/download?download\\_frd=1](https://canvas.northwestern.edu/files/15108068/download?download_frd=1)) for Question 4 about linear algebra and graphs.

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This question wasn't answered

