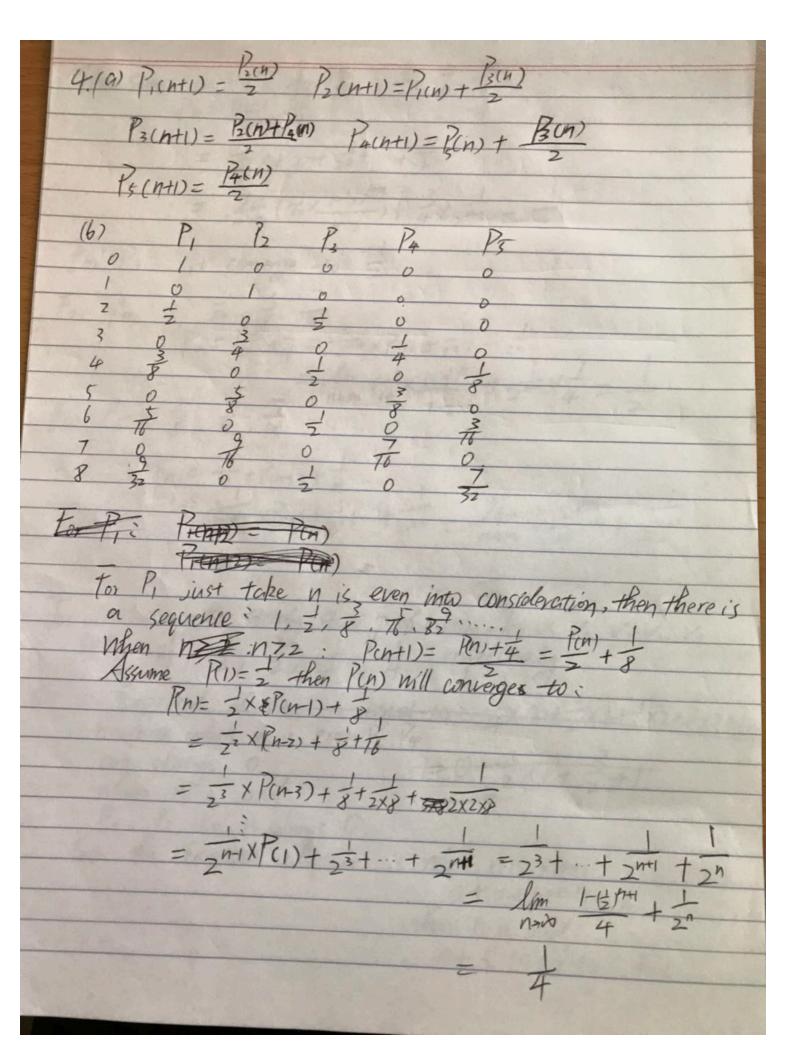
1. For all nzi and 15 p Right Side = (1) + (R+1) 1 (NHUX.X(h-k+1) (k+1) (NHI)XNX. X (NHI-R-1+1) (NHI)X. X (A-RHI) = (n+1) x · x (n+(+1) olone 2. (a) tormules be constructed -5 equivolent classes can be found by all those famulas.

As a result, each of one choice those 10,25 3. (a) E = 4×5+ (E+3) 4 + 4×8+ 4 (E+2) The expected time is 9 minutes (b) Essume Expected time E: 4×5+4×8+4×(Eof Option B)+ 4×(Fof option D) Expected time of thoose option B: 3×5+3×8+3× (2+E3) Ez= 345+3X8+3X (3+E,) So the expected time is 4X5+ 4X8+ 4X = 8,17 mins



The same as P1, for P2. 3. 8. 76. = = = + Purt = + ... + zh = llm (4x + (2) 1+ 3 x mi = = for P3 it converge to = For P4: 4 3 16 PIN # 22+ +25 1 hon (4×+(5)) + 2mx4 = -In= = xP(m)+= In conclusion the steady state probabilities for VI, V3, V3, V4, V3

are \$\frac{1}{4}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{4} \quad \text{respectively}. when n is even Pr. 14 ore always 0 =0.

When n is add

P1, P3, P5 is always 0.

So the Expected distance is when when h is odd: 0+ = +0+3+0=2.

5. (a) INI= 3 = 81 The number of possible 3-colouring the graph by 3 colours $|s| = \frac{2}{27}$ (6) VU= 65 = 7776 We assign six "color pairs" to clayonal line. For each assignment only have one possible valids 3-coloring. As a result the answer is: 7776 - 1