PART 1:

If u = 0:

pA_1=0.4

pA_2=0.4

pA_3=0.4

pA_4=0.4

pA_5=0.4

pA_t is constant.

If u = 0.4:

pA_1= 0.4458598726

pA_2= 0.4487392395

pA_3= 0.5281852561

pA_4= 0.5640610115

pA_5= 0.5964468487

From t = 0, to t=1, pA_t is multiplied by a factor of roughly 1.114649682

From t = 1, to t=2, pA_t is multiplied by a factor of roughly 1.006458009

From t = 2, to t=3, pA_t is multiplied by a factor of roughly 1.177042722

From t = 3, to t=4, pA_t is multiplied by a factor of roughly 1.067922675

From t = 4, to t=5, pA_t is multiplied by a factor of roughly 1.006458009

Each time, it increases by a very little amount, but there isn't a direct relationship that can be defined numerically, as shows by the different factors each term is multiplied by to get to the next term.

If u = -0.4:

pA_1= 0.3225806452

pA_2= 0.2470119522

pA_3= 0.1792547371

pA_4= 0.1237022851

pA_5= 0.0818737159

From t = 1, to t=2, pA_t is multiplied by a factor of roughly 0.806451613

From t = 1, to t=2, pA_t is multiplied by a factor of roughly 0.7657370517

From t = 1, to t=2, pA_t is multiplied by a factor of roughly 0.7256934461

From t = 1, to t=2, pA_t is multiplied by a factor of roughly 0.6900921398

From t = 1, to t=2, pA_t is multiplied by a factor of roughly 0.6618609821

PART 2

The green line goes straight and remains on the line. This is because when u=0, the difference equation is:

$$\frac{\text{pAt}(1+0)}{1+0\times\text{pAt}(2-\text{pAt})}$$

Which then simplifies to:

$$\frac{\text{pAt}}{1}$$

Which is equal to just pA_t, meaning that the value of pA_t will be constant.

When u = 0.4, it means that every organism with genotype AA, or AB will have, on average, 2.8 children. This is larger than 2, i.e., the number of organisms required to sexually reproduce, meaning that the overall population of the species is growing. The number of organisms with allele A will also be growing by the same amount as the total population growth, as it is their offspring that is making the population bigger. Therefore, we can express this as something like:

$$\frac{population\ with\ allele\ A+x}{total\ population+x}$$

Where x is the growth in the population. An increase in the numerator and an increase in the denominator by the same amount, there will be an increase on the overall fraction on the overall value.

However, when u = -0.4, the opposite is true, and can be expressed as something along the lines of this:

$$\frac{population\ with\ allele-x}{total\ population-x}$$

When you decrease both the numerator and the denominator by the same amount, there will be a decrease in the overall value of the fraction, however this decrease will be bigger than the increase than the increase when u=0.4, explaining why the red line approaches 0 quicker than the blue line approaches 1.d