**8.2**

**Q2. Solve these recurrence relations together with the initial conditions given.**

**a) an = 2an−1 for n ≥ 1, a0 = 3**

an = 3 ·

**b) an = an−1 for n ≥ 1, a0 = 2**

an =2

**c) an = 5an−1 − 6an−2 for n ≥ 2, a0 = 1, a1 = 0**

an = 3 · − 2 ·

**d) an = 4an−1 − 4an−2 for n ≥ 2, a0 = 6, a1 = 8**

an = 6 · − 2 · n

**e) an = −4an−1 − 4an−2 for n ≥ 2, a0 = 0, a1 = 1**

an = n(−

**f ) an = 4an−2 for n ≥ 2, a0 = 0, a1 = 4**

an = 2n − (−

**g) an = an−2 /4 for n ≥ 2, a0 = 1, a1 = 0**

an = - (-1/

**Q6. A model for the number of lobsters caught per year is based on the assumption that the number of lobsters caught in a year is the average of the number caught in**

**the two previous years.**

**a) Find a recurrence relation for {Ln}, where Ln is the number of lobsters caught in year n, under the assumption for this model.**

The recurrence relation is, by the definition of average, Ln = (1/2)Ln−1 + (1/2)Ln−2 .

**b) Find Ln if 100,000 lobsters were caught in year 1 and**

**300,000 were caught in year 2.**

The characteristic equation is r2 −(1/2)r −(1/2) = 0, which gives us r = −1/2 and r = 1. Therefore the general solution is Ln = a 1(−1/2)n + a 2 . Plugging in the initial conditions L1 = 100000 and L2 = 300000 gives 100000 = (−1/2) a 1 + a 2 and 300000 = (1/4) a 1 + a 2 . Solving these yields a 1 = 800000/3 and a 2 = 700000/3. Therefore the answer is Ln = (800000/3)(−1/2)n + (700000/3).

**Q11 Find the solution to an = 2an−1 + 5an−2 − 6an−3 with a0 = 7, a1 = −4, and a2 = 8.**

An = 5+3(-) -