1.

Cost per die = Cost per wafer / (Dies per wafer*Yield)

First Year

Cost per wafer = 10 000 * 0.8 = 8 000$
Dies per wafer = 120

Yield = 0.8*0.9 = 0.72

Cost per die = 8 000/ (120*0.72) = 92.59 $

Second Year

Cost per wafer = 8 000 * 0.8 = 6 400$
Dies per wafer = 120

Yield = 0.8*0.9 = 0.648

Cost per die = 6 400/ (120*0.648) = 82.304 $

Third Year

Cost per wafer = 6 400 * 0.8 = 5 120$
Dies per wafer = 120

Yield = 0.648*0.9 = 0.5832

Cost per die = 5 120/ (120*0.5832) = 73.159 $

Fourth Year

Cost per wafer = 5 120 * 0.8 = 4 096$
Dies per wafer = 120

Yield = 0.583*0.9 = 0.524

Cost per die = 4 096/ (120*0.524) = 65.139 $

2.

a.

CPU clock cycle for a program = Instructions for a program * CPI(Average Clock Cycles per instruction)

We have to find number of clock cycles because we will compare the compiler performance not a computer performance because the program will be execute with same computer but different compiler therefore the number of clock cycles is important.

Clock $Cycles_A$ = ((2*50) + (4*10) + (3*2)) * 10^6 = 146

Clock $Cycles_B$ =((2*80) + (5*4) + (3*1)) * 10^6 = 183

(183*10^6) / (146*10^6) = 1,253

$Performance_A$ is 1,253 times faster than $Performance_B$.

b.

CPI_A = ((2*50) + (4*10) + (3*2) / 62) * 10^6 = 2.354

CPI_B = ((2*80) + (5*4) + (3*1) / 86) * 10^6= 2.127

We found the CPI so now we must to find CPU clock cylce. We know CPU execution time that is 100ms. If we divide CPU clock cycle by CPU execution time, we obtain Clock rate.

CPU clock cycle = IC(instractions for program) * CPI

IC = (50+10+2)*10^6 = 62 * 10^6

CPU clock cycle = 62 * 10^6 * 2.354 = 145.948 * 10^6

CPU execution time = 100ms = 0.1s

CPU clock cycle / CPU execution time = Clock Rate

145.948 * 10^6 / 0.1s = 145.948 * 10^7