***Assignment (1)***

**Die size** = 200 mm2**Defects per cm²** = 0.04  
**N** = 14  
**Phoenix8 cores** = 8  
**The area of one core** = 200mm2/8 cores = 25mm2 = 0.25 cm²

*(a)* **Die yield** = 1 /(1 + Defects per unit area × Die area)N = 1/(1 + 0.04 × 0.25 cm²)14 ≈ 0.869963  
**Phoenix8 :** Y = (086.9963)8 ≈ 0.3281

**Phoenix4 :** Y = = ≈0.67

**Phoenix2 :** Y = = ≈0.0015

**Phoenix1 :** Y = ≈ 4.37×10-6

*(b)* **Phoenix8 (33%):** High probability of having all 8 functional cores. These chips can be marketed as high-performance.

**Phoenix4 (67%):** Sufficiently high probability (67%) of having at least 4 functional cores. These chips are less powerful but are in demand for budget solutions.

**Phoenix2 (0.15%):** Very low probability of appearance. Producing such chips is not cost-effective.

**Phoenix1 (0.000437%):** Nearly zero probability of having only one functional core. Manufacturing such chips definitely makes no sense.  
  
**Conclusion:** Based on these results, it makes sense to focus on producing Phoenix 8 and Phoenix 4. Their probabilities of occurrence are sufficiently high, and they can cater to different customer segments: Phoenix 8 for high-performance systems and Phoenix 4 for less demanding systems.

Producing Phoenix 2 and Phoenix 1 chips is not worthwhile, as their probabilities of occurrence are extremely low.  
  
*(с)* **Phoenix8 :** Cost = 20/0.3281 ≈ 60.95 $

**Phoenix4:** Cost = 20/0.67 ≈ 29,85$

**Phoenix2:** Cost = 20/0.0015 ≈ 13334$

**Phoenix1:** Cost = 20/4.37×10-6 ≈ 4.5766×10-6$  
  
*(d)* **Phoenix4** / **Phoenix8 =** 0.67 / 0.3281 ≈ 2.04  
Profit for **Phoenix4** = 2.04 × 25 = 51$

1. 30 + 51 = 81$
2. 51 × 0.3281 ≈ 16.7331$

81 + 16.7331 = 97.7331$