Q1 (using C++).

```
Class Solution {.
  private:
    vector<i guests;
    vector<string> guests;
    vector<string> know;      map<string, vector<string>> know
    vector<string> unknow;
    vector<bool> knowFlag;
public:
    void import() {
        string temp = "";
        cin >> tem
      int num;
      cin >> num;
      for(int i=0; i< num; i++){
          string temp;
          cin>> temp
          guests.push_back(temp)
          knowFlag.Push_back(false).
      }
      cin >> num;
      for (int i=0; i<num; i++){
          know.set( string g1, g2)
          cin>> g1;
          cin>> g2;
              know.set(g1
              if (know.get(g1) !== know.end()
              know.get(g1).push_back(g2).
              } else {
                  vector<string> temp(1, g2).
                  know.set(g1, temp).
              }.
              if.
      }
    }
    vector<string> solve( ){



    };
}
```

1)

Q2.

(i) each pocket can contains at least 0 dollar and ~~44~~ 44 coins at most

supposed that we put 0 coin in the first pocke

1 coin in the second pocke

the 2 coin ith the tird and soxon ... until the tenth pocket

we have $0+1+2+\cdots+9 = \frac{(1+9)\times 9}{2} = 45$

~~th~~ since $44 < 45$

so the last two pocket must contain 8 coins

therefore. NO.

(ii) To generalize the problem. we know that.

the number of coins must be ~~larger than~~ no less than.

$$0+1+2+\cdots+p = \frac{(1+p-1)(p-1)}{2}$$

therefore. $n \geq \frac{(1+p-1)(p-1)}{2} = \frac{p^2-p}{2}$.

Q3

1. let $f(x) = \ln(\sqrt{x^2+x+7})$. $\therefore f'(x) = \frac{1}{\sqrt{x^2+x+7}} \cdot \frac{1}{2\sqrt{x^2+x+7}} \cdot (2x+1)$

let $g(x) = 2\sqrt{x^2+x+7}$ $= \frac{2x+1}{2(x^2+x+7)}$

we have $g(x) =$

2. $\int \frac{7}{(x-3)(2x+1)}\,dx = \int \frac{7}{2x^2-5x-3}\,dx$ let $f(x) = \ln(\frac{\cdot}{2x^2-5x-3})$

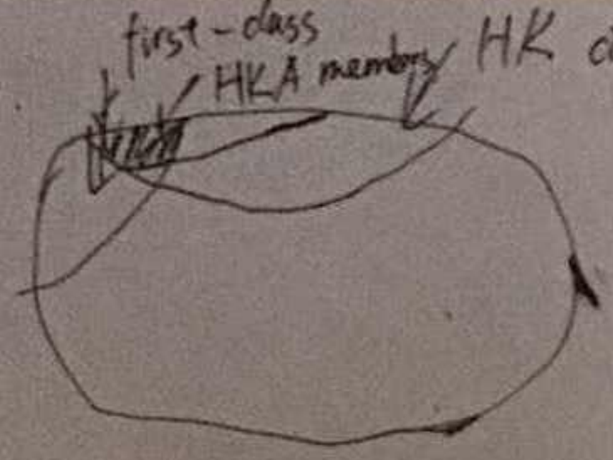
we have $f'(x) = \frac{4x-5}{2x^2-5x-3}$

assume that $g'(x) = \frac{7}{4x-5}$

$\therefore g(x) = \int \frac{7}{4x-5}\,dx = \frac{7}{4}\ln(4x-5)$

sorry... I have forgot that...

Q4.



We can define passenger takes a first-class seat as event A,

not member of HKA as event B.

$\therefore P(A \cap B) = P(A)\,P(B|A)$ ∵ where we know $P(A) = 5\%$.

$P(B|A)$ is the ~~event~~ probability that, when people take first-class seat, but not he/she is not HKA member.

we know ~~$P(B|A) = 1 - 30\% \times 60\% = 1 - 18\% = 82\%$~~

$P(B|A) = 1 - 30\% \times 60\% = 1 - 18\% = 82\%$

$\therefore P(A \cap B) = 5\% \; P(A)\,P(B|A) = 5\% \times 82\% = 4.1\%$