Project 4

MGMTMFE 405

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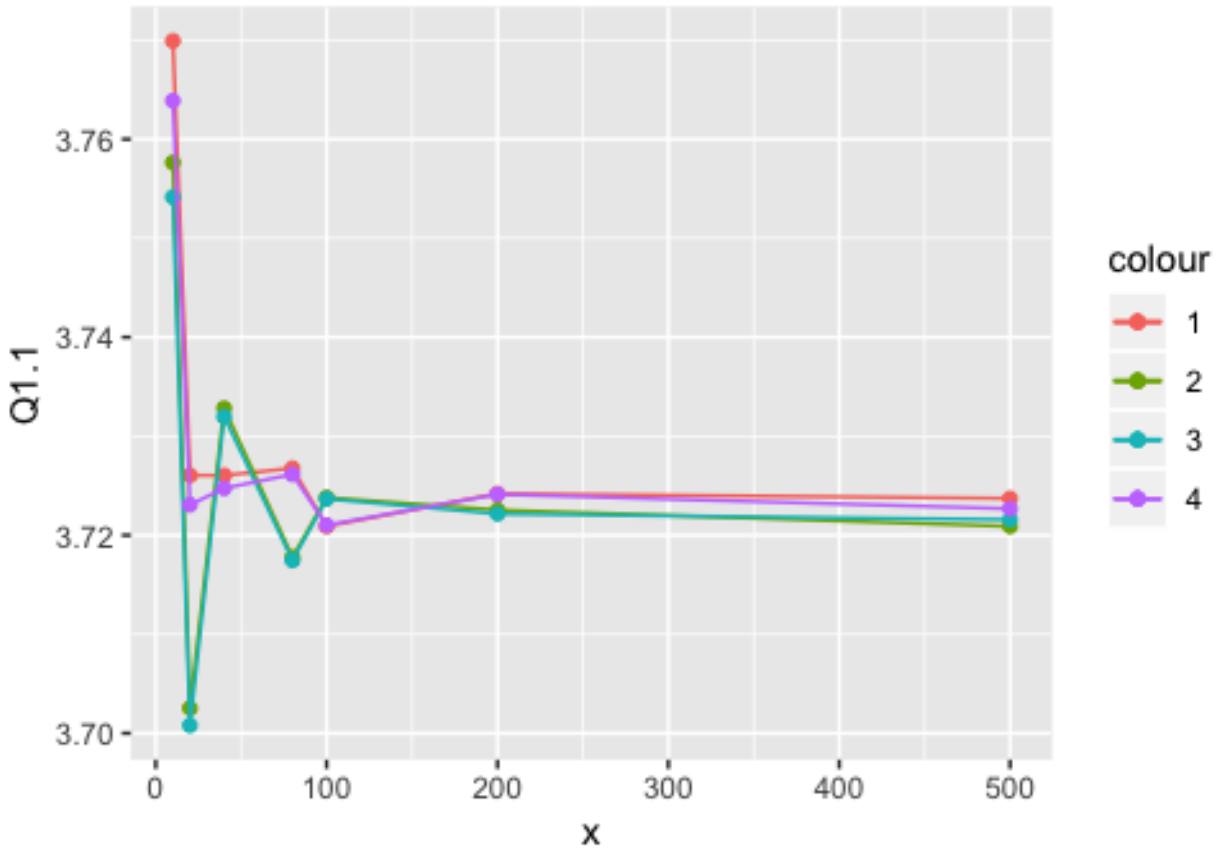
1.



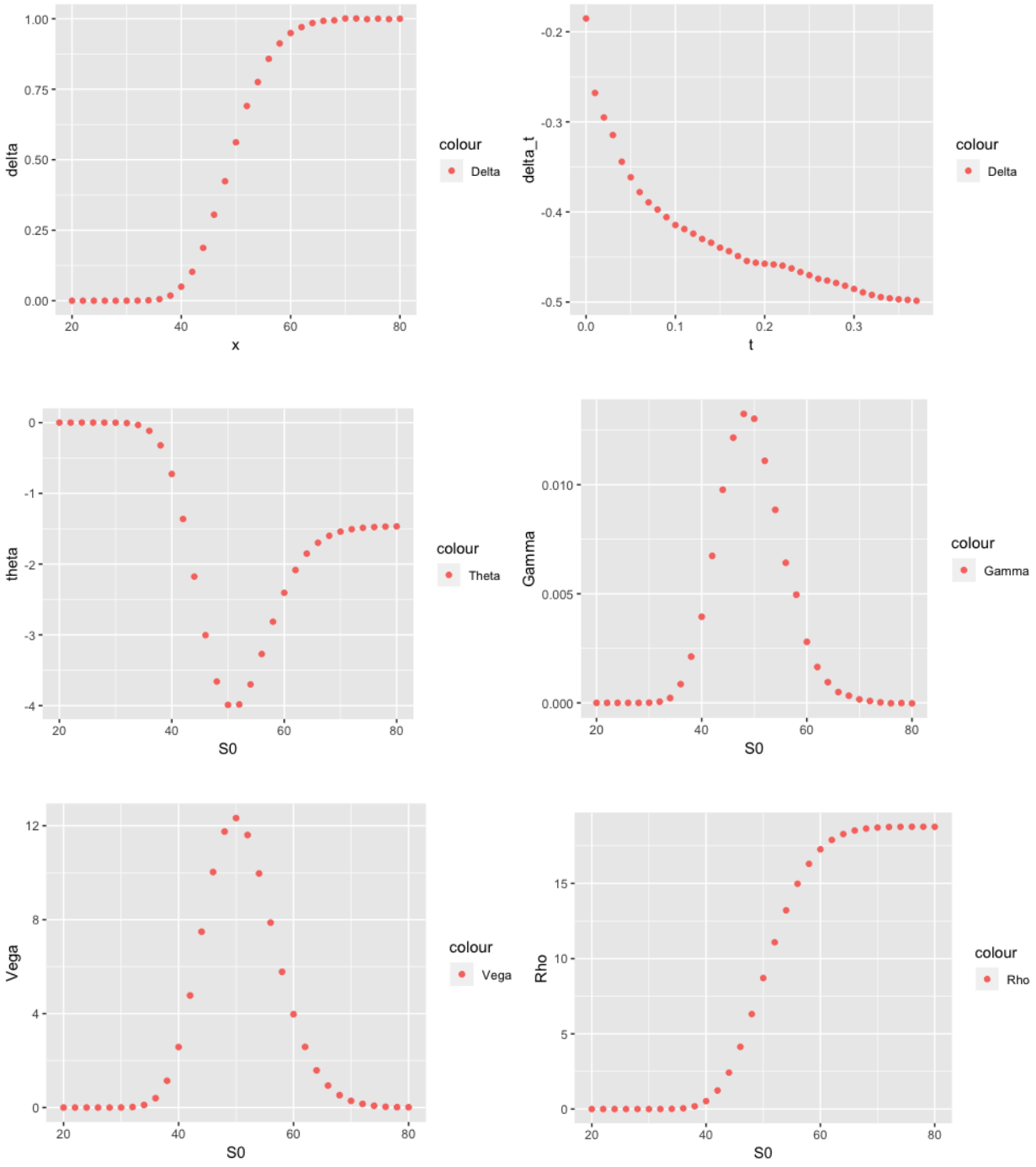
2.

(a) We extracted data on Feb 2, 2019. The closed stock price was 1110.75. From binomial tree method, the one-year call option price at strike price of 1220 was calculated to be 69.80.

From Yahoo finance, the call option price is 73.80.

(b) The calculated call option is slightly slower than the value found in Yahoo finance. In order to make my estimated price equal to the market price, we adjusted our annual volatility to 24.26%. This might imply the market expects higher volatility than the 23.31% (five-year average). This difference may also due to the premium charged by the market maker.

3.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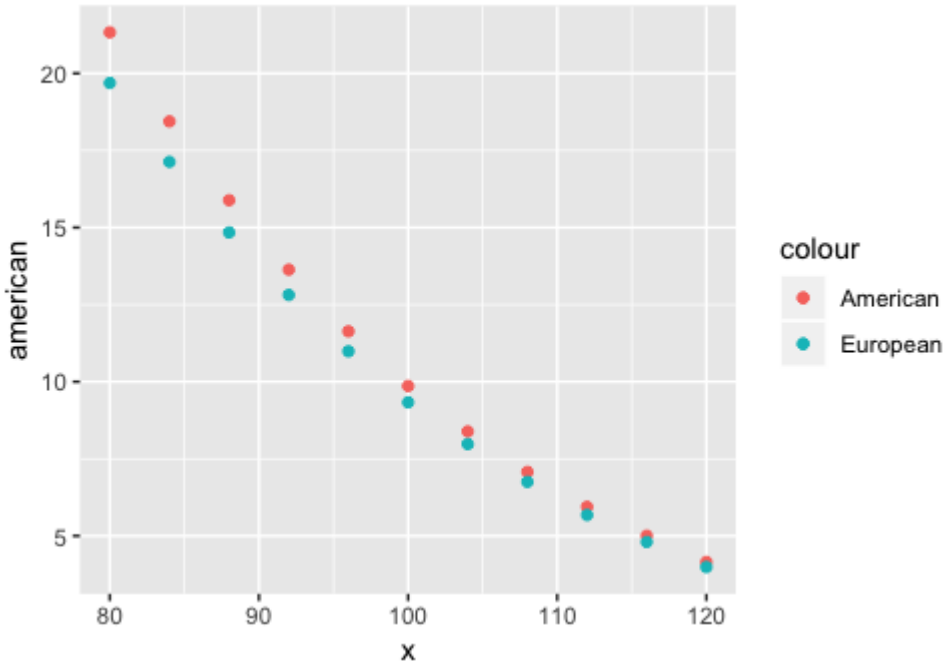
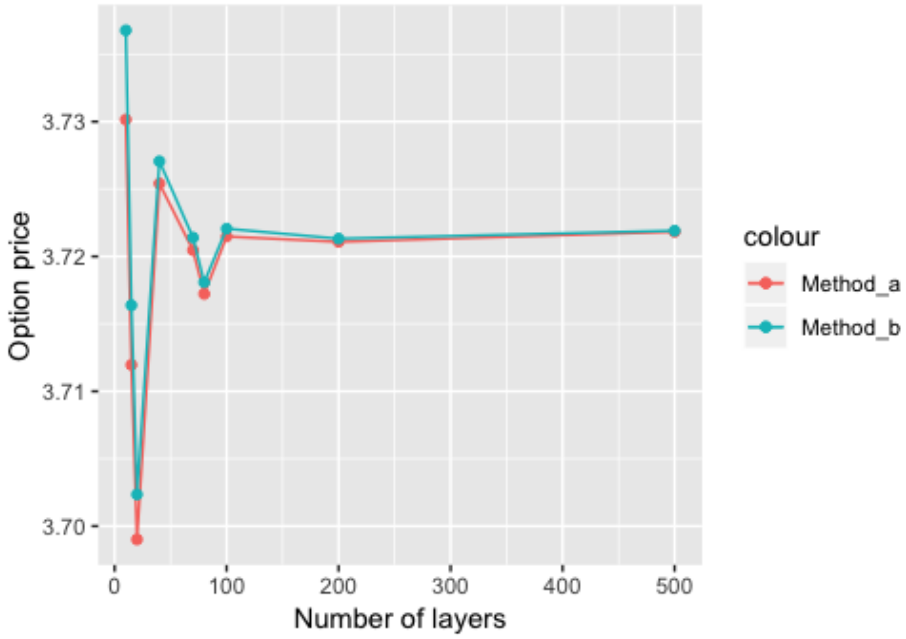
4.



From our calculation, the American put option is more valuable than the European put option. Even for the stock does not pay the dividend, we can exercise the American option when it is deep in the money. Therefore, the American put option is more valuable than European put option.

5.



6. The program ask user to input values of S0, r, k sigma, T, base1 and base2. The program will output the call option price based on these inputs. Here is one example:

```
float S0 = 32.0;
float r = 0.05;
float k = 30.0;
float sigma = 0.24;
float T = 0.5;
    int N = 10000;
    Base1 = 3;
    Base2 = 7;


    Call option = 3.72263
```