1. Find the stock price \( S(T) \) on the exercise date in three months for a European put option with the strike price £30 to produce the profit of £4 if the option is bought for £2, financed by a loan at the interest rate of 10%.

2. Find the expected gain (or loss) for a holder of a European call option with \( E = 94 \) to be exercised in six months if the stock price \( S(T) \) on the exercise date is £90 with probability \( \frac{1}{4} \), £96 with probability \( \frac{1}{4} \), £98 with probability \( \frac{1}{2} \), given that the option is bought for £10, financed by a loan at the interest rate of 10%.

3. Draw the payoff diagrams for each of the following portfolios:
   
   (a) Short one share, long two calls with strike price \( E \) (this combination is called a straddle);
   (b) Long two puts and one call, all with strike price \( E \) (a strip);
   (c) Long one put and two calls, all with strike price \( E \) (a strap);
   (d) Long one call with strike price \( E_1 \) and one put with strike price \( E_2 \). Compare three cases \( E_1 > E_2 \) (known as a strangle), \( E_1 = E_2 \) and \( E_1 < E_2 \).

4. Explain what view about the financial market is reflected in strip and strap (what is the benefit to hold such portfolios?)

5. Butterfly Spread. Find a portfolio consisting of European calls with three strike prices, 10, 20 and 30, all with same expiration time \( T \), whose payoff is described in the graph below. (Hint: try from left to right).

![Butterfly Spread Graph]

What is the benefit to hold Butterfly Spread?
6. Find a portfolio consisting of shares and European call options with different strike prices and the same expiry date, whose payoff is described below.

![Payoff Graph](image)

1. **Answers**

1. Ans: £23.95
2. Ans: −£8.01
3. -
4. -
5. -
6. -