**MFE5130 – Financial Derivatives**

**Class Activity (18-September-2018) (Solution)**

**Important Notes:**

1. This class activity is counted toward to your class participation score. **Fail** to hand in this class activity worksheet in the class will receive **0 score** for that class.
2. **0 mark** will be received if you leave the solution blank.

|  |  |
| --- | --- |
| Name: | Student No.: |

**Problem 1**

An asymmetric buttery spread has the following payoff diagram:



*ST*

This position was created using calls that are priced as follows:

|  |  |
| --- | --- |
| Strike Price | Premium |
| 80 | 4 |
| 84 | 2 |
| 90 | 0.5 |

What is the cost to establish this asymmetric buttery spread at *t* = 0?

**Solution**

Using the notations in the lecture notes, we have



To construct this asymmetric butterfly, for every 84-strike call we write, we buy 0.6 80-strike call and 0.4 90-strike call. When *ST* = 84, its payoff is



From the given payoff diagram, the payoff is 12 when *ST* = 84. So, the diagram corresponds to write 5 84-strike call, buy 3 80-strike call and 2 90-strike call.

The cost of this asymmetric butterfly spread at *t* = 0 = –5×2 + 3×4 + 2×0.5 = 3.