Problem Set 6: Solutions

1. (a) This position will be worth $1.
(b) It will be worth $0.
(c) The price of the call options with strikes of 54, 55 and 56 are: $3.36, $2.45 and $1.64 respectively. The total cost will be $3.36+$1.64-(2*$2.45)=$0.10.
(d) 10 percent.

2. Let’s draw the diagram with the nodes

```
121
 /  \
110
 /  \
100 100
 /  \
90 81
```

At the node color-coded in red, the call option is worth nothing.

At the node color-coded in yellow, the call option will have a payoff of $0 or $21. Buying one share and borrowing $\frac{100}{1.05}$ will cost $14.76 and also have a payoff of $0 or $21. So the European call option is worth $14.76.

At the node color-coded in green, the option will pay off $14.76 or 0. If I buy 1 share and borrow $\frac{90}{1.05}$, this costs me $14.29 and will have a payoff of $20 or $0. So the European call option is worth $10.55.

3. $7.48, computed using the spreadsheet.

4. (a) Impossible. Violates $C \geq S_o - \frac{X}{(1+r_f)^T}$.
(b) Possible.
(c) Impossible. Violates $C \leq S_o$.
(d) Impossible. Call prices cannot be an increasing function of the strike price.