

Solutions:

1.  $F_0 = 150 \times 1.05^{4/12} - 5 \times 1.05^{1/12} = 147.44$

2. When traders have no inventory, there exists an arbitrage opportunity that involves buying the underlying and selling the futures if and only if  $F_0 > 40 \times = 42\$/barrel$ , i.e.,  $43\$/barrel$

3. An American option can be exercised any time before maturity

4.  $P_T = \max(K - ST, 0) = \max(40 - 42, 0) = 0$

5. Third graph