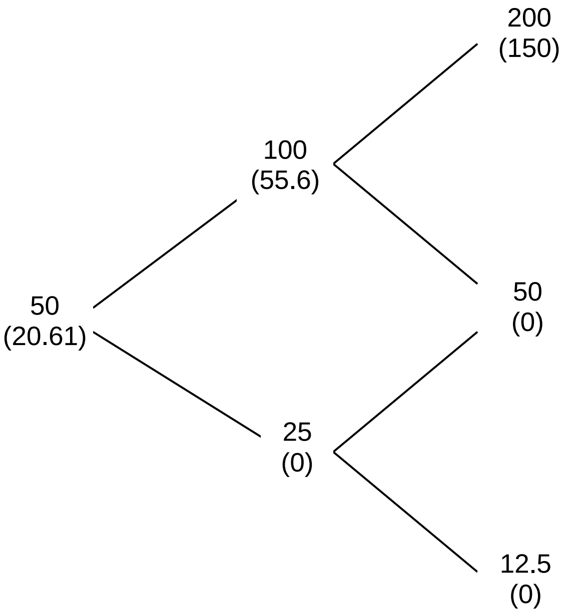
Question 1

$F_t = S_0\,(1 + r_f - y)^t = 21{,}317(1 + 0.16 - 0.04)^{1/4} = 21{,}929.59$
The futures are not fairly priced.

Question 2

The possible prices of ABC stock and the associated call option values (shown in parentheses) are:



(a) $q = \dfrac{1.125 - 0.5}{2 - 0.5} = 0.417$

$C_u = \dfrac{150 \times 0.417}{1.125} = 55.6$

$C_d = 0$

$C_0 = \dfrac{55.6 \times 0.417}{1.125} = 20.61$

(b)

$\Delta_0 = \dfrac{55.6 - 0}{100 - 25} = 0.74$

$\Delta_u = \dfrac{150 - 0}{200 - 50} = 1$

$\Delta_d = \dfrac{0}{50 - 12.5} = 0$

(c) $B = \dfrac{uC_d - dC_u}{u - d}$

$B_0 = -18.53$
$B_u = -58$
$B_d = 0$

at t=0 we can replicate the stock as follows:
stock=(1/0.74)calls+(18.53/(0.74*1.125))=1.35calls + 22.2

	t=0	t=1	
		up	down
Buy 1.35 calls	-27.8	75	0
Lend 22.2	-22.2	25	25
Total CF	-50	100	25
Buy 1 stock	-50	100	25

Hence, the replicating portfolio has the same cash flows as the stock.

Question 3

Use put-call parity.
Let P_3 = the value of the three month put, C_3 = the value of the three month call, S = the market value of a share of stock, and EX = the exercise price of the options. Then, from put-call parity:
$C_3 + [EX/(1 + r)^{0.25}] = P_3 + S$
Since both options have an exercise price of \$60 and both are worth \$10, then:
$EX/(1 + r)^{0.25} = S$
From put-call parity for the six-month options, we have:
$C_6 + [EX/(1 + r)^{0.50}] = P_6 + S$
Since $S = EX/(1 + r)^{0.25}$ and $EX/(1 + r)^{0.50} < EX/(1 + r)^{0.25}$, then the value of the six-month call is greater than the value of the six-month put.

Question 4

One strategy might be to buy a straddle, that is, buy a call and a put with exercise price equal to the asset's current price. If the asset price does not change, both options become worthless. However, if the price falls, the put will be valuable and, if price rises, the call will be valuable. The larger the price movement in either direction, the greater the profit.
If investors have underestimated volatility, the option prices will be too low. Thus, an alternative strategy is to buy a call (or a put) and hedge against changes in the asset price by simultaneously selling (or, in the case of the put, buying) delta shares of stock.