This version follows my clarification in the class regarding the asymmetrical change of exchange rate movement, i.e., the percentage of one currency's depreciation does not equal the percentage of another currency's appreciation.

Problem 1
Understand currency risk hedging

1) Since both exchange rates use Euro as base currency, so the change of 11.11% = (1.35-1.2)/1.35 should be Euro's depreciation.

   If I were to ask you how much US dollar has appreciated, you should calculate the percentage of appreciation as follows:
   (1.35- 1.2)/1.2 = 12.5%
   Alternatively, you can also calculate the appreciation in the following way:
   (1/1.2-1/1.35)/(1/1.35) = 12.5%

   The forward contract enables you to buy US dollar using Euro you have. So to calculate the company savings, Euro's deprecation rate is a relevant number. The money you saved for your company is the net of potential loss minus the cost of the forward contract, i.e., $10m x 11.11% - $10m x 0.005 = $1,111,000 - $ 5,000 = $1,106,000.

2) You locked in the exchange rate at $1.20 per euro, but euro is traded at $1.35 on 09/30, which means euro has appreciated by 12.5%, or (1.35-1.2)/1.2. In this case, you lost money and the total loss is: $10m x 12.5% + $10m x 0.01 = $1,250,000 + $ 100,000 = $1,350,000 or $1.35 million.

   If I were to ask you how much US dollar has depreciated, you can use the same formula as above, which is (1.35-1.2)/1.35 = 11.11%.

3) The lesson is that when exchange rate is extremely volatile, using currency forward contract may not eliminate currency risk completely. In the above case, Euro reversed its direction in a very dramatic way, and buying forward contract actually increased loss to the company. A better alternative is buy currency options, which give buyers the option not to execute the contract at a pre-fixed exchange rate, if the currency moves in the opposite direction as previously anticipated. For details, please read p.327 of the textbook.

Problem 2
Calculate Exchange Rate

1) The first three days of January were not trading days, so we begin our analysis on Jan. 4, when Yuan/dollar was at 6.8276 Yuan per dollar. On Sept. 30, the exchange rate moved to 6.6914. Obviously, US dollar has depreciated against Yuan during this period. The percentage of dollar's depreciation is roughly: (6.83-6.69)/6.83 = 2%.

   Similarly, if I were to ask you how much Yuan has appreciated, you can calculate in the following way:
   (6.83-6.69)/6.69 = 2%,
   Or (1/6.69-1/6.83)/(1/6.83) =2%
   (Since the first formula is much easier, I'd suggest that you always use it).

   In this case, the % of Yuan's appreciation and Dollar's depreciation are the same.

2) On Jan. 4, Euro/Dollar was traded at 0.69358 euro per dollar, and on Sept. 30, the rate was at 0.73526. So US dollar has appreciated against the Euro, by roughly (0.74-0.69)/0.69 = 7.2%. In other words, Euro has depreciated against US dollar by roughly 5.7% = (0.74-0.69)/0.74.

3) We know from 2), Euro has depreciated against US dollar by 5.7%, and from 1), we know US dollar has depreciated against Yuan by roughly 2%, so Euro must have depreciated against Yuan by roughly 2% + 5.7% = 7.7%.

   The above calculation is just an approximation. To be more precise, you need to first find out the direct rate between Yuan and Euro.

   Since ¥/€ = (¥/$) / (€/$), so on Jan. 4, the ¥/€ rate should be 6.83/0.69 =9.90, and on Sept. 30, the ¥/€ rate should be 6.69/0.74=9.04. So Euro has depreciated against Yuan by (9.90-9.04)/9.90=8.7%.

4) Since Danish Krone is pegged to the Euro, DKK must have also depreciated against Yuan by 8.7% during the same period. However, the same air ticket may still cost the same because the ticket price was originally quoted in Danish currency. But if the ticket price was quoted in Yuan, then this Danish business man may end up paying roughly 8.7% more. Of course, in reality, where the airline is headquartered also matters because it will determine which currency air ticket will be quoted in.