1) A trader has the following position: buying GBP 25 million versus EUR at 0.8760. If the current EURGBP rate is 0.8420, what is the mark-to-market value of the position in GBP terms?

   The trader's initial position is buying GBP 25,000,000 and selling EUR 25,000,000/0.8760) = EUR 28,538,813.

   The GBP-value of EUR 28,528,813 at the market rate of 0.8420 is 28,528,813 * 0.8420 = GBP 24,029,680.

   So the mark-to-market value is positive (GBP has strengthened, EUR has weakened) and equals GBP 25,000,000 - 24,029,680 = GBP 970,320.

2) Assume USDCHF is 0.9200 and USDJPY is 92.00, what is the implied CHFJPY cross rate?

   The CHFJPY cross rate represents to value of CHF 1 in terms of JPY.

   The value of CHF 1 is USD 1/0.9200, and the value of USD 1 is JPY 92.00. So the value of CHF 1 must be (1/0.9200)*92.00 = 100.00 in terms of JPY.

3) A trader has the following position: selling GBP 100 million versus JPY at 80.00. The current spot GBPJPY rate is 70.00, and current spot GBPUSD is 1.50. What is the market-to-market value of the trader's position in USD?

   The trader's initial position is selling GBP 100,000,000 and buying JPY 100,000,000*80.00 = JPY 8,000 million. The value of JPY 8,000 million at the current spot rate of 70.00 is GBP (8,000/70) million = GBP 114,285,714.

   So the mark-to-market is positive (GBP has weakened) GBP 14,285,714.

   And the USD value = 14,285,714 * 1.50 = USD 171,428,571

4) Assume the following rates, which include both bid and offer: USDNOK 8.5720 / 8.5730. If a customer (i.e., market taker) buys USD 25 million versus NOK, what will the USD amount be?

   NOTE: This was a typo. The question should have read "…what will the NOK amount be?" If you answered "USD 25 million", we will give full credit due to the confusing text.

   If you answered the corrected version "…what will the NOK amount be?" then:

   A market-taker buys USD on the offer, which is 8.5730. So the NOK amount would be given by

   25,000,000 * 8.5730 = NOK 214,325,000.

5) Find the all-in 3-month forward rate for USDJPY, ignoring bid/ask and assuming the following:

USDJPY spot	110.05
USD deposit rate	1.20%
JPY deposit rate	-0.15%

90 days between spot and the forward date. USD and JPY deposit rates follow ACT/360.

Forward = Spot * (1 + JPY deposit * 90/360) / (1 + USD deposit * 90/365)

So, Forward = 110.05 * (1-0.0015*0.25) / (1+0.0120*0.25) = 109.68

6) Calculate the EUR interest rates implied by the following rates ("implied yield"), ignoring bid/offer.

EURUSD spot	1.1050
EURUSD forward	1.1115
USD deposit rate	1.40%

180 days between spot and the forward date. USD and EUR deposit rates follow ACT/360.

Forward = Spot * (1 + USD deposit * 180/360) / (1 + EUR implied yield * 180/365)

So, 1.1115 = 1.1050 * (1+0.0140*0.5) / (1 + EUR implied yield *0.5)

EUR implied yield = 2 * ((1.1050/1.1115) * (1+0.0140*0.5) - 1)

EUR implied yield = 0.22%

7) Assume the rates listed below, with bid and offer listed. What is the upper arbitrage limit for 6 month AUDUSD all-in forward rate?

AUDUSD	0.7650 / 0.7655
USD deposit rate	1.10% / 1.20%
AUD deposit rate	2.95% / 3.05%

180 days between spot and the forward date. USD deposit rates follow ACT/360, AUD deposit rates follow ACT/365.

The upper arbitrage limit is found using the spot rate offer, USD deposit offer and AUD deposit bid.

Forward = 0.7655 * (1 + 1.20% * 180/360) / (1 + 2.95% * 180/365) = 0.7591

8) Given the information below, calculate the FX swap points for a EURUSD position maturing in 3 months that needs to be rolled out to the 6 month date, ignoring bid/offer.

EURUSD spot	1.0950
3mo USD deposit	1.20%
6mo USD deposit	1.40%
3mo EUR deposit	0.10%
6mo EUR deposit	0.20%

90 days between spot and the 3-month forward date. 180 days between spot and the 6-month forward date. USD and EUR deposit rates follow ACT/360. ? (EURUSD forward points follow the common convention of 10^-4.)

Swap points are the difference between the two forward rates, expressed in pips

Near rate = 1.0950 * (1 + 1.20% * 90/360) / (1 + 0.10% * 90/360) = 1.09801

Far rate = 1.0950 * (1 + 1.40% * 180/360) / (1 + 0.20% *180/360) = 1.10156

Swap points = +35.5

9) A trader (market-maker) executes a USDCHF forward contract, buying CHF. If the spot rate (including bid/offer) is 0.9910/0.9915 and the forward point quote (also with bid/offer) is -33/-31, then what is the trader's all-in forward rate? (USDCHF forward points follow the common convention of 10^-4.)

Buying CHF = selling USDCHF, so a market-maker would use the offer for both spot and for forward points. We apply the forward point quote of "-31" by adjusting the decimal place to reflect that forward points are quoted in pips.

So, the all-in forward rate = 0.9915 - 0.0031 = 0.9886

10) If CNY deposit rates are higher than USD deposit rates for a particular maturity, then must the USDCNY non-deliverable forward rate for the same maturity be higher than the USDCNY spot rate? **(Indicate your answer by circling one of the following choices)**

a) Yes, lower USD deposit rates imply the USD is stronger on a forward basis

b) No, lower USD deposit rates imply the USD is weaker on a forward basis

c) No, non-deliverable forward rates can violate the covered interest rate parity formula

d) Yes, non-deliverable forward rates are always above spot rates

Covered interest rate parity does not apply to non-deliverable forward rates. The relationship between deposit rates does not necessarily influence NDF rates. It is possible for NDF rates to be either higher or lower than spot rates (meaning that even with very low USD interest rates, negative implied yields for CNY are possible in theory.)

11) Let ***S*** be the spot rate, ***rd*** the domestic deposit rate, ***rf*** the foreign deposit rate, and ***T*** time to maturity. Which of the following is a formula for forward points? **(Indicate your answer by circling one of the following choices)**

a) ***S*** * (1+ ***rf*** *T)/ (1+ ***rd*** *T) * 10,000

b) ***S*** * (1+ ***rd*** *T)/ (1+ ***rf*** *T) * 10,000

c) ***S*** * { (1+ ***rf*** *T)/ (1+ ***rd*** *T) - 1 } * 10,000

d) ***S*** * { (1+ ***rd*** *T)/ (1+ ***rf*** *T) - 1 } * 10,000

Forward rate formula: ***F*** = ***S*** * (1+ ***rd*** *T)/ (1+ ***rf*** *T)

Forward points = ***F*** - ***S*** (times a constant, which is 10,000 for some currencies)

So, forward points (for some currencies) = { ***S*** * (1+ ***rd*** *T)/ (1+ ***rf*** *T) - ***S*** } * 10,000,

which is equivalent to d)

12) The price of an AUD put USD call struck at 0.9500 is 0.0200 USD pips. If the spot rate is 1.0200 and the forward rate is 0.9900, then what is the price of an AUD call USD put struck at 0.9500? (Assume USD deposit rates are zero.)

By put-call parity we know that for a call and put with equal strikes, Call - Put = (Forward - Strike), where we have omitted the discount factor since we assume USD deposit rates are zero.

In this case, using USD as the numeraire currency, Call - 0.0200 = 0.9900 - 0.9500, or Call = 0.0600

13) Let the EURUSD spot rate be 1.3000 and the forward rate 1.2800. If a EUR put USD call has a strike of 1.2000 and a premium of 0.0390 in USD pips, then which of the following might be its premium in EUR% **(Indicate your answer by circling one of the following choices)**

a) 3.00%

b) 3.05%

c) 3.25%

d) 3.90%

Premium of "0.0390 in USD pips", means the premium is USD 0.0390 for a notional = EUR 1. If we calculate the EUR-value of this exact premium, that will give us the premium in %EUR.

The conversion to EUR is done using the spot rate: 0.0390 / spot = 0.0390 / 1.3000 = 0.0300.

So premium is 3.00% of EUR.

14) The EURGBP spot rate is 0.8400. The one week outright is 0.8420 and the one month outright is 0.8480. Which of these options have the highest vega? **(Indicate your answer by circling one of the following choices)**

a) 0.7480 EUR call expiring in one month

b) 0.8480 EUR call expiring in one month

c) 0.7400 EUR call expiring in one hour

d) 0.8400 EUR call expiring in one hour

Vega is highest for at-the-money options, so we can eliminate a) and c). Of the at-the-money options, b) has significantly longer time to maturity so must also have the higher vega.

15) If EURUSD risk reversals are strongly negative (puts are favored over calls), then which of the following is true of the market implied EURUSD distribution? **(Indicate your answer by circling one of the following choices)**

a) The distribution has fat tails relative to a lognormal distribution

b) The distribution is skewed to the downside

c) The mean of the distribution is lower

d) Both b) and c) are true

The mean of the market-implied distribution is always given by the forward rate, so c) and d) are false. A risk reversal strategy means buying an out-of-the-money call and selling an out-of-the-money put so this strategy's value depends on market implied skewness. The question refers to situations where puts are relatively more expensive than calls, which corresponds to negative skewness.