ANSWERS MIDTERM TEST 2, 26 NOVEMBER 2019 (draft)

Number of points = (number of correctly answered questions – 4) × 7,5

Grade = (number of points + 10) / 10

VERSION A / VERSION B

1./7. Answer: b

Clean price = Cash (dirty) price – Accrued interest.

2./8. Answer: b

In an efficient market, the yield of a zero coupon bond is equal to the spot rate corresponding to the maturity of the bond.

3./9. Answer: a

The pay-off of bond C can be replicated by going long in 2 bonds A and shorting 1 bond B.
2 x 882,02 – 1004,12 = 759,92.

4./10. Answer: d

$P_A = 1.000 = 1020/(1+r_1) \Rightarrow r_1 = 2,0\%$
$P_B = 970,85 = 40/(1+r_1) + 1040/(1+r_2)^2 \Rightarrow r_2 = 5,7\%$
${}_1f_2 = (1+r_2)^2/(1+r_1)-1 = (1,057)^2/(1,020) -1 = 9,4\%$
${}_1f_2 = 9,4\%$, which is closest to answer d: 5,9%

5./11. Answer: b

$P_0 / EPS_1 = k / (r – g)$

6./12. Answer: d

While an investor's short position remains open, she must pay any dividends made.

7./13. Answer: b
$(P_1 + div_1 – P_0) / P_0 = (104 + div_1 – 100) / 100 = 8\% \Rightarrow div_1 = 4$

Or, alternatively:
$g = (P_1 – P_0) / P_0 = 4\%$
$P_0 = div_1 / (r-g) = 100 = div_1 / (0.08-0.04) \Rightarrow div_1 = 4$

$wpa_1 = div_1 / k = 4 / 0,4 \Rightarrow wpa_1 = 10$

8./14. Answer: c

At t=3 the following applies:
$P_{ex,A} = div_{4,A}/(r-g_A) = (2 \times 0{,}25 \times 1{,}04^3) / (0{,}10-0{,}04) = 9{,}37$
$P_{ex,B} = div_{4,B}/(r-g_B) = (div_{1,A} \times 1{,}05^3) / (0{,}10-0{,}05) = 9{,}37 \Rightarrow$

$div_{1,A} = 0{,}405 \Rightarrow EPS_{1,A}=1{,}62.$

9./15. Answer: a

Expected returns of portfolios are not affected by correlations and variances between/of constituents (*ceteris paribus*). Standard deviations of returns of portfolios do depend on correlations and variances variances between/of constituents, and do not depend on their expected returns (*ceteris paribus*).

10./16. Answer: b

The correlation coefficient is positive.

11./1. Answer: a

If $\rho = 0$, then $\sigma_P^2 = x_A^2\sigma_A^2 + x_B^2\sigma_B^2$. In the given case, $\sigma_P^2 = 0{,}5^2\ 0{,}30^2 + 0{,}5^2\ 0{,}40^2 = 0{,}0625$. This corresponds to $\sigma_P = 0{,}25$

12./2. Answer: a

For the MRP it holds that $x_A = \sigma_B^2 / (\sigma_A^2 + \sigma_B^2)$. In the given case, this implies $x_A = 0{,}64$ and $x_B = 0{,}36$. These weights in turn imply $E(R_{MRP}) = 0{,}23$.

13./3. Answer: a

a. False: correlation P_1 and P_4 is -1, combinations are on line from F through P_1 and on line from F through P_4.
b. True: both P_1 and P_3 are a combination of F and a long position in P_2
c. True: the slope of the straight line FP_4 is minus the slope of line FP_2
d. True: P_4 = short in P_2 and long in F.

14./4. Answer: d

a. True: by combining P_1 and P_3 MV-efficient investment F can be obtained.
b. True: P_1 consists of F and P_2.
c. True: P_1 and P_2 both consist of (F and) P_2.
d. False: P_2 is not in the set of MV-efficient portfolios that is reflected by the (imaginary) line that starts at F and is tangent to the curve.

15./5. Answer: a

In Figure B and D short selling is possible, in C and D the returns are perfectly positively correlated.

16./6. Answer: c

A portfolio that consists exclusively of Q is not on the efficient frontier and therefore unattractive for any investor. A risk-neutral investor will select the portfolio that has the highest expected return, which here is a portfolio that consists exclusively of R.