U22053: Money, Banking, and Finance

ASSIGNMENT 3

This assignment contains 7 questions. You are required to answer all questions. Answer the questions in the order numbered. The marks for each question are as indicated. **Show all calculations and support all assumptions.**

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QUESTION 1:

(a)(i) Explain the difference between Ω-Bank's return on assets (ROA) and its return on equity ROE and how these measures of bank profitability are related. (ii) Ω-Bank has informed bank analysts that its ROA for the most recent financial period is 1 per cent. The industry average ROA is 1.5 per cent. Explain how ratio analysis can help the bank managers of Ω-Bank identify the reason for this discrepancy. (iii) What is the difference between the net interest margin and the spread.   [3 marks]

(b) Explain why the manager of Ω-Bank would want the bank to be highly leveraged and, in turn, why Ω-Bank's shareholders would want the bank to be less highly leveraged?   [1 mark]

(c) Δ-Bank has released its financial statement which indicate that the value of its assets year end is £40 billion and the value of its liabilities £36 billion. If Δ-Bank has a 2 per cent ROA, what is its ROE?   [1 mark]

(d) θ-Bank has £200,000,000 in assets and £20,000,000 in equity capital. (i) If θ-Bank has a 2 per cent ROA, what is its ROE? (ii) Suppose that θ-Bank's equity capital declines to £10,000,000, while its ROA remains unchanged. What is θ-Bank's ROE?   [1 mark]

(e) The return on equity capital can be determined by using the return on assets as follows:

$$ROE = ROA \times \frac{\text{Total assets}}{\text{Total equity capital}}$$

Explain precisely what the above relationship demonstrates.   [2 marks]

(f) In the aftermath of the 2008-2009 global banking crisis, the consensus among central banks was that in the context of the Basel Accord, regulatory capital requirements for the banking system were far too low, suggesting that bank leverage was too high. Thus:

(i) Explain the concept regulatory capital requirements and why would regulatory capital requirements being too low result in leverage being too high? What does leverage being too high have to do with the financial crisis? [2 marks]

(ii) What are the definitive differences between Common equity Tier 1, Tier T1 and Tier II capital of a commercial bank? [2 marks]

QUESTION 2:

(a) Zeta Asset Management has £100,000,000 under management in fixed income securities and is looking to invest for three years in the Eurozone to earn the highest possible return. Zeta Asset Management has three available options from which to choose: (i) Reinvest the three one-year bonds which pay interest rates of 8% in the first year, 11% in the second year, and 7% in the third year; (b) purchase a two-year bond with a 10% interest rate and then reinvest the amount received when the bond matures into a one-year bond with an interest of 7%; or (ii) purchase a three-year bond with an interest rate of 8.5%. The face value of the bond is £1,000. (iii) Assuming annual compounding, no-coupon payments, and no transaction costs, which option should Zeta Asset Management choose? [3 marks]

(b) Let the interest rate on a one-year Treasury security be available in the market at 1%. Investors in Treasuries expect that the interest rates on one-year Treasury bills over the next three years will be 2%, 3%, and 2%. Use the expectations theory to calculate the current interest rates on two-year, three-year, and four-year securities. [2 marks]

(c) Assuming the following information on Treasury securities:

1-year	2-year	3-year	4-year	5-year
0.75%	1.25%	2.00%	2.75%	3.25%

On account that the liquidity preference theory is correct, what did investors on this day expect the interest rate to be on the one-year Treasury bill two-years from now if the term premium on a two-year Treasury note was 0.10% and the term premium on a three-year Treasury note was 0.25%? [2 marks]

(d) The following yield curve is observed in the market.

Maturity	Yield
One day	2.00%
One year	5.50
Two years	6.50
Three years	9.00

What is the one-year forward rate for the period commencing one year from today, $_2f_1$? [2 marks]

(e) Let the rate on a three-year Treasury security be 5.25 per cent and the rate on a four-year Treasury security be 5.50 per cent. The one-year interest rate expected in three years, $E\left(_4r_1\right)$, is 6.10 per cent. Based on your understanding of the liquidity preference, what is the liquidity premium on the four-year Treasury security? [1 mark]

QUESTION 3:

(a) Explain the money market instrument repurchase agreement and how and why banks use repurchase agreements as a source of funds in the financial markets. [2 marks]

(b) The quoted market rate for a 91-day Treasury bill is 5 per cent in the USA, UK, France and Australia. Each Treasury bill has a face value of £1,000,000 of the local currency. Determine the amount paid for the bill in each country? [3 marks]

(c)(i) WZX, a UK pension fund, is interested in investing in a £1,000,000 sterling 60-day banker's acceptance and seeks a yield of 9.5 per cent. What is the discount rate and the amount of this discount? [2 marks]

(ii) If the actual discount rate was 9.5 per cent, what would be the yield and the amount WZX would be expected to pay for the banker's acceptance? [2 marks]

(iii) If the amount paid in question (ii) were £975,000,000, what is the discount rate? [1 mark]

QUESTION 4:

(a)(i) Treasury bills are currently trading in the market with a maturity of 13 weeks and have a yield to maturity of 2.5 per cent. At the same time, long-term Treasury bonds have yields of about 3.5 percent. On account of the following:

$$r_n = r_r + P^\varepsilon + r_p$$

Explain why these returns differ. [1 mark]

(ii) Long-term BBB-rated corporate bonds yield more than AAA-rated corporate bonds with the same maturity. Explain in the context of the following:

$$r_n = r_r + P^\varepsilon + r_p$$

[1 mark]

(b) Account for the difference between a zero-coupon bond and a normal coupon bond. [2 marks]

(c) Explain what happens to the fair present value of a bond when the required rate of return on the bond increases. [2 marks]

(d) Orius Pension fund holds as part of its pension fund portfolio bonds purchased for €900 million that have a par value of €50,000 with 50 years to maturity, and annual coupon rate of 4 per cent. The Pension fund's financial economist forecast that in 35 years the required rate of return on these bonds will be 8 per cent. Using **present value tables**, determine the price Orius Pension fund could expect to receive should it choose to sell these bonds 35 years from now. [2 marks]

(e) TX Water has three bonds trading in the market with a face value of £1,000. These corporate bonds pay interest semi-annually and have 12 years remaining to maturity. The required rate of return for a bond of this risk is 10 per cent. Using the following coupon rates:

 (a) The bond has a 6 per cent coupon rate.

 (b) The bond has a 8 per cent coupon rate.

 (c) The bond has a 10 per cent coupon rate.

 (d) The bond has a 6 per cent coupon rate.

(i) Calculate the fair price or the present values the above bonds.   [4 marks]

(ii) What do your calculations to part (a), (b) and (c) reveal about the relation between coupon rates and present values?   [2 marks]

(iii) Repeat parts (a), (b), and (c) of problem (b) using a required rate of return on the bond of 8 per cent. What does your calculations suggest about the relation between the coupon rates and bond price volatility?   [2 marks]

QUESTION 5:

(a) (i) Explain the main difference between a stock exchange and an over-the-counter market? What are the main stock market indexes of the London stock exchange and the exchange for lesser stocks?
                                                                                        [2 marks]

(ii) Describe the fundamental value of a share of stock and explain the Gordon Growth model. What is it that the Gordon Growth model help to measure?   [2 marks]

(iii) What is the relationship between HSBC's profit and its stock price?   [1 mark]

(iv) Let HSBC's stock be currently paying a dividend of £1.75 per share. HSBC's dividend is expected to grow at a rate of 5 per cent annually, and the rate of return required by investors is 8 per cent. Estimate the price per share for HSBC's stock.   [2 mark]

(b) Rho-Asset management has £7 billion under management and is deliberating purchasing the stock of ZX a UK gaming company that is currently selling at £64 per share. Stock market analyst at Rho-Asset management expect the stock to pay £4.50 in dividends next year.

(i) If dividends are expected to grow at a constant rate of 3 per cent per annum, determine the expected rate of return of ZX's stock.   [1 mark]

(ii) If dividends are expected to grow at a constant rate of 5 per cent per annum, determine the expected rate of return of ZX's stock.   [1 mark]

(iii) What does your calculations to part (i) and (ii) suggest about the impact of dividend growth rates on the expected rate of return on stocks?   [1 mark]

(c) Analysts at Rho-Asset management are evaluating the stock of ALON.com, which they expect to experience supernormal growth of dividends of 8 per cent over the next six years. Following this period, dividends are expected to grow at a constant rate of 3 per cent. ALON.com stock paid a dividend of £5.50 last year and the required rate of return on the stock is 10 per cent. Determine the price of ALON.com stock.

(i) Find the stock's value at the beginning of the constant growth period.   [2 marks]

(ii) Find the present value of constant growth in dividends.   [2 marks]

QUESTION 6:

(a) Explain the relationship between the expected return and the required return.   [2 marks]

(b) (i) Explain the concept portfolio diversification and why it is that investors seek diversified portfolios? (ii) What types of risk are present in a diversified portfolio? (iii) Which type of risk remains after the portfolio has been diversified?   [3 marks]

(b) According to portfolio theory, how is the risk of the portfolio measured precisely?   [1 mark]

(c) Is the standard deviation of the return of a portfolio higher than, equal to or less than the average standard deviation of the stocks in the portfolio? Why?   [2 marks]

(c) In what sense do investors face a trade-off between risk and return?   [1 mark]

(d) Explain the difference between market risk and idiosyncratic risk? How does diversification reduce the risk of a portfolio?   [2 marks]

(e) Let the rates of return for stock γ and stock κ be as follows:

	Rates of Return	
Probability	Stock γ	Stock κ
0.1	-10%	4%
0.3	0	8
0.3	6	0
0.2	10	-5
0.1	20	15

Calculate:
(i)   the expected return for each stock.   [2 marks]
(ii) the variance and standard deviation of the rate of return for each stock,   [4 marks]
(iii) the covariance between the rates of return for each stock, and   [2 marks]
(iv) the correlation coefficient between the rates of return for each stock.   [1 mark]

QUESTION 7:

(a) Briefly discuss the real rate of return, expected inflation, and risk component of the required rate of return.   [2 marks]

(b) Explain the relation between risk and return as demonstrated by the CAPM.   [2 marks]

(c) Discuss the advantage and disadvantages of the standard deviation as a measure of risk for individual securities and portfolios of securities.   [3 marks]

(d) Explain how the beta coefficient can be used to estimate the required return for an individual asset or portfolio.   [2 marks]

(e) What are the relative merits of measuring the risk of an individual stock by beta versus measuring the risk by standard deviation?   [2 marks]

(f) What is the beta of a stock whose covariance with the market portfolio returns is 0.0045 if the variance of the rate of return on the market portfolio is 0.002?   [2 marks]

(g) Let the yield on Treasury bills be 10 per cent, and the beta on Na.com be 2. Given an expected return of 18 per cent for the ensuing financial year, what is the market's expected return?   [3 marks]

(h) The risk-free rate is 7 per cent, and the expected return on the market portfolio is 12 per cent. What is the equation for the security market line (SML)?   [2 marks]

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Table A-3 Present Value Interest Factors for One Dollar Discounted at k Percent for n Periods: $PVIF_{k,n} = 1/(1+k)^n$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
2	0.9803	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264	0.8116	0.7972	0.7831	0.7695	0.7561	0.7432	0.6944	0.6504	0.6400	0.5917
3	0.9706	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513	0.7312	0.7118	0.6931	0.6750	0.6575	0.6407	0.5787	0.5245	0.5120	0.4552
4	0.9610	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830	0.6587	0.6355	0.6133	0.5921	0.5718	0.5523	0.4823	0.4230	0.4096	0.3501
5	0.9515	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209	0.5935	0.5674	0.5428	0.5194	0.4972	0.4761	0.4019	0.3411	0.3277	0.2693
6	0.9420	0.8880	0.8375	0.7903	0.7462	0.7050	0.6663	0.6302	0.5963	0.5645	0.5346	0.5066	0.4803	0.4556	0.4323	0.4104	0.3349	0.2751	0.2621	0.2072
7	0.9327	0.8706	0.8131	0.7599	0.7107	0.6651	0.6227	0.5835	0.5470	0.5132	0.4817	0.4523	0.4251	0.3996	0.3759	0.3538	0.2791	0.2218	0.2097	0.1594
8	0.9235	0.8535	0.7894	0.7307	0.6768	0.6274	0.5820	0.5403	0.5019	0.4665	0.4339	0.4039	0.3762	0.3506	0.3269	0.3050	0.2326	0.1789	0.1678	0.1226
9	0.9143	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241	0.3909	0.3606	0.3329	0.3075	0.2843	0.2630	0.1938	0.1443	0.1342	0.0943
10	0.9053	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855	0.3522	0.3220	0.2946	0.2697	0.2472	0.2267	0.1615	0.1164	0.1074	0.0725
11	0.8963	0.8043	0.7224	0.6496	0.5847	0.5268	0.4751	0.4289	0.3875	0.3505	0.3173	0.2875	0.2607	0.2366	0.2149	0.1954	0.1346	0.0938	0.0859	0.0558
12	0.8874	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3186	0.2858	0.2567	0.2307	0.2076	0.1869	0.1685	0.1122	0.0757	0.0687	0.0429
13	0.8787	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897	0.2575	0.2292	0.2042	0.1821	0.1625	0.1452	0.0935	0.0610	0.0550	0.0330
14	0.8700	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633	0.2320	0.2046	0.1807	0.1597	0.1413	0.1252	0.0779	0.0492	0.0440	0.0254
15	0.8613	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2394	0.2090	0.1827	0.1599	0.1401	0.1229	0.1079	0.0649	0.0397	0.0352	0.0195
16	0.8528	0.7284	0.6232	0.5339	0.4581	0.3936	0.3387	0.2919	0.2519	0.2176	0.1883	0.1631	0.1415	0.1229	0.1069	0.0930	0.0541	0.0320	0.0281	0.0150
17	0.8444	0.7142	0.6050	0.5134	0.4363	0.3714	0.3166	0.2703	0.2311	0.1978	0.1696	0.1456	0.1252	0.1078	0.0929	0.0802	0.0451	0.0258	0.0225	0.0116
18	0.8360	0.7002	0.5874	0.4936	0.4155	0.3503	0.2959	0.2502	0.2120	0.1799	0.1528	0.1300	0.1108	0.0946	0.0808	0.0691	0.0376	0.0208	0.0180	0.0089
19	0.8277	0.6864	0.5703	0.4746	0.3957	0.3305	0.2765	0.2317	0.1945	0.1635	0.1377	0.1161	0.0981	0.0829	0.0703	0.0596	0.0313	0.0168	0.0144	0.0068
20	0.8195	0.6730	0.5537	0.4564	0.3769	0.3118	0.2584	0.2145	0.1784	0.1486	0.1240	0.1037	0.0868	0.0728	0.0611	0.0514	0.0261	0.0135	0.0115	0.0053
21	0.8114	0.6598	0.5375	0.4388	0.3589	0.2942	0.2415	0.1987	0.1637	0.1351	0.1117	0.0926	0.0768	0.0638	0.0531	0.0443	0.0217	0.0109	0.0092	0.0040
22	0.8034	0.6468	0.5219	0.4220	0.3418	0.2775	0.2257	0.1839	0.1502	0.1228	0.1007	0.0826	0.0680	0.0560	0.0462	0.0382	0.0181	0.0088	0.0074	0.0031
23	0.7954	0.6342	0.5067	0.4057	0.3256	0.2618	0.2109	0.1703	0.1378	0.1117	0.0907	0.0738	0.0601	0.0491	0.0402	0.0329	0.0151	0.0071	0.0059	0.0024
24	0.7876	0.6217	0.4919	0.3901	0.3101	0.2470	0.1971	0.1577	0.1264	0.1015	0.0817	0.0659	0.0532	0.0431	0.0349	0.0284	0.0126	0.0057	0.0047	0.0018
25	0.7798	0.6095	0.4776	0.3751	0.2953	0.2330	0.1842	0.1460	0.1160	0.0923	0.0736	0.0588	0.0471	0.0378	0.0304	0.0245	0.0105	0.0046	0.0038	0.0014
30	0.7419	0.5521	0.4120	0.3083	0.2314	0.1741	0.1314	0.0994	0.0754	0.0573	0.0437	0.0334	0.0256	0.0196	0.0151	0.0116	0.0042	0.0016	0.0012	*
35	0.7059	0.5000	0.3554	0.2534	0.1813	0.1301	0.0937	0.0676	0.0490	0.0356	0.0259	0.0189	0.0139	0.0102	0.0075	0.0055	0.0017	0.0005	*	*
36	0.6989	0.4902	0.3450	0.2437	0.1727	0.1227	0.0875	0.0626	0.0449	0.0323	0.0234	0.0169	0.0123	0.0089	0.0065	0.0048	0.0014	*	*	*
40	0.6717	0.4529	0.3066	0.2083	0.1420	0.0972	0.0668	0.0460	0.0318	0.0221	0.0154	0.0107	0.0075	0.0053	0.0037	0.0026	0.0007	*	*	*
50	0.6080	0.3715	0.2281	0.1407	0.0872	0.0543	0.0339	0.0213	0.0134	0.0085	0.0054	0.0035	0.0022	0.0014	0.0009	0.0006	*	*	*	*

Table A-4 Present Value Interest Factors for a One-Dollar Annuity Discounted at *k* Percent for *n* Periods: PVIFA = $[1 - 1/(1 + k)^n] / k$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	20%	24%	25%	30%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8333	0.8065	0.8000	0.7692
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.7125	1.6901	1.6681	1.6467	1.6257	1.6052	1.5278	1.4568	1.4400	1.3609
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4437	2.4018	2.3612	2.3216	2.2832	2.2459	2.1065	1.9813	1.9520	1.8161
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.1024	3.0373	2.9745	2.9137	2.8550	2.7982	2.5887	2.4043	2.3616	2.1662
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6959	3.6048	3.5172	3.4331	3.3522	3.2743	2.9906	2.7454	2.6893	2.4356
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.2305	4.1114	3.9975	3.8887	3.7845	3.6847	3.3255	3.0205	2.9514	2.6427
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.7122	4.5638	4.4226	4.2883	4.1604	4.0386	3.6046	3.2423	3.1611	2.8021
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5348	5.3349	5.1461	4.9676	4.7988	4.6389	4.4873	4.3436	3.8372	3.4212	3.3289	2.9247
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.9952	5.7590	5.5370	5.3282	5.1317	4.9464	4.7716	4.6065	4.0310	3.5655	3.4631	3.0190
10	9.4713	8.9826	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.4177	6.1446	5.8892	5.6502	5.4262	5.2161	5.0188	4.8332	4.1925	3.6819	3.5705	3.0915
11	10.368	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	6.2065	5.9377	5.6869	5.4527	5.2337	5.0286	4.3271	3.7757	3.6564	3.1473
12	11.255	10.575	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.4924	6.1944	5.9176	5.6603	5.4206	5.1971	4.4392	3.8514	3.7251	3.1903
13	12.134	11.348	10.635	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.7499	6.4235	6.1218	5.8424	5.5831	5.3423	4.5327	3.9124	3.7801	3.2233
14	13.004	12.106	11.296	10.563	9.8986	9.2950	8.7455	8.2442	7.7862	7.3667	6.9819	6.6282	6.3025	6.0021	5.7245	5.4675	4.6106	3.9616	3.8241	3.2487
15	13.865	12.849	11.938	11.118	10.380	9.7122	9.1079	8.5595	8.0607	7.6061	7.1909	6.8109	6.4624	6.1422	5.8474	5.5755	4.6755	4.0013	3.8593	3.2682
16	14.718	13.578	12.561	11.652	10.838	10.106	9.4466	8.8514	8.3126	7.8237	7.3792	6.9740	6.6039	6.2651	5.9542	5.6685	4.7296	4.0333	3.8874	3.2832
17	15.562	14.292	13.166	12.166	11.274	10.477	9.7632	9.1216	8.5436	8.0216	7.5488	7.1196	6.7291	6.3729	6.0472	5.7487	4.7746	4.0591	3.9099	3.2948
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.3719	8.7556	8.2014	7.7016	7.2497	6.8399	6.4674	6.1280	5.8178	4.8122	4.0799	3.9279	3.3037
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.6036	8.9501	8.3649	7.8393	7.3658	6.9380	6.5504	6.1982	5.8775	4.8435	4.0967	3.9424	3.3105
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.8181	9.1285	8.5136	7.9633	7.4694	7.0248	6.6231	6.2593	5.9288	4.8696	4.1103	3.9539	3.3158
21	18.857	17.011	15.415	14.029	12.821	11.764	10.836	10.017	9.2922	8.6487	8.0751	7.5620	7.1016	6.6870	6.3125	5.9731	4.8913	4.1212	3.9631	3.3198
22	19.660	17.658	15.937	14.451	13.163	12.042	11.061	10.201	9.4424	8.7715	8.1757	7.6446	7.1695	6.7429	6.3587	6.0113	4.9094	4.1300	3.9705	3.3230
23	20.456	18.292	16.444	14.857	13.489	12.303	11.272	10.371	9.5802	8.8832	8.2664	7.7184	7.2297	6.7921	6.3988	6.0442	4.9245	4.1371	3.9764	3.3254
24	21.243	18.914	16.936	15.247	13.799	12.550	11.469	10.529	9.7066	8.9847	8.3481	7.7843	7.2829	6.8351	6.4338	6.0726	4.9371	4.1428	3.9811	3.3272
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.8226	9.0770	8.4217	7.8431	7.3300	6.8729	6.4641	6.0971	4.9476	4.1474	3.9849	3.3286
30	25.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.4269	8.6938	8.0552	7.4957	7.0027	6.5660	6.1772	4.9789	4.1601	3.9950	3.3321
35	29.409	24.999	21.487	18.665	16.374	14.498	12.948	11.655	10.567	9.6442	8.8552	8.1755	7.5856	7.0700	6.6166	6.2153	4.9915	4.1644	3.9984	3.3330
36	30.108	25.489	21.832	18.908	16.547	14.621	13.035	11.717	10.612	9.6765	8.8786	8.1924	7.5979	7.0790	6.6231	6.2201	4.9929	4.1649	3.9987	3.3331
40	32.835	27.355	23.115	19.793	17.159	15.046	13.332	11.925	10.757	9.7791	8.9511	8.2438	7.6344	7.1050	6.6418	6.2335	4.9966	4.1659	3.9995	3.3332
50	39.196	31.424	25.730	21.482	18.256	15.762	13.801	12.233	10.962	9.9148	9.0417	8.3045	7.6752	7.1327	6.6605	6.2463	4.9995	4.1666	3.9999	3.3333