KASNEB

CIFA PART III SECTION 5

FIXED INCOME INVESTMENTS ANALYSIS

WEDNESDAY: 25 May 2016.

The corporate tax rate is 30%.

| Ansv | ver AL | L questions. Marks allocated to each question are shown at the end of the question. Show A | LL your workings. |
|------------|--------|--|-----------------------------|
| QUE (a) | | N ONE ss three negative bond covenants that could be included in a bond indenture. | (3 marks) |
| | | uss the following coupon payment structures offered in the global fixed income markets: | (, |
| (b) | | uss the following coupon payment structures offered in the global fixed income markets: | |
| | (i) | Floating rate notes (FRNs). | (2 marks) |
| | (ii) | Step-up coupon bonds. | (2 marks) |
| | (iii) | Credit-linked coupon bonds. | (2 marks) |
| | (iv) | Payment-in-kind (PIK) coupon bonds. | (2 marks) |
| | (v) | Credit-linked coupon bonds. Payment-in-kind (PIK) coupon bonds. Deferred coupon bonds. Solution has just purchased a bond with a par value of Sh 1 000 at 8 price of Sh 959 20 and should be shou | (2 marks) |
| (c) | | s Maina has just purchased a bond with a par value of Sh.1,000 at a price of Sh.959.20 and nent rate of 5 per cent. The bond has 5 years to maturity. uired: The bond's current yield. The bond's adjusted current yield. The bond's yield-to-maturity (YTM). N TWO mercial banks act as an important source of credit to both individual and corporate clients. For | an annual coupon |
| | Requ | uired: | |
| | (i) | The bond's current yield. | (2 marks) |
| | (ii) | The bond's adjusted current yield. | (2 marks) |
| | (iii) | The bond's yield-to-maturity (YTM). | (3 marks) (Total: 20 marks) |
| OUE | 'CTION | N TWO | |
| (a) | Com | mercial banks act as an important source of credit to both individual and corporate clients. For cted to maintain considerable levels of liquidity at all times to mitigate against bank runs in the f | |
| | Requ | uired: | |
| | | reference to the above statement, discuss the following short-term wholesale funding alternercial banks: | natives available to |
| | (i) | Reserve funds | (2 marks) |
| | (ii) | Interbank funds. | (2 marks) |
| | (iii) | Large-denomination negotiable certificates of deposits. | (2 marks) |
| (b) | Expla | ain three factors that could affect the level of a repurchase agreement (repo) margin. | (3 marks) |
| (c) | Evalu | uate three credit risk measures of a bond. | (3 marks) |
| (d) | a non | leza Limited has 8% convertible bond which is due for redemption in 5 years' time. The bond is minal value of Sh.82 per Sh.100. The bond can be converted into 25 ordinary shares in 5 years set price per share of the company is Sh.3.50. This price is expected to grow at a constant rate | ' time. The current |

Time Allowed: 3 hours.

| | Requ (i) | Required: (i) Determine whether the bondholders would consider converting the bond or redeeming the bond fifth year. | | | | | | | | | | | | |
|------------|--|---|---------------------------------------|--------------------------------------|--|-----------------------------|--|--|--|--|--|--|--|--|
| | (ii) | Calcula | te the cost of the conve | rtible bond. | . (То | (5 marks) tal: 20 marks) | | | | | | | | |
| QUI (a) | | THREE | E assumptions of yield-to | o-maturity (YTM). | | (3 marks) | | | | | | | | |
| (b) | b) Evaluate three differences between the money market and the bond market in relation to yield measures. | | | | | | | | | | | | | |
| (c) | The following information relates to a portfolio constructed from zero coupon issues of Sh.100 million: | | | | | | | | | | | | | |
| | Portfolio I II | | 2 year issue Sh.50 million | 16 year issue - Sh.100 million | 30 year issue Sh.50 million | | | | | | | | | |
| | Requ | | e duration for each issu | e of the securities in the | portfolio. | (3 marks) | | | | | | | | |
| | (ii) Effective duration for each portfolio. | | | | | | | | | | | | | |
| (d) | | | o-coupon bond yields 6 spectively. | .0 per cent. The two-ye | ear and three-year zero coupon bonds yield 7 | .0 per cent and | | | | | | | | |
| | Requ (i) | | ward rate for a one-year | r loan beginning in one | year. | (3 marks) | | | | | | | | |
| | (ii) | year. | (3 marks) | | | | | | | | | | | |
| | (iii) | year. year. years. (To | (3 marks) tal: 20 marks) | | | | | | | | | | | |
| QUE (a) | | FOUR late four o | characteristics of credit | scores used in credit an | alysis models. | (8 marks) | | | | | | | | |
| (b) | In January 2016, the government of your country issued 10-year on-the-run treasury bond, and a 10-year infrastructur bond. The yield on the 10-year on-the-run treasury bond issue was 4.88%, while the yield on the 10% infrastructur bond was 6.24%. | | | | | | | | | | | | | |
| | Requ | | | of file | | (2 | | | | | | | | |

Absolute yield spread.

(2 marks)

(i) Absolute yield spread. (2 marks)

(ii) Relative yield spread. (2 marks)

(iii) Yield ratio. (2 marks)

Waumini county government has issued 8%, Sh.1000 par value municipal bond with a maturity of 10 years. The spot (c) rate of interest rates have been forecasted as follows:

| Year | Spot rate (yield) % |
|------|---------------------|
| 1 | 9 |
| 2 | 10 |
| 2 3 | 11 |
| 4 | 8 |
| 5 | 10 |
| 6 | 11 |
| 7 | 9 |
| 8 | 12 |
| 9 | 8.5 |
| 10 | 10 |

Required:

The Arbitrage-free value of the bond.

(6 marks)

(Total: 20 marks) CF52 Page 2 Out of 3

QUESTION FIVE

(a) (i) Equilibrium term structure models such as the Cox-Ingersoll-Ross Model and the Vasicek Model usually seek to describe the dynamics of the term structure using fundamental economic variables that are assumed to affect interest rates.

Required:

In relation to the above statement, discuss three characteristics shared by equilibrium term structure models.

(3 marks)

(ii) Summarise three strengths of the reduced form models used in corporate credit risk analysis.

(3 marks)

(b) (i) Explain the term "price value of a basis point (PVBP)" as used in fixed income securities.

(1 mark)

(ii) Mr. Hakiba is holding a Sh.1,000, 8%, 10 year bond which is currently selling at Sh.877.110. The current market yield is 10%. He anticipates that the interest rates would increase in the near future, a fact that would affect the market value of his bond. He has approached you as an investment and financial analyst to help him assess the price volatility of the bond in order to quantify the interest rate risk.

Required:

The price value of a basis point (PVBP).

(6 marks)

(c) The following information was extracted from Dyton Ltd.'s consolidated income statement for the year ended 31 December 2015:

| | Sh. "Million" |
|-------------------------------|----------------|
| Gross profit | 5,730 |
| Royalty and commission income | 100 |
| Other operating income | 110 |
| Other operating expenses | <u>(5,046)</u> |
| Operating profit | 894 |
| Interest income | 25 |
| Interest expenses | <u>(113)</u> |
| Income before taxes | 806 |
| Income taxes | 238 |
| Net income | <u>568</u> 0 |
| | |

Additional information:

- 1. Depreciation and armotisation amounted to \$\frac{1}{2}\$49 million.
- 2. Total assets are estimated to be Sh.10,618 million.
- 3. Total debt amounted to Sh.1,613 million.
- 4. Shareholders equity is Sh.4,616 million.

Required:

(i) Earnings before interest, tax depreciation and armotisation (EBITDA) interest coverage ratio.

(4 marks)

(ii) Debt/capital ratio.

(3 marks) (Total: 20 marks)

Present Value of 1 Received at the End of *n* Periods:

| PVIF, | == | 1/(| l+r)" | =(1 | +r)-" |
|-------|----|-----|-------|-----|-------|
| | | | | | |

| Period | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | 12% | 1.40 | 151 | 4.00 | 4011 | | | | | |
|--------|-------|-------|-------|----------------|----------------|----------------|-------|-------|-------|-------|-------|-------|-------|--------|--------|----------------|----------------|-------|-------|-------|
| 1 | .9901 | .9804 | .9709 | | | | | | | | | 14% | 15% | 16% | 18% | 20% | 24% | 28% | 32% | 36% |
| 2 | .9803 | .9612 | .9426 | .9615 .9246 | .9524 .9070 | .9434 | .9346 | 9259 | .9174 | .9091 | .8929 | 8772 | .8696 | .8621 | .8475 | .8333 | .8065 | .7813 | 7576 | .735 |
| 3 | .9706 | .9423 | .9151 | 8890 | .8638 | .8900 .8396 | .8734 | .8573 | .8417 | .B264 | .7972 | .7695 | 7561 | .7432 | .7182 | .6944 | .6504 | .6104 | 5739 | .540 |
| 4 | .9610 | .9238 | .8885 | .8548 | .8227 | | .8163 | .7938 | .7722 | .7513 | .7118 | .6750 | 6575 | .6407 | .6086 | .5787 | .5245 | .4768 | 4348 | .397 |
| 5 | .9515 | .9057 | .8626 | .8219 | .7835 | .7921 .7473 | .7629 | .7350 | .7084 | .6830 | .6355 | .5921 | .5718 | .5523 | .5158 | .4823 | .4230 | .3725 | .3294 | .292 |
| J | .5515 | .3037 | .0020 | .0213 | .7633 | .7413 | .7130 | .6806 | .6499 | .6209 | .5674 | 5194 | .4972 | .4761 | .4371 | .4019 | .3411 | .2910 | .2495 | .2149 |
| 6 | .9420 | .8880 | .8375 | .7903 | .7462 | .7050 | .6663 | .6302 | .5963 | .5645 | .5066 | .4556 | .4323 | .4104 | .3704 | .3349 | .2751 | .2274 | 1890 | .1580 |
| 7 | .9327 | .8706 | .8131 | .7599 | .7107 | ,6651 | .6227 | .5835 | .5470 | .5132 | .4523 | .3996 | .3759 | .3538 | .3139 | .2791 | .2218 | :1776 | .1432 | .1162 |
| 8 | .9235 | .8535 | .7894 | .7307 | .6768 | .6274 | .5820 | .5403 | .5019 | .4665 | .4039 | .3506 | .3269 | .3050 | .2660 | .2326 | .1789 | .1388 | .1085 | .0854 |
| 9 | .9143 | .8368 | .7664 | .7026 | .6446 | .5919 | .5439 | .5002 | .4604 | .4241 | .3606 | 3075 | .2843 | .2630 | .2255 | .1938 | .1443 | .1084 | .0822 | .0628 |
| 10 | .9053 | .8203 | .7441 | .6756 | .6139 | .5584 | .5083 | .4632 | .4224 | .3855 | .3220 | .2697 | .2472 | .2267 | .1911 | .1615 | .1164 | .0847 | .0623 | .0462 |
| . 11 | .8963 | .8043 | .7224 | .6496 | .5847 | .5268 | .4751 | .4289 | .3875 | .3505 | 2875 | .2366 | .2149 | .1954 | .1619 | .1346 | .0938 | .0662 | .0472 | .0340 |
| 12 | .8874 | .7885 | .7014 | .6246 | .5568 | .4970 | .4440 | .3971 | .3555 | .3186 | .2567 | .2076 | .1869 | 1685 | .1372 | .1122 | .0757 | .0517 | .0357 | .0250 |
| 13 | .8787 | .7730 | .6810 | .6006 | .5303 | .4688 | 4150 | .3677 | .3262 | 2897 | .2292 | .1821 | .1625 | .1452 | .1163 | .0935 | .0610 | .0404 | .0337 | .023 |
| 14 | .8700 | .7579 | .6611 | .5775 | .5051 | .4423 | .3878 | .3405 | .2992 | .2633 | .2046 | 1597 | .1413 | .1252 | .0985 | .0779 | .0492 | .0316 | .0205 | .013 |
| 15 | .8613 | .7430 | .6419 | .5553 | .4810 | .4173 | .3624 | 3152 | .2745 | .2394 | .1827 | .1401 | .1229 | .1079 | .0835 | .0649 | .0397 | .0247 | .0155 | 0099 |
| 16 | .8528 | .7284 | .6232 | .5339 | .4581 | .3936 | .3387 | .2919 | .2519 | .2176 | .1631 | .1229 | 1069 | .0930 | 0700 | 0544 | 0200 | 0400 | | |
| 17 | 8444 | .7142 | .6050 | .5134 | .4363 | .3714 | .3166 | .2703 | .2311 | .1978 | .1456 | .1078 | .0929 | .0802 | .0708 | .0541 .0451 | .0320 .0258 | .0193 | .0118 | .0073 |
| 18 | .8360 | .7002 | .5874 | .4936 | .4155 | .3503 | .2959 | .2502 | .2120 | .1799 | .1300 | .0946 | .0808 | .0691 | .0508 | .0576 | .0208 | .0150 | .0089 | .0054 |
| 19 | 8277 | .6864 | .5703 | .4746 | .3957 | .3305 | .2765 | .2317 | .1945 | .1635 | .1161 | .0829 | .0703 | .0596 | .0308 | 0313 | | .0118 | .0068 | .003 |
| 20 | 8195 | .6730 | .5537 | .4564 | .3769 | .3118 | .2584 | .2145 | .1784 | .1486 | 1037 | .0728 | .0611 | .0514 | .0365 | 0261 | .0168 | .0092 | .0051 | .0029 |
| | | | .0001 | | .57.55 | .0110 | .2504 | .2143 | .1704 | .1400 | 1037 | .0126 | .0611 | .0314 | .0363 | .0261 | .0135 | .0072 | .0039 | .0021 |
| 25 | .7798 | .6095 | .4776 | .3751 | .2953 | .2330 | .1842 | .1460 | .1160 | .0923 | .0588 | .0378 | .0304 | .0245 | 60 | .0105 | .0046 | .0021 | .0010 | .000 |
| 30 | .7419 | .5521 | .4120 | .3083 | .2314 | .1741 | .1314 | .0994 | .0754 | .0573 | .0334 | .0196 | .0151 | .01167 | \sim | .0042 | .0016 | .0006 | .0002 | .000 |
| 40 | .6717 | .4529 | 3066 | .2083 | .1420 | .0972 | .0668 | 0460 | .0318 | .0221 | .0107 | .0053 | 0037 | .0026 | .0013 | .0007 | .0002 | .0001 | | |
| 50 | .6080 | .3715 | .2281 | .1407 | .0872 | .0543 | .0339 | .0213 | .0134 | .0085 | .0035 | .0014 | .0009 | 0006 | .0003 | .0001 | | | | ٠ |
| 60 | .5504 | .3048 | .1697 | .0951 | .0535 | .0303 | .0173 | .0099 | .0057 | .0033 | .0011 | .0004 | .0002 | .0001 | | | | • | • | • |
| | | | | | | | | | | | | | 600 | | | • | • | • | • | • |

^{*} The factor is zero to four decimal places

Present Value of an Annuity of 1 Per Period for n Periods:

$$PVIF_{rt} = \sum_{r=1}^{n} \frac{1}{(1+r)^r} = \frac{1-\frac{1}{(1+r)^r}}{r}$$

| | | | | | | | .01 | _ | | | | | | | | | | _ |
|---------|---|--|---|---|--|--|---|---|--|--|--|---|--|--|--|---|--|--|
| 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | 12% | 14% | 15% | 16% | 10% | 201/ | 248 | 204/ | |
| 0.9901 | 0.9804 | 0.9709 | 0.9615 | 0.9524 | 0.9434 | 08245 | 0.0250 | 0.0474 | 2 2224 | | | | | | 20% | 24% | 28% | 32% |
| 1.9704 | | | | | | C. P | | | | | | | | 0.8475 | 0.8333 | 0.8065 | 0.7813 | 0.757 |
| 2.9410 | | | | | | | | | | | | | | 1.5656 | 1.5278 | 1.4568 | 1.3916 | 1.331 |
| 3.9020 | | | | _ | | | | | | | | | | 2.1743 | 2.1065 | 1.9813 | 1.8684 | 1.766 |
| | | | | | | | | | | | | | | 2.6901 | 2.5887 | 2.4043 | 2.2410 | 2.095 |
| | 4.1100 | 4.0757 | 4.4510 | 4.3233 | (4.2124 | 4.1002 | 3.9927 | 3.8897 | 3.7908 | 3.6048 | 3.4331 | 3.3522 | 3.2743 | 3.1272 | 2.9906 | 2.7454 | 2.5320 | 2.345 |
| 5.7955 | 5.6014 | 5.4172 | 5.2421 | 5.0757 | 4.9173 | 4.7665 | 4 6229 | 4 4859 | 4 3553 | 4 1114 | 3 0007 | 2 7045 | 2 60 47 | | | | | |
| 6.7282 | 6.4720 | 6.2303 | 6.0021 | <u> </u> | | | | | | | | | | | | | | 2.534 |
| 7.6517 | 7.3255 | 7.0197 | 6.7327 | 4.4632 | | | | | | | | | | | | | 2.9370 | 2.677 |
| 8.5660 | 8.1622 | | |) | | | | | | | | | | | | 3.4212 | 3.0758 | 2.786 |
| 9.4713 | 8.9826 | | | | | | | 5.3332 C 4477 | 5.1350 | | | | | | 4.0310 | 3.5655 | 3.1842 | 2.868 |
| | | | 0.1100 | | 1.5001 | 1.0236 | 6.7101 | 6.41// | 5.1446 | 5.6502 | 5.2161 | 5.0188 | 4.8332 | 4.4941 | 4.1925 | 3.6819 | 3.2689 | 2.930 |
| 10.3676 | 9.7868 | 9.2526 | 8.7605 | 8.3064 | 7.8869 | 7.4987 | 7.1390 | 6.8052 | 6.4951 | 5 9377 | 5 4527 | 5 22 27 | 5.0200 | 4 0500 | 4 2074 | | | |
| 11.2551 | 10.5753 | 9.9540 | 9.3851 | 8.8633 | 8.3838 | 7.9427 | | | | | | | | | | | | 2.977 |
| 12.1337 | 11.3484 | 10.6350 | 9.9856 | 9.3936 | 8.8527 | 8.3577 | | | | | | | | | | | | 3.013 |
| 13.0037 | 12.1062 | 11.2961 | 10,5631 | 9.8986 | 9.2950 | | | | | | | | | | | | _ | 3.040 |
| 13.8651 | 12.8493 | 11.9379 | 11,1184 | 10,3797 | | 9 1079 | R 5595 | 8.0607 | | | | | | | | | | 3.060 |
| | | | | | | 0.10.0 | 0.5555 | 0.0001 | 7.0001 | 0.0103 | 9.1422 | 3.8474 | 3.3/55 | 5.0916 | 4.6755 | 4.0013 | 3.4834 | 3.076 |
| | | | | | | | | 8,3126 | 7.8237 | 6.9740 | 6.2651 | 5 9542 | 5 6685 | 5 1624 | 4 7200 | 4.0222 | 3 5000 | • |
| | | | | | | | | 8,5436 | 8.0216 | 7.1196 | | | | | | | | 3.088 |
| 16.3983 | 14.9920 | 13.7535 | 12.6593 | 11.6896 | 10.8276 | 10.0591 | 9.3719 | 8.7556 | 8.2014 | | | | | | | | | 3.097 |
| 17.2260 | 15.6785 | 14.3238 | 13.1339 | 12.0853 | 11.1581 | 10.3356 | 9.6036 | 8.9501 | 8.3649 | | | | | | | | | 3.103 |
| 18.0456 | 16.3514 | 14.8775 | 13.5903 | 12.4622 | 11.4699 | 10.5940 | 9.8181 | | | | | | | | | | | 3.109 |
| | | | | | | | | | | | 0.0251 | 0.2333 | 3.3200 | 3.3321 | 4.8696 | 4.1103 | 3.5458 | 3.112 |
| 22.0232 | 19.5235 | 17.4131 | 15.6221 | 14.0939 | 12.7834 | 11.6536 | 10.6748 | 9.8226 | 9.0770 | 7.8431 | 6.8729 | 6 4641 | 6.0971 | 5 4660 | 4 0470 | 4 4 4 7 4 | 3 5 6 4 6 | |
| 25.8077 | 22.3965 | 19.6004 | 17,2920 | 15.3725 | 13.7648 | 12.4090 | 11.2578 | 10.2737 | 9.4269 | | | | | | | | | 3.1220 |
| 32.8347 | 27.3555 | 23.1148 | 19,7928 | 17.1591 | 15.0463 | 13.3317 | 11.9246 | 10.7574 | 9.7791 | | | | | | | | | 3 124 |
| 39.1961 | 31.4236 | 25.7298 | 21.4822 | 18.2559 | 15.7619 | 13.8007 | 12.2335 | 10.9617 | 9.9148 | | | | | | | | | |
| 44.9550 | 34.7609 | 27.6756 | 22.6235 | 18.9293 | 16.1614 | 14.0392 | 12.3766 | 11 0480 | 9.9672 | P 3240 | | | | | | | | 3.125 |
| | | | | | | | . 2.01 30 | . 1.0400 | J.JU. Z | U.324U | 7.1401 | 0.6631 | b.2402 | 5.5553 | 4.9999 | 4.1667 | 3.5714 | 3 1250 |
| | 0.9901 1.9704 2.9410 3.9020 4.8534 5.7955 6.7282 7.6517 8.5660 9.4713 10.3676 11.2551 12.1337 13.0037 13.8651 14.7179 15.5623 16.3983 17.2260 18.0456 22.0232 22.0232 25.8077 32.8347 39.1961 | 0.9901 0.9804 1.9704 1.9416 2.9410 2.8839 3.9020 3.8077 4.8534 4.7135 5.7955 5.6014 6.7282 6.4720 7.6517 7.255 9.4713 8.9826 10.3676 9.7868 11.2551 10.5753 12.1337 11.3484 13.0037 12.1062 13.8651 12.8493 14.7179 13.5777 15.5623 14.2919 16.3983 14.9920 17.2260 15.63514 22.0232 19.5235 22.8347 27.3555 33.1961 31.4236 | 0.9901 0.9804 0.9709 1.9704 1.9416 1.5135 2.9410 2.8839 2.8286 3.9020 3.8077 3.7171 4.8534 4.7135 4.5797 5.7955 5.6014 5.4172 6.7282 6.4720 6.2303 7.6517 7.3255 7.0197 8.5660 8.1622 7.7861 9.4713 8.9826 8.5302 10.3676 9.7868 9.2526 11.2551 10.5753 9.9540 12.1337 11.3484 10.6350 13.0037 12.1062 11.2961 13.8651 12.8493 11.9379 14.7179 13.5777 .12.5611 15.5623 14.2919 13.1661 16.3983 14.9920 13.7535 17.2260 15.6785 14.3238 18.0456 16.3514 14.8775 22.0232 19.5235 17.4131 22.0232 19.5235 17.4131 22.0232 19.5235 17.4131 22.0232 19.5235 17.4131 22.0232 19.5235 17.4131 32.8347 27.3555 23.1148 33.1961 31.4236 25.7298 | 0.9901 0.9804 0.9709 0.9615 1.9704 1.9416 1.9135 1.8861 2.9410 2.8839 2.8286 2.7751 3.9020 3.8077 3.7171 3.6299 4.8534 4.7135 4.5797 4.4518 5.7955 5.6014 5.4172 5.2421 6.7282 6.4720 6.2303 6.0021 7.6517 7.3255 7.0197 6.7327 8.9826 8.1622 7.7861 7.4359 9.4713 8.9826 8.5302 8.1109 10.3676 9.7868 9.2526 8.7605 11.2551 10.5753 9.9540 9.3851 12.1337 11.3484 10.6350 9.9856 13.0037 12.1062 11.2961 10.5631 13.8651 12.8493 11.9379 11.1184 14.7179 13.5777 12.5611 11.6523 15.5623 14.2919 13.1661 12.1657 16.3983 14.9920 13.7535 12.6593 17.2260 15.6785 14.3238 13.1339 18.0456 16.3514 14.8775 13.5903 18.0456 16.3514 14.8775 13.5903 22.0232 19.5235 17.4131 15.6221 22.0272 21.9555 19.6004 17.2920 32.8347 27.3555 23.1148 19.7928 39.1961 31.4236 25.7298 21.4822 | 0.9901 0.9804 0.9709 0.9615 0.9524 1.9704 1.9416 1.9135 1.8861 1.8594 2.9410 2.8839 2.8286 2.7751 2.7232 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6.2469 9.4713 8.9826 8.5302 8.1099 7.7217 7.36</td> <td>1½ 2½ 3½ 4½ 5½ 6½ 7½ 8½ 9½ 0.9901 0.9804 0.9709 0.9615 0.9524 0.9434 0.9346 0.9259 0.9174 1.9704 1.9416 1.9135 1.8861 1.8594 1.8334 1.8080 1.7833 1.7591 2.9410 2.8839 2.8286 2.7751 2.7232 2.6730 2.6243 2.5771 2.5313 3.9020 3.8077 3.7171 3.6299 3.5460 3.4851 3.3872 3.3121 3.2397 4.8534 4.7135 4.5797 4.4518 4.3295 4.2124 4.1002 3.9927 3.8897 5.7955 5.6014 5.4172 5.2421 5.0757 4.9173 4.7665 4.6229 4.4859 5.7852 6.4720 6.2303 6.0021 7.764 5.5824 5.3893 5.2064 5.5348 8.5660 8.1622 7.7861 7.4359 7.1078 6.8017 6.5152 6.2469</td> <td>1½ 2½ 3½ 4½ 5½ 6½ 7½ 8½ 9½ 10½ 0.9901 0.9804 0.9709 0.9615 0.9524 0.9434 0.9346 0.9259 0.9174 0.9091 1.9704 1.9416 1.9135 1.8861 1.8394 1.8334 1.8080 1.7833 1.7591 1.7355 2.9410 2.8839 2.8266 2.7751 2.7232 2.6730 2.6243 2.5771 2.5313 2.4869 3.9020 3.8077 3.7171 3.6299 3.5460 3.4651 3.3872 3.3121 3.2397 3.1699 4.8534 4.7135 4.5797 4.4518 4.3295 4.2124 4.1002 3.9927 3.8897 3.7908 5.7955 5.6014 5.4172 5.2421 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