

## Midterm 2

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- 1) In the context of inflation, Real MARR is equal to
- A) Current MARR plus inflation rate
  - B) Current MARR plus inflation rate, plus the adjustment factor
  - C) Current MARR minus the inflation rate, minus the adjustment factor
  - D) Real MARR plus inflation rate
  - E) None of the above

Answer: **C**

$$\text{Since } \text{MARR}_C = \text{MARR}_R + f + \text{MARR}_R * f$$

$$\text{MARR}_R = \text{MARR}_C - f - \text{MARR}_R * f$$

where,  $\text{MARR}_C$  = current MARR;  $\text{MARR}_R$  = real MARR and

$\text{MARR}_R * f$  = adjustment factor

- 2) While evaluating a project proposal in the presence of inflation, Current MARR
- A) could be used with current cash-flow**
  - B) could be used with real cash-flow
  - C) could be used with cash-flow from which impact of inflation has been removed
  - D) should not be used at all
  - E) None of the above

Answer: **A**

- 3) The following inflation indexes are given. Find the percentage increase in prices between 2000 and 2003.

Year	Price Index 1995 Base	Price Index 2001 Base
2000	118	N/A
2001	121	100
2002	N/A	105
2003	N/A	108

- A) 12.68%
- B) 11.52%
- C) 10.75%
- D) 10.31%
- E) 9.74%

Answer: C

To solve this problem you either need to change the base year for index in 2000 from 1995 to 2001 or alternatively, change the base year for index in 2003 from 2001 to 1995.

Changing base year for 2000 index from 1995 to 2001

Recognize that 2001 has two index values linking the conversion. So:

Index value 121 (with base year 1995) is equivalent to 100 (with base year 2001)

Then, following the unitary method, a value of 1 is equivalent to  $100/121$

Hence the value of 118 (in 2000 with a base year of 1995) is equivalent

$$\begin{aligned} & \text{to } [(100/121) * 118] \text{ (with a base year converted to 2001)} \\ & = 97.52 \end{aligned}$$

Then percentage increase in prices between 2000 and 2003 is:

$$[(108 - 97.52) / 97.52] * 100 = [10.48 / 97.52] * 100 = 10.747\% \approx 10.75\%$$

Changing base year for 2003 index from 2001 to 1995

Again, recognize that 2001 has two index values linking the conversion. So:

Index value 100 (with base year 2001) is equivalent to 121 (with base year 1995)

Then a value of 1 is equivalent to  $121/100$

Hence the value of 108 (in 2003 with a base year of 2001) is equivalent

$$\begin{aligned} & \text{to } [(121/100) * 108] \text{ (with a base year converted to 1995)} \\ & = 130.68 \end{aligned}$$

Then percentage increase in prices between 2000 and 2003 is:

$$[(130.68 - 118) / 118] * 100 = [12.68 / 118] * 100 = 10.746\% \approx 10.75\%$$

4) Patricia's income rose from \$75,000 per year in 2013 to \$82,000 in 2015. At the same time the CPI (base year 2000) rose from 107.5 in 2013 to 110.6 in 2015. What is Patricia's real income in 2015?

- A) \$81,500.08
- B) \$80,709.03
- C) \$78,195.17
- D) \$74,141.05
- E) \$72,375.81

Answer: **D**

Note here:

$C_N = C_{2015} =$  current dollars in year 2015 = \$82,000

$I_{0,N} = I_{2000, 2015} = 110.6 =$  the value of a price index at year 2015, relative to the base year 2000

$R_{0,N} = R_{2000, 2015} =$  real dollars equivalent to  $C_{2001}$  relative to year 2000 = ?

Therefore, using the formula:

$$R_{0,N} = C_N / (I_{0,N} / 100)$$

$$\text{or, } R_{2000, 2015} = C_{2015} / (I_{2000, 2015} / 100) = 82,000 / (110.6 / 100) = 82,000 / 1.106 = 74,141.05$$

So, even though Patricia's income is \$82,000 in 2015 dollars, her real income is \$74,141.05 in constant (i.e. 2000) dollars.

5) For a project to be considered for investment, its IRR

- A) must be greater than the MARR
- B) must be lower than the MARR
- C) must be equal to the MARR
- D) must at least be equal to or lower than the MARR
- E) must at least be equal to or greater than the MARR

Answer: **E**

6) What is the current IRR on an investment of \$1,265 that yields a return of \$1,505 in a year, where an inflation of 2.5% is expected over the year.

- A) 29.65%
- B) 25.06%
- C) 21.95%

- D) 18.97%
- E) 17.71%

Answer: C

Note that the question is asking for current IRR but the cash flows are given in real dollars. Hence, we need to convert the real cash flows into current cash flows using the inflation rate.

For the first cost, real investment is equal to the current investment since it's for the current year.

For the return, we convert real cash inflow of \$1,505 into current cash inflow as follows:  $\$1,505 * (1 + f) = \$1,505 * (1 + 0.025) = \$1,505 * (1.025) = \$1,542.63$   
where,  $f = \text{inflation rate} = 2.5\% = 0.025$

Then using the definition of current IRR we get:

PW (current first cost) = PW (current return)

$1,265 = 1,542.63 / (1 + r_c)$ , where  $r_c = \text{current IRR}$

$(1 + r_c) = 1,542.63 / 1,265$

$r_c = 1.21946 - 1 = 0.21946 \approx 21.95\%$

- 7) The fundamental idea behind comparison of mutually exclusive projects on the basis of incremental IRR is
  - A) high uncertainty
  - B) some investments are not productive
  - C) different fractions of investments are associated with different levels of productivity
  - D) multiple IRRs
  - E) all investments are non-simple

Answer: C

The basic idea is based on the "principle of equi-marginal productivity".

- 8) If the current interest rate is 10% and the inflation rate 7% in the same year, the real interest rate is approximately
  - A) 17%
  - B) 15%
  - C) 12%
  - D) 9%

E) 3%

Answer: E

Recall that the relationship between current interest rate, real interest rate and inflation rate is given by:

$$r_c = r_r + f + r_r^*f$$

where,  $r_c$  = current interest rate = 10% = 0.1

$r_r$  = real interest rate = ?

$f$  = inflation rate = 7% = 0.07

$r_r^*f$  = adjustment factor  $\approx 0$  [notice that the question is looking for approximate relationship]

Hence,  $r_c \approx r_r + f$

$$r_r \approx r_c - f$$

$$r_r \approx 0.10 - 0.07 \approx 0.03 \approx 3\%$$

- 9) The "Half-Year Rule" of taxation refers to the fact that
- A) half of the capital cost is allowed in CCA calculation in the second year of purchase of an asset
  - B) full capital cost is allowed in CCA calculation in the second year of purchase of an asset
  - C) full capital cost is allowed in CCA calculation in the year of purchase of an asset
  - D) half of the capital cost is allowed in CCA calculation in the year of purchase of an asset
  - E) None of the above

Answer: D

- 10) The effect of taxation on annual savings is captured by
- A) the depreciation rate
  - B) the capital tax factor
  - C) the capital salvage factor
  - D) multiplying savings by the corporate tax rate
  - E) multiplying savings by one minus the corporate tax rate

Answer: E

11) In 2011, Alberta Gold Corp. purchased a tester for \$30,000. The CCA rate is 25% and the business is subject to a 47% corporate tax rate. If the investment was evaluated using an after-tax MARR of 10%, what is the present worth of the first cost of this tester, taking into account the future tax savings resulting from depreciation?

- A) \$20,386.36
- B) \$21,762.23
- C) \$25,859.32
- D) \$27,781.59
- E) \$28,116.21

Answer: **A**

The following information are given:

CCA rate =  $d = 25\% = 0.25$

Corporate tax rate =  $t = 47\% = 0.47$

After-tax MARR =  $I = 10\% = 0.1$

and first cost = \$30,000

Hence,  $CTF = 1 - \{(t d) (1 + i/2) / (i + d) (1 + i)\} = 0.679545$

Then, the present worth of the first cost of this tester is then calculated as:

$PW = 0.679545 * \$30,000 = \$20,386.36$

12) For a business, the CCA rate is

- A) the interest rate used by the business
- B) the physical depreciation rate applied to an asset
- C) the rule-based depreciation rate applied to an asset class
- D) the MARR used for evaluating an investment
- E) None of the above

Answer: **C**

13) The Capital Tax Factor (CTF) is a function of

- A) depreciation rate, interest rate and tax rate
- B) interest rate, time, and tax rate
- C) depreciation rate, tax rate and time
- D) CCA rate, interest rate and tax rate
- E) MARR, tax rate and interest rate

Answer: **D**

Note that the formula for CTF is given by:

$$CTF = 1 - \{(t d) (1 + i/2) / (i + d) (1 + i)\}$$

That is, CTF is calculated given the CCA rate, interest rate and the tax rate. In other words CTF is a function of these rates.

14) Suppose that cash flows of a project are given as follows:

Year	Costs, \$\$	Savings, \$\$
0	210,000	0
1	40,000	60,000
2	45,000	70,000
3	50,000	90,000
4	55,000	95,000

It is known that MARR is 10%. What is the project's payback period?

- A) four years
- B) one year
- C) three years
- D) two years
- E) the project does not pay back

Answer: **C**

Note that: Payback period = First cost / Annual savings; that is, payback period is the number of years taken to recover the first cost. Here, first cost, incurred at the beginning of Year 0 is \$210,000. At the end of Year 0 (or the first year), the savings is \$0. It would take the end of Year 2 or three years to recover the first cost. Hence, the answer is C.

15) Sally Stratford started her consulting business in 2007. For her company, she bought an old car for \$15,250 in 2007. Her firm is subject to a corporate tax rate of 33%, the CCA rate of 35% and the after-tax MARR of 10%. If the car was sold for \$1,500 in 2014, what was the tax impact on selling of the car?

- A) \$1,084.53
- B) \$1,115.00
- C) \$1,192.90
- D) \$1,281.00
- E) \$1,330.21

Answer: **B**

The following information are given:

CCA rate =  $d = 35\% = 0.35$   
Corporate tax rate =  $t = 33\% = 0.33$   
After-tax MARR =  $I = 10\% = 0.1$   
and first cost of the old car = \$15,250

Hence,  $CSF = 1 - \{(t d) / (i + d)\} = 0.743333$

Then, the tax impact on selling the car for \$1,500 is calculated as:  
 $CSF * \$1,500 = 0.743333 * \$1,500 = \$1,115$

- 16) Mutually exclusive projects can be compared in terms of present worth if
- A) they have the same depreciation rate
  - B) they have the same costs
  - C) they have the same service life
  - D) they have the same rate of return
  - E) they have the same benefits

Answer: **C**

- 17) A project requires \$15,000 as initial investment and will earn a revenue of \$3,500 per year over the next five years. Annual interest rate is 10%. What is the present worth of the project's benefits?
- A) \$10,000
  - B) \$11,372
  - C) \$12,846
  - D) \$13,268
  - E) \$15,637

Answer: **D**

Note that the question is asking only about the present worth of project's benefits.

Observe that the following information are given:

Interest rate =  $i = 10\% = 0.1$

Annual revenue is given in the form of an annuity,  $A = \$3,500$

Time,  $t = 5$  years

Therefore,  $PW(\text{benefits}) = A * (P / A, i, t) = 3,500 * (P / A, 0.1, 5)$

From the table provided at the end, we observe:  $(P / A, 0.1, 5) = 3.7908$

Hence,  $PW(\text{benefits}) = 3,500 * 3.7908 = \$13,267.8 \approx \$13,268$

- 18) What is the annual worth of an independent project that requires initial investment of \$25,000 and annual maintenance costs of \$2,000 for 15 years at a 10% before-tax MARR?
- A) - \$5,286.75
  - B) - \$7,893.56
  - C) - \$10,574.00
  - D) - \$15,444.71
  - E) - \$16,581.32

Answer: **A**

The following information are provided:

Interest rate =  $i = 10\% = 0.1$

Initial investment or first cost,  $FC = \$25,000$

Annual maintenance cost is given in annualized term,  $A = \$2,000$

Time,  $t = 15$  years

Annual Worth,  $AW = ?$

$$\begin{aligned}
 \text{Hence, } AW(\text{project}) &= -FC * (A / P, i, t) - A \\
 &= -\$25,000 * (A / P, 0.1, 15) - 2,000 \\
 &= -\$25,000 * 0.13147 - 2,000, \text{ where from the table } (A / P, 0.1, 15) = 0.13147 \\
 &= -\$5,286.75
 \end{aligned}$$

- 19) A project requires \$15,000 as initial investment and will earn a revenue of \$3,000 per year over the next seven years. The interest rate is 10.0% per year. What is the present worth of the project's costs?
- A) \$11,372
  - B) \$13,268
  - C) \$14,737
  - D) \$15,000
  - E) \$17,660

Answer: **D**

Note that the question is asking only about the present worth of project's costs. Since there is only one cost of \$15,000 that was incurred at the beginning of the project (and is provided in present worth terms) the answer is D.

- 20) If the effective equivalent annual interest rate is 16.2%, and interest is compounded daily, what is the corresponding nominal annual interest rate?
- A) 11%

- B) 17%
- C) 19%
- D) 15%
- E) 13%

Answer: **D**

Here, effective equivalent annual interest rate,  $i_e = 16.2\% = 0.162$

Interest period,  $m = 365$

Nominal interest rate,  $r = ?$

From the relevant formula we know:

$$i_e = (1 + r/m)^m - 1$$

$$0.162 = (1 + r/365)^{365} - 1$$

$$1.162 = (1 + r/365)^{365}$$

$$(1.162)^{1/365} = (1 + r/365)^{365 \cdot (1/365)}$$

$$1.000411 = (1 + r/365)$$

$$r/365 = 0.000411$$

$$r = 365 * 0.000411 = 0.15 = 15\%$$

- 21) For the purpose of comparison, what alternative should be used to an independent project?
- A) the incremental MARR
  - B) other projects, earning MARR or higher interest rate
  - C) investing money in an alternative project that can recoup the investment
  - D) putting money into a bank to earn a bank interest rate
  - E) do nothing alternative

Answer: **E**

- 22) If a company has to use declining-balance depreciation model, what is the depreciation rate of a physical asset with the purchase price of \$200,000 and salvage value of \$11,500 after 10 years of service?
- A) 16.84%
  - B) 18.92%
  - C) 20.01%
  - D) 24.84%
  - E) 25.75%

Answer: **D**

Here, purchase price,  $P = \$200,000$

Salvage value,  $S = \$11,500$

Time,  $n = 10$  years

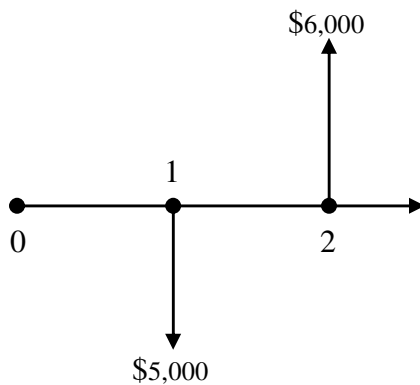
Depreciation rate,  $d = ?$

From the relevant formula we know:

$$d = 1 - (S/P)^{1/n} = 1 - (11,500 / 200,000)^{1/10}$$

$$= 1 - (11,500 / 200,000)^{1/10} = 1 - 0.751565 = 0.248435 \approx 24.84\%$$

23) A project is subject to the following cash flow diagram:



What is its rate of return?

- A) 20%
- B) 25%
- C) 36%
- D) 41%
- E) 50%

Answer: **A**

Using the definition of IRR, we have:

PW (costs) = PW (benefits)

$$5,000 = 6,000 / (1 + r), \text{ where } r = \text{IRR}$$

$$5 = 6 / (1 + r)$$

$$(1 + r) = 6 / 5 = 1.2$$

$$r = 0.2 = 20\%$$

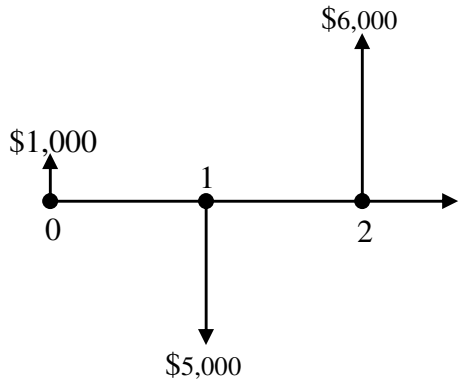
24) The most used depreciation method for physical assets in Canada is

- A) 150%-declining-balance depreciation
- B) sum-of-the-years'-digits depreciation
- C) declining-balance depreciation
- D) double-declining-balance depreciation

E) units-of-production depreciation

Answer: C

25) A project has a MARR of 10% and is subject to the following cash flow diagram:



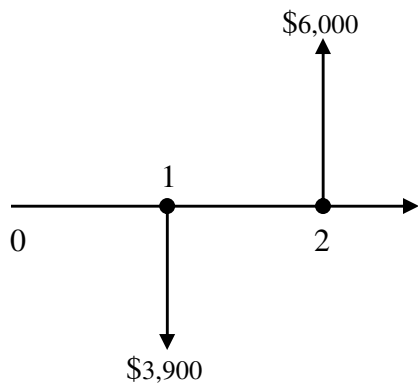
If it has two IRR of 100% and 200%, what is its External Rate of Return (ERR)?

- A) 50% and 100%
- B) 100% and 200%
- C) 54%
- D) 75%
- E) 66%

Answer: C

In order to determine ERR, we need to transform the cash flow diagram by investing the free cash at Year 0 (i.e., \$1,000) at MARR = 10% = 0.1. Over a year, this would generate a return of  $\$1,000 * (1 + 0.1) = 1,000 * 1.1 = \$1,100$ . Thus, at Year 1, the cash net outflow would be  $\$5,000 - \$1,100 = \$3,900$ .

Thus, the revised cash flow diagram would look like:



Now using the definition of ERR, we have:

$$3,900 = 6,000 / (1 + r^*), \text{ where } r^* = \text{ERR}$$

$$39 = 60 / (1 + r^*)$$

$$(1 + r^*) = 60 / 39 = 1.538462$$

$$r^* = 0.538462 \approx 54\%$$

- 26) I sign a contract that guarantees me an immediate payment of \$500, and another payment of \$3,000 at the end of second year. However, the plan requires me to invest \$2,500 a year from now. What is my internal rate of return on the contract?
- A) There are two solutions: 150% and 175%
  - B) There is a single solution: about 75%
  - C) There are two solutions: 200% and 100%
  - D) There are two solutions: 75% and 125%
  - E) There are two solutions: 50% and 75%

Answer: **C**

Using the definition of IRR, we have:

PW (costs) = PW (benefits)

$2,500/(1+r) = 500 + 3,000/(1+r)^2$ , where  $r = \text{IRR}$

$5/(1+r) = 1 + 6/(1+r)^2$ ; dividing both sides by 500

$5*(1+r) = (1+r)^2 + 6$ ; multiplying both sides by  $(1+r)^2$

$5 + 5r = 1 + 2r + r^2 + 6$ ; expanding the bracketed terms

$r^2 - 3r + 2 = 0$ ; collecting terms

$r^2 - r - 2r + 2 = 0$

$r(r-1) - 2(r-1) = 0$

$(r-1)(r-2) = 0$

Hence,  $r = 1 = 100\%$  or  $r = 2 = 200\%$

- 27) Two mutually exclusive alternatives are being compared. We should choose the alternative that
- A) has an incremental investment with a rate of return equal to the minimum acceptable rate of return
  - B) has a higher minimum acceptable rate of return assuming the lives of the alternatives are equal
  - C) has a higher internal rate of return assuming the lives of the alternatives are equal.
  - D) has an incremental investment with the rate of return exceeding minimum acceptable rate of return
  - E) has a higher internal rate of return regardless of the lives of the alternatives.

Answer: **D**

- 28) A computer was bought for \$2,000. After three years of service it can be sold for \$500. If straight line depreciation is assumed, what was the computer's book value at the end of year 2?
- A) \$1,500
  - B) \$1,000
  - C) \$0
  - D) \$2,000
  - E) \$500

Answer: **B**

Here, purchase price,  $P = \$2,000$

Salvage value,  $S = \$500$

Time,  $N = 3$  years

Book value at the end of Year 2,  $D_{sl}(n = 2) = ?$

From the relevant formula we know:

$$D_{sl}(2) = P - 2 * \{(2,000 - 500) / 3\} = 2,000 - 2 * 500 = 1,000$$

- 29) Charles has just purchased a car for \$15,050. He expects that the value of this car will decline by 10% each year. Eventually Charles wants to sell this car for \$2,500 and buy a new one. How many years should Charles use this car before he can sell it?
- A) around 9 years
  - B) around 12 years
  - C) around 14 years
  - D) around 18 years
  - E) around 25 years

Answer: **D**

Here, purchase price,  $P = \$15,050$

Salvage value,  $S = \$2,500$

Depreciation rate,  $d = 10\% = 0.1$

Time,  $n = ?$

From the relevant formula we know:

$$d = 1 - (S/P)^{1/n}$$

$$0.1 = 1 - (2,500 / 15,050)^{1/n}$$

$$(2,500 / 15,050)^{1/n} = 0.9$$

$$(2,500 / 15,050)^{1/n} = 0.9$$

$$(0.166113)^{1/n} = 0.9$$

$$(1/n) \ln (0.166113) = \ln (0.9)$$

$$n = \ln (0.166113) / \ln (0.9) \approx 18 \text{ years}$$

30) The following table summarizes information for five projects:

Project	First Cost (in \$)	IRR on Overall Investment	IRR on Increments of Investment Compared with Projects (%)			
			1	2	3	4
1	100,000	19%				
2	175,000	15%	9%			
3	200,000	18%	17%	23%		
4	250,000	16%	12%	17%	13%	
5	300,000	17%	14%	11%	17%	16%

The data can be interpreted in the following way: The IRR on the incremental investment between project 5 and project 4 is 16%.

If all projects are independent and the company has at least \$1,500,000 to invest, which projects should be undertaken if the before-tax MARR is 16%?

- A) only 5
- B) 1, 2, 3, 4 and 5
- C) 1, 3, 4 and 5**
- D) 2 and 4
- E) 1, 3 and 5

Answer: **C**

Note that all projects are independent. Also the company has \$1.5 million. Hence, every project that yield  $IRR \geq MARR$  should be accepted. Thus, every project except for project 2 should be accepted.

## Midterm 2

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### List of Useful Formulas

Name	Symbol and Formula
Compound amount factor	$(F/P, i, N) = (1 + i)^N$
Present worth factor	$(P/F, i, N) = 1 / (1 + i)^N$
Sinking fund factor	$(A/F, i, N) = i / [(1 + i)^N - 1]$
Uniform series compound amount factor	$(F/A, i, N) = [(1 + i)^N - 1] / i$
Capital recovery factor	$(A/P, i, N) = \{i(1 + i)^N\} / [(1 + i)^N - 1]$
Series present worth factor	$(P/A, i, N) = [(1 + i)^N - 1] / \{i(1 + i)^N\}$
Capitalized value formula	$P = A / i$
Capital recovery <u>formula</u>	$A = (P - S) (A/P, i, N) + Si$
Payback period	Payback period = First cost / Annual savings
Depreciation charge for period $n$ using the straight-line method	$D_{sl}(n) = (P - S) / N$
Depreciation rate for period $n$ using the declining-balance method	$d = 1 - (S/P)^{1/n}$
Capital Tax Factor	$CTF = 1 - \{(t d) (1 + i/2) / (i + d) (1 + i)\}$
Capital Salvage Factor	$CSF = 1 - (t d) / (i + d)$
If $C_N$ = current dollars in year $N$ $R_{0,N}$ = real dollars equivalent to $C_N$ relative to year 0	Then,  $R_{0,N} = C_N / (I_{0,N} / 100)$

$I_{0,N}$ = the value of a price index at year N, relative to year 0	
<p>If</p> <p><math>C_N</math> = current dollars in year N</p> <p><math>R_{0,N}</math> = real dollars equivalent to <math>C_N</math> relative to year 0</p> <p><math>f</math> = average inflation rate over year 0 to N</p>	<p>Then,</p> $R_{0,N} = C_N / (1 + f)^N$

**DISCRETE CASH FLOW AND COMPOUNDING**  
**10.00 % DISCRETE RATE OF INTEREST**

n	(F/P,i%,n)	(P/F,i%,n)	(A/P,i%,n)	(P/A,i%,n)	(A/F,i%,n)	(F/A,i%,n)	(A/G,i%,n)
1	1.1000	0.9091	1.1000	0.9091	1.0000	1.0000	0.0000
2	1.2100	0.8264	0.5762	1.7355	0.4762	2.1000	0.4762
3	1.3310	0.7513	0.4021	2.4869	0.3021	3.3100	0.9366
4	1.4641	0.6830	0.3155	3.1699	0.2155	4.6410	1.3812
5	1.6105	0.6209	0.2638	3.7908	0.1638	6.1051	1.8101
6	1.7716	0.5645	0.2296	4.3553	0.1296	7.7156	2.2236
7	1.9487	0.5132	0.2054	4.8684	0.1054	9.4872	2.6216
8	2.1436	0.4665	0.1874	5.3349	0.0874	11.4359	3.0045
9	2.3579	0.4241	0.1736	5.7590	0.0736	13.5795	3.3724
10	2.5937	0.3855	0.1627	6.1446	0.0627	15.9374	3.7255
11	2.8531	0.3505	0.1540	6.4951	0.0540	18.5312	4.0641
12	3.1384	0.3186	0.1468	6.8137	0.0468	21.3843	4.3884
13	3.4523	0.2897	0.1408	7.1034	0.0408	24.5227	4.6988
14	3.7975	0.2633	0.1357	7.3667	0.0357	27.9750	4.9955
15	4.1772	0.2394	0.1315	7.6061	0.0315	31.7725	5.2789
16	4.5950	0.2176	0.1278	7.8237	0.0278	35.9497	5.5493
17	5.0545	0.1978	0.1247	8.0216	0.0247	40.5447	5.8071
18	5.5599	0.1799	0.1219	8.2014	0.0219	45.5992	6.0526
19	6.1159	0.1635	0.1195	8.3649	0.0195	51.1591	6.2861
20	6.7275	0.1486	0.1175	8.5136	0.0175	57.2750	6.5081
21	7.4002	0.1351	0.1156	8.6487	0.0156	64.0025	6.7189
22	8.1403	0.1228	0.1140	8.7715	0.0140	71.4027	6.9189
23	8.9543	0.1117	0.1126	8.8832	0.0126	79.5430	7.1085
24	9.8497	0.1015	0.1113	8.9847	0.0113	88.4973	7.2881
25	10.8347	0.0923	0.1102	9.0770	0.0102	98.3471	7.4580
26	11.9182	0.0839	0.1092	9.1609	0.0092	109.1818	7.6186
27	13.1100	0.0763	0.1083	9.2372	0.0083	121.0999	7.7704
28	14.4210	0.0693	0.1075	9.3066	0.0075	134.2099	7.9137
29	15.8631	0.0630	0.1067	9.3696	0.0067	148.6309	8.0489
30	17.4494	0.0573	0.1061	9.4269	0.0061	164.4940	8.1762