

FINAL ASSIGNMENT /FINAL Term Paper**Risk and Disaster Management in Construction****Submitted to:-****Engr.Yaseen Mahmood****Submitted by:-****Waqar Ali****ID # 14749****Department of Civil Engineering,
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Question 1. Define and explain the risk log/register in your own words. Develop a risk log/register for the construction project (you have worked in or you are working). Details of each project must be unique and should be provided accurately to the best of your knowledge. Risk register is attached at the end of the paper (Table 1). Use notes for specifying headings.

Answer: A **risk log/register** is a tool in risk management and project management. It is used to identify potential risks in a project or an organization, sometimes to fulfill regulatory compliance but mostly to stay on top of potential issues that can derail intended outcomes. The risk register includes all information about each identified risk, such as the nature of that risk, level of risk, who owns it and what are the mitigation measures in place to respond to it.

A **Risk Register** or **Risk Log**, is a master document which is created during the early stages of a certain project. It is a tool that plays an important part in Risk Management Plan, thus helping to track issues and address problems as they arise.

The risk register addresses risk management in four key steps:

- identifying the risk
- evaluating the severity of any identified risks
- applying possible solutions to those risks
- Monitoring and analyzing the effectiveness of any subsequent steps taken.

The **Risk Register** is a document that contains information about identified project risks, analysis of risk severity and evaluations of the possible solutions to be applied. Presenting this in a spreadsheet is often the easiest way to manage things, so that key information can be found and applied quickly and easily.

The **Risk Register** will generally be shared between project stakeholders, allowing those involved in the project to be kept aware of issues and providing a means of tracking the response to issues. It can be used to flag new project risks and to make suggestions on what course of action to take to resolve any issues.

All corporate and organizational projects face risk at one time or another. Having a Risk Register in place simply provides a better means of responding to problems as they arise. The Risk Register is there to help with the decisions making process and enables managers and project stakeholders to handle risk in the most appropriate way. A risk needn't be a threat to your project, it is simply an issue that can arise during the project; if effectively managed, and it shouldn't prevent your project from attaining its goals and objectives.

To develop a risk log/register for the construction project are as under:

A construction project risk register is a register which summarizes all of the brainstormed or hypothesized risks associated with a project.

Here data presented in tabular form is of Peshawar BRT project in which proper Risk Log was not maintained and risks were not identified prior to its execution that's why these risks were without control and control actions were unable to be taken to control/reduce the risks

ID	Date raised	Risk description	Risk			Without controls			Controls	Residual risk	Action
			H	M	L	Cost impact	Time impact	Other			
ID	[Date mm/dd/yyyy]	[There is a risk that.... If this happens.....]	[tick or enter Y]	[tick or enter Y]	[tick or enter Y]	[The cost if the risk occurs e.g. x man days]	[The time impact if the risk occurs e.g. x days delay]	[Anything else that would happen e.g. lost reputation]	[Actions that will be taken to reduce the impact of the risk]	[Any risks that remain once the controls are in place]	[Document any actions to be taken to implement controls or manage residual risks]
15255	17 feb, 2018	Project design and duration change	High			\$41billion-\$73billion	6months-24months	MMD Pakistan consultancy , Peshawar development authority and PTI lost their reputation	Project Duration extended, Funding Raised	Delay in completion	Strict vigilance and monitoring to ensure time completion
	Prior to execution	Consultant or contractor delays	Y			4million	3months		Include late penalties in contracts. Build in and protect lead time in the schedule. Communicate schedule early. Check in with suppliers regularly. Query '90% done'. Ask again and again if they need anything else.	Trust deficient between consultant and client	Escalate to Project Sponsor and Contracts Manager. Implement late clauses.
	Prior to execution	Delay in earlier project phases jeopardizes ability to meet fixed date. For example, delivery of just in time materials, for conference or launch date.	Y			2million	1month		Ensure the project plan is as accurate as possible using scheduling workshops and work breakdown structure. Use Tracking Gantt and Baseline to identify schedule slippage early.		Consider insurance to cover costs and alternative supplier as a back up.

Question 2.

Discuss how Cost-benefit analysis is effective for a project? Support your arguments with real example.

Answer: Cost-benefit analysis is effective for a project as when managing a project, one is required to make a lot of key decisions. You can then use that data to evaluate your decisions with a process called cost benefit analysis (CBA). An intelligent use of cost benefit analysis will help you minimize risks and maximize gains both for your project and your organization.

There are two main purposes in using cost benefit analysis.

1. To determine if the project is sound, justifiable and feasible by figuring out if its benefits outweigh costs.
2. To offer a baseline for comparing projects by determining which project's benefits are greater than its costs.

To evaluate the cost benefit analysis the following major points should be kept in mind

What are the effects on users?

What are the effects on nonusers?

Are there any externality effects?

Is there a social benefit?

Accurate as the data you put into the process. The more accurate your estimates, the more accurate your results.

Background of Cost –benefits analysis (CBA): Jules Dupuit, a French engineer and economist, introduced the concepts behind CBA in the 1840s. It became popular in the 1950s as a simple way of weighing up project costs and benefits, to determine whether to go ahead with a project.

As its name suggests, Cost-Benefit Analysis involves adding up the benefits of a course of action, and then comparing these with the costs associated with it.

Purpose of Cost-benefits analysis: The purpose of cost benefit analysis in project management is to have a systemic approach to figure out the pluses and minuses of various paths through a project, including transactions, tasks, business requirements and investments. Cost benefit analysis gives you options, and it offers the best approach to achieve your goal while saving on investment.

Practical examples for the cost –benefits analysis:

Example # 1

Cost benefits analysis is also used for strategic policy and government long term policy to decrease the trust deficit as well as create employment. There is practical example of for social and govt policy as well as for sustainable small scale projects. The Kp-Govt have start an initiative with joint venture of EU and KP-Govt for the sustaible small scale structure projects with the help of Community and give name to this project "**Community driven local development**". (CDLD)

The project initially started in 2014 for the malakand Division and give the positive result Than govt have extended this project upto Hazara division as well as to Swabi and Nowshehra.

The only purpose of this project creation of jobs for engineers and social mobilizer as well as the sustainable projects.

The long term goal of the project to decrease trust deficit and make the sustaible small scale projects and engage community in the development of the country.

Example # 2

Another example which is concerned for business as follows.

Project: 01

Total cost= \$8000

Total benefits=\$12000

Cost benefits ratio= $\$12000/\8000

=1.5 Cost
benefits ratio

Project: 02

Total cost= $\$11000$

Total benefits= $\$20000$

Cost benefit ratio= $\$20000/\11000

=1.81

Cost benefits
ratio

So the company will be select one of these project which have more cost benefits ratio. Both values are +ve and can earn money but the company should be select which have more +ve value. So the main purpose of Cost-Benefits analysis is to make the right decision in case of business.

Example # 3

In this example, a financial technology startup is expanding and adding two new programmers. The CEO of the company decides to run a cost benefit analysis to determine whether the decision will be beneficial to the company - and to what degree.

The company is analyzing a time horizon of one year, and estimates that revenue would increase some 50% if the two programmers were hired.

On the cost side of the equation, the CEO must examine the cost of the two programmer's salaries - estimated at \$75,000. Additionally, there is the cost of recruitment, which might be around \$3,000. Training could add an additional \$4,000. Additionally, there is the cost of new work areas and computers, totaling \$5,000, and the cost of additional licensing for software and the like, around \$2,000.

The total direct and indirect costs would total around \$89,000.

When calculating benefits, the CEO would examine the benefit of additional revenue within a 12 month period, estimated around \$100,000. Additionally, the increase in product quality resulting from the new programmers (and therefore presumed customer satisfaction) would increase by 10%, adding an estimated \$10,000 in value to the company.

In total, the benefits would be \$110,000. Using the benefit-cost ratio equation, that would be $BCR = \$110,000/\$89,000$, or 1.24. Given that the value is positive (and the total benefits are greater than the total costs), the cost benefit analysis indicates the decision to hire two additional programmers would be a beneficial move for the company.

Question 3.

(a) What is Normal Probability distribution?

(b) Suppose that the data concerning the first-year salaries of employees is normally distributed with the population mean $\mu = 60000$ PKR and the population standard deviation $\sigma = 15000$ PKR. Find the probability of a randomly selected employees earning less than 45000 PKR annually. Hint: To answer this question, you have to find the portion of the area under the normal curve from 45 all the way to the left. Find Z-Score table at the end of the paper (Table 2)

Answer: Normal Probability Distribution:

The normal distribution is the most important probability distribution in statistics because it fits many natural phenomena. For example, heights, blood pressure, measurement error, and IQ scores follow the normal distribution. It is also known as the **Gaussian distribution and the bell curve.**

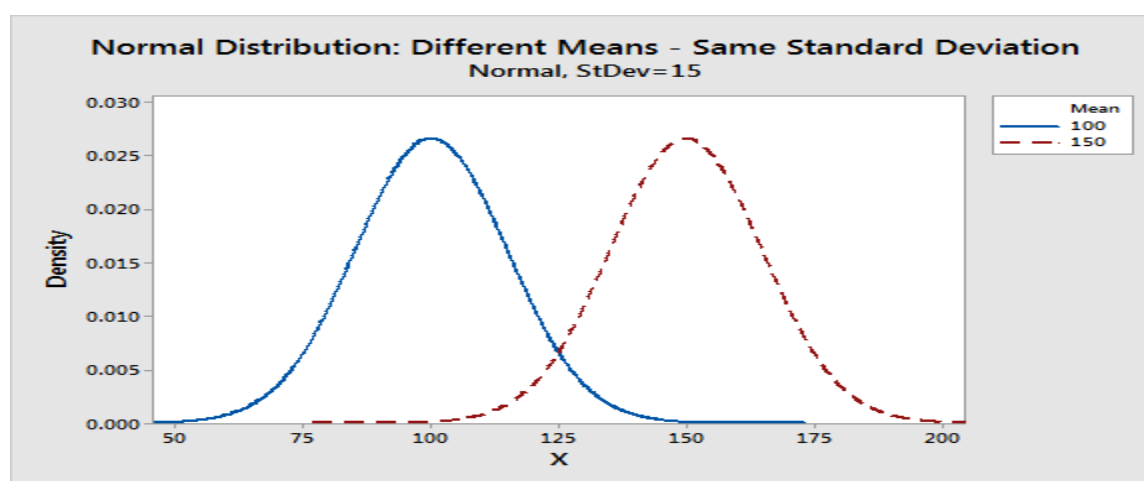
The normal distribution is a probability function that describes how the values of a variable are distributed. It is a symmetric distribution where most of the observations cluster around the central peak and the probabilities for values further away from the mean taper off equally in both directions. Extreme values in both tails of the distribution are similarly unlikely.

Parameters of the Normal Distribution

As with any probability distribution, the parameters for the normal distribution define its shape and probabilities entirely. The normal distribution has two parameters, **the mean and standard deviation**. The normal distribution does not have just one form. Instead, the shape changes based on the parameter values.

Mean

The mean is the central tendency of the distribution. It defines the location of the peak for normal distributions. Most values cluster around the mean. On a graph, changing the mean shifts the entire curve left or right on the X-axis.

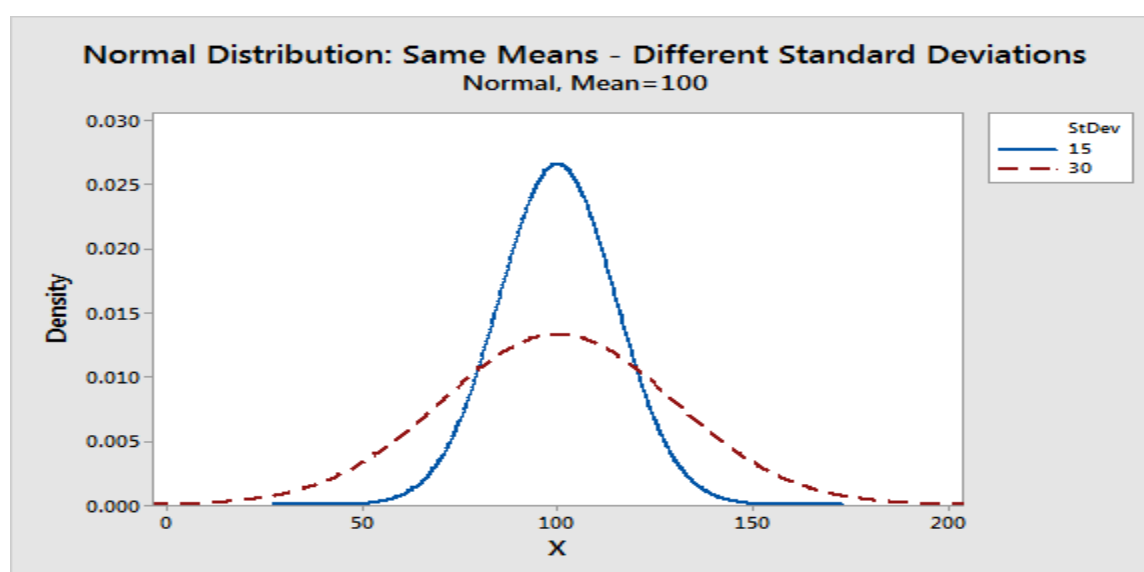


Standard deviation

The standard deviation is a measure of variability. It defines the width of the normal distribution. The standard deviation determines how far away from the mean the values tend to fall. It represents the typical distance between the observations and the average.

On a graph, changing the standard deviation either tightens or spreads out the width of the distribution along the X-axis.

Larger standard deviations produce distributions that are more spread out.



When you have narrow distributions, the probabilities are higher that values won't fall far from the mean. As you increase the spread of the distribution, the likelihood that observations will be further away from the mean also increases.

Common Properties for All Forms of the Normal Distribution

Despite the different shapes, all forms of the normal distribution have the following characteristic properties.

- They're all symmetric. The normal distribution cannot model skewed distributions.
- The mean, median, and mode are all equal.
- Half of the population is less than the mean and half is greater than the mean.
- The Empirical Rule allows you to determine the proportion of values that fall within certain distances from the mean.

The Empirical Rule for the Normal Distribution

The Normal pdf: $f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$ where

μ = mean

σ^2 = variance

$\pi=3.14159$ =ratio of the circumference to diameter

$e = 2.71829$

Important things about at the normal distribution

- (1) There are infinitely many variations of the normal distribution differentiated by μ and σ^2 .
- (2) The highest point of a normal is at the mean which is also the median.
- (3) The normal distribution is symmetric. This implies that

$$F(x) = 1 - F(-x)$$

PART B

Given Data

Mean $\mu = 60000$ PKR

Standard deviation $\sigma = 15000$ PKR

Required:

To find out the probability of a randomly selected employees earning less than 45000 PKR annually

And Z-Score table at the end of the paper (Table 2)?

Solution:

Normally distributed with the population mean $\mu = 60000$ PKR and standard deviation $\sigma = 15000$ PKR what is the probability of a randomly selected employees earning less than 45000 PKR annually

$$Z = \frac{(x-u)}{\sigma} \dots\dots\dots -1$$

Put value in equ 1

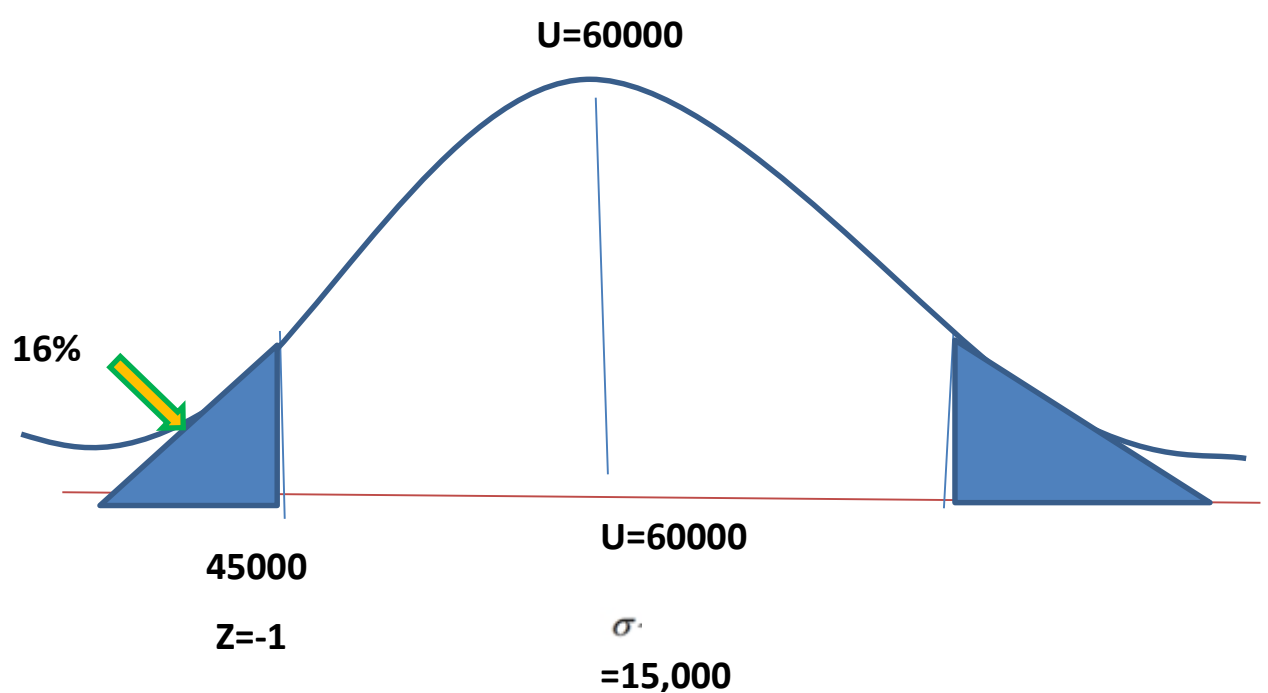
$$Z = \frac{(45000-60,000)}{15,000}$$

$$= -1.00$$

What is $P(Z=-1.00)$

$$P(X < 45,000) = P(Z < -1.00) = .15866 = 16\%$$

From table 2 we have (**.15866**)



Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-3.9	.00005	.00005	.00004	.00004	.00004	.00004	.00004	.00004	.00003	.00003
-3.8	.00007	.00007	.00007	.00006	.00006	.00006	.00006	.00005	.00005	.00005
-3.7	.00011	.00010	.00010	.00010	.00009	.00009	.00008	.00008	.00008	.00008
-3.6	.00016	.00015	.00015	.00014	.00014	.00013	.00013	.00012	.00012	.00011
-3.5	.00023	.00022	.00022	.00021	.00020	.00019	.00019	.00018	.00017	.00017
-3.4	.00034	.00032	.00031	.00030	.00029	.00028	.00027	.00026	.00025	.00024
-3.3	.00048	.00047	.00045	.00043	.00042	.00040	.00039	.00038	.00036	.00035
-3.2	.00069	.00066	.00064	.00062	.00060	.00058	.00056	.00054	.00052	.00050
-3.1	.00097	.00094	.00090	.00087	.00084	.00082	.00079	.00076	.00074	.00071
-3.0	.00135	.00131	.00126	.00122	.00118	.00114	.00111	.00107	.00104	.00100
-2.9	.00187	.00181	.00175	.00169	.00164	.00159	.00154	.00149	.00144	.00139
-2.8	.00256	.00248	.00240	.00233	.00226	.00219	.00212	.00205	.00199	.00193
-2.7	.00347	.00336	.00326	.00317	.00307	.00298	.00289	.00280	.00272	.00264
-2.6	.00466	.00453	.00440	.00427	.00415	.00402	.00391	.00379	.00368	.00357
-2.5	.00621	.00604	.00587	.00570	.00554	.00539	.00523	.00508	.00494	.00480
-2.4	.00820	.00798	.00776	.00755	.00734	.00714	.00695	.00676	.00657	.00639
-2.3	.01072	.01044	.01017	.00990	.00964	.00939	.00914	.00889	.00866	.00842
-2.2	.01390	.01355	.01321	.01287	.01255	.01222	.01191	.01160	.01130	.01101
-2.1	.01786	.01743	.01700	.01659	.01618	.01578	.01539	.01500	.01463	.01426
-2.0	.02275	.02222	.02169	.02118	.02068	.02018	.01970	.01923	.01876	.01831
-1.9	.02872	.02807	.02743	.02680	.02619	.02559	.02500	.02442	.02385	.02330
-1.8	.03593	.03515	.03438	.03362	.03288	.03216	.03144	.03074	.03005	.02938
-1.7	.04457	.04363	.04272	.04182	.04093	.04006	.03920	.03836	.03754	.03673
-1.6	.05480	.05370	.05262	.05155	.05050	.04947	.04846	.04746	.04648	.04551
-1.5	.06681	.06552	.06426	.06301	.06178	.06057	.05938	.05821	.05705	.05592
-1.4	.08076	.07927	.07780	.07636	.07493	.07353	.07215	.07078	.06944	.06811
-1.3	.09680	.09510	.09342	.09176	.09012	.08851	.08691	.08534	.08379	.08226
-1.2	.11507	.11314	.11123	.10935	.10749	.10565	.10383	.10204	.10027	.09853
-1.1	.13567	.13350	.13136	.12924	.12714	.12507	.12302	.12100	.11900	.11702
-1.0	.15866	.15625	.15386	.15151	.14917	.14686	.14457	.14231	.14007	.13786
-0.9	.18406	.18141	.17879	.17619	.17361	.17106	.16853	.16602	.16354	.16109
-0.8	.21186	.20897	.20611	.20327	.20045	.19766	.19489	.19215	.18943	.18673
-0.7	.24196	.23885	.23576	.23270	.22965	.22663	.22363	.22065	.21770	.21476
-0.6	.27425	.27093	.26763	.26435	.26109	.25785	.25463	.25143	.24825	.24510
-0.5	.30854	.30503	.30153	.29806	.29460	.29116	.28774	.28434	.28096	.27760
-0.4	.34458	.34090	.33724	.33360	.32997	.32636	.32276	.31918	.31561	.31207
-0.3	.38209	.37828	.37448	.37070	.36693	.36317	.35942	.35569	.35197	.34827
-0.2	.42074	.41683	.41294	.40905	.40517	.40129	.39743	.39358	.38974	.38591
-0.1	.46017	.45620	.45224	.44828	.44433	.44038	.43644	.43251	.42858	.42465
-0.0	.50000	.49601	.49202	.48803	.48405	.48006	.47608	.47210	.46812	.46414
Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-3.9	.00005	.00005	.00004	.00004	.00004	.00004	.00004	.00004	.00003	.00003
-3.8	.00007	.00007	.00007	.00006	.00006	.00006	.00006	.00005	.00005	.00005
-3.7	.00011	.00010	.00010	.00010	.00009	.00009	.00008	.00008	.00008	.00008
-3.6	.00016	.00015	.00015	.00014	.00014	.00013	.00013	.00012	.00012	.00011
-3.5	.00023	.00022	.00022	.00021	.00020	.00019	.00019	.00018	.00017	.00017
-3.4	.00034	.00032	.00031	.00030	.00029	.00028	.00027	.00026	.00025	.00024
-3.3	.00048	.00047	.00045	.00043	.00042	.00040	.00039	.00038	.00036	.00035
-3.2	.00069	.00066	.00064	.00062	.00060	.00058	.00056	.00054	.00052	.00050
-3.1	.00097	.00094	.00090	.00087	.00084	.00082	.00079	.00076	.00074	.00071
-3.0	.00135	.00131	.00126	.00122	.00118	.00114	.00111	.00107	.00104	.00100
-2.9	.00187	.00181	.00175	.00169	.00164	.00159	.00154	.00149	.00144	.00139
-2.8	.00256	.00248	.00240	.00233	.00226	.00219	.00212	.00205	.00199	.00193
-2.7	.00347	.00336	.00326	.00317	.00307	.00298	.00289	.00280	.00272	.00264
-2.6	.00466	.00453	.00440	.00427	.00415	.00402	.00391	.00379	.00368	.00357
-2.5	.00621	.00604	.00587	.00570	.00554	.00539	.00523	.00508	.00494	.00480
-2.4	.00820	.00798	.00776	.00755	.00734	.00714	.00695	.00676	.00657	.00639
-2.3	.01072	.01044	.01017	.00990	.00964	.00939	.00914	.00889	.00866	.00842
-2.2	.01390	.01355	.01321	.01287	.01255	.01222	.01191	.01160	.01130	.01101
-2.1	.01786	.01743	.01700	.01659	.01618	.01578	.01539	.01500	.01463	.01426
-2.0	.02275	.02222	.02169	.02118	.02068	.02018	.01970	.01923	.01876	.01831
-1.9	.02872	.02807	.02743	.02680	.02619	.02559	.02500	.02442	.02385	.02330
-1.8	.03593	.03515	.03438	.03362	.03288	.03216	.03144	.03074	.03005	.02938
-1.7	.04457	.04363	.04272	.04182	.04093	.04006	.03920	.03836	.03754	.03673
-1.6	.05480	.05370	.05262	.05155	.05050	.04947	.04846	.04746	.04648	.04551
-1.5	.06681	.06552	.06426	.06301	.06178	.06057	.05938	.05821	.05705	.05592
-1.4	.08076	.07927	.07780	.07636	.07493	.07353	.07215	.07078	.06944	.06811
-1.3	.09680	.09510	.09342	.09176	.09012	.08851	.08691	.08534	.08379	.08226
-1.2	.11507	.11314	.11123	.10935	.10749	.10565	.10383	.10204	.10027	.09853
-1.1	.13567	.13350	.13136	.12924	.12714	.12507	.12302	.12100	.11900	.11702
-1.0	.15866	.15625	.15386	.15151	.14917	.14686	.14457	.14231	.14007	.13786
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