



**FINAL EXAM**

Spring 2020

**RISK AND DISASTER MANAGEMENT IN  
CONSTRUCTION**

M.S (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.

### **RISK REGISTER:**

A Risk Register is a tool for documenting risks, and actions to manage each risk. The Risk Register is essential to the successful management of risk. As risks are identified they are logged on the register and actions are taken to respond to the risk.

Risk Register is a document that contains the information about identified risks, results of Risk Analysis (impact, probability, effects), as well as Risk Response Plans. You also use the Risk Register to monitor and control risks during the whole project life cycle.

### **EXPLANATION:**

Most frequently Risk Managers attempt to reduce the likelihood of the risk occurring or the impact if the risk does occur. The responses are documented on the Risk Register and the register should regularly reviewed to monitor progress. Ideally the Risk Register should be reviewed in every project team meeting. It should certainly be review at the end of each phase of the project lifecycle. Management of risk should be a constant ongoing process with the project team raising risks with the Risk Manager or Project Manager who then logs the risk and identifies actions that can be taken to mitigate the risk. To properly respond to a risk the Risk Manager may need to bring in experts to understand the actions that can be taken to reduce the likelihood of the risk occurring or the impact if the risk does occur. Read more on the possible responses to risk. At first glance, it's a simple document, one just need to fill in the information he collects about each risk however, It's a pitfall for many junior project managers. The results of the interviews and reviews of the Programme and budget should form the basis for a risk log or risk register that will list all the identified risks.

### **THINGS TO REMEMBER IN MAINTAINING RISK REGISTER:**

- You need to keep in mind that the Risk Register is a living thing.
- The information you put in it is changing rapidly.
- Risks evolve and change attributes.
- A Risk Response Plan may not provide the required efficiency.
- Threats and opportunities may disappear, or they may become irrelevant.
- Risk Register should be simple, adaptable, maintainable, and close at hand.

## PRIMARY ENTITIES OF RISK REGISTER:

ENTITY	DETAILS
<b>Risk ID</b>	A unique identifier for the risk
<b>Date Raised</b>	The date the risk was identified
<b>Risk Description</b>	Best written as 'There is a risk that ABC, because of ABC if this occurs it will XYZ'
<b>Likelihood</b>	How likely is that the risk will occur. Can be 1- 5 or High / Medium / Low
<b>Impact</b>	What will the impact be if the risk occurs?
<b>Severity</b>	Likelihood x Impact Owner - The person who will be responsible for managing the risk.
<b>Risk Rank</b>	It is the Probability * Impact. The risk rank is the easiest way to shortlist the risk you'll work with directly.
<b>Mitigating action</b>	Actions that can be taken to reduce the likelihood of the risk occurring. May also be acceptance of the risk or transference of the risk e.g. insurance. Risk Mitigation techniques.
<b>Contingent action</b>	What will be done if this risk does occur. Usually actions to reduce the impact on the project
<b>Status</b>	For example, Open, Waiting, Closed, in Progress etc.
<b>Risk Owner</b>	It's just the name of a responsible person. This person must monitor, manage, and report on the risk to you.
<b>Risk Category</b>	Grouping risks by categories can help you to fight the root cause of problems. It may show you a way to tackle several risks with one Risk Response Plan.
<b>Risk Breakdown Structure</b>	The risk breakdown structure identification number.

## EXAMPLE:

The Risk Register table is of the site SHAHALAM SARDARYAAB ROAD Under the PRIP Project of CNW Department. It identifies the major risks of the project in different phases and its effects on the project. Moreover, it also helps the Project Manager to find alternates to minimize the risks involved.

[The Table is Given Below:](#)

**Project: Rehabilitation of Road from Shah Alam to Sardaryaab PRIP - KPK**

ID	Date	Risk description	Risk			Likely Hood of Occurrence	Without controls		Owner	Controls	Residual risk	Action
			H	M	L		Cost impact	Time impact				
1	Jun-18	Project purpose and need is not well-defined.	Y			Medium	Yes	Yes	Project Sponsor	Complete a business case if not already provided and ensure purpose is well defined on Project Charter and PID.	Project Charter or business case may be incomplete	Escalate to the Project Board with an assessment of the risk of runaway costs/never-ending project.
2	Jul-18	Project design and deliverable definition is incomplete.	Y			Low	Yes	Yes	Project Sponsor	Define the scope in detail via design workshops with input from subject matter experts.	Scope may not be properly defined as per site and based on opinion of different experts	Document assumptions made and associated risks. Request high risk items that are ill-defined are removed from scope.
3	Jul-18	Project schedule is not clearly defined or understood		Y		Low	Yes	Yes	Project Manager	Hold scheduling workshops with the project team so they understand the plan and likelihood of missed tasks is reduced. Share the schedule and go through upcoming tasks at each weekly project progress meeting.	The schedule may be imperfect due to the progress of the project and changes may occur in the future	Revisit the schedule with the project team. 'Relaunch' the schedule.
4	Sep-18	No control over staff priorities		Y		Medium	No	Yes	Project Manager	The Project Sponsor will brief team managers on the importance of the project. Soft book resources as early as possible and then communicate final booking dates asap after the scheduling workshops. Identify back ups for each human resource on the project.	Control over human resources/ staff may be disturbed with any mishap or bad event on the site	Escalate to the Project Sponsor and bring in back up resource.
5	Feb-19	Consultant or contractor delays	Y			Medium	Yes	Yes	Project Manager	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.	Delay may be caused in the deployment of consultant or contractor	Escalate to Project Sponsor and Contracts Manager. Implement late clauses.

6	Mar-19	Estimating and/or scheduling errors	Y		Medium	Yes	No	Project Manager	Break this risk into two: 'cost estimating' and 'scheduling errors'. Use two methods of cost estimation, and carefully track costs and forecast cost at completion making adjustments as necessary. Build in 10% contingency on cost and scheduling.	Scheduling/estimating may occur at any calculation stage	Escalate to project sponsor and project board. Raise change request for change to budget or schedule. Pull down contingency.
7	May-19	Unplanned work that must be accommodated	Y		Low	Yes	Yes	Team Manager	Attend project scheduling workshops. Check previous projects, for actual work and costs. Check all plans and quantity surveys. Document all assumptions made in planning and communicate to the project manager before project kick off.	Some unplanned work can arise due to negligence	Escalate to the Project Manager with plan of action, including impact on time, cost and quality.
8	Jun-19	Lack of communication, causing lack of clarity and confusion.		Y	Medium	No	Yes	Project Manager	Write a communication plan which includes frequency, goal, and audience of each communication. Identify stakeholders early and make sure they are considered in the communication plan. Use most appropriate channel of communication for audience e.g. don't send 3 paragraph email to Developers, have a call instead.	Communication gap may occur at any stage of the project	Correct misunderstandings immediately. Clarify areas that are not clear swiftly using assistance from Project Sponsor if needed.
9	Aug-19	Pressure to arbitrarily reduce task durations and or run tasks in parallel which would increase risk of errors.	Y		Low	No	Yes	Project Manager	Share the schedule with key stakeholders to reduce the risk of this happening. Patiently explain that schedule was built using the expertise of subject matter experts.	Deficiencies may be there in the schedule	Escalate to Project Board with assessment of risk and impact of the change. Hold emergency RM call with decision makers & source of pressure and lay out risk and impact.
10	Aug-19	Scope creep	Y		Medium	Yes	No	Project Manager	Document the project scope in a Project Initiation Document or Project Charter and get it	Scope may change with changing situations	

									authorised by the Project Board. Refer to it throughout the project and assess all changes against it also ensuring alignment of any changes with Business Case.		Document each and every example of scope creep NO MATTER HOW SMALL in a change order and get authorisation from the project board BEFORE STARTING WORK.
11	Sep-19	Unresolved project conflicts not escalated in a timely manner		Y	Low	No	Yes	Project Manager	Hold regular project team meetings and look out for conflicts. Review the project plan and stakeholder engagement plan for potential areas of conflict.	Conflict may still arise due to presence of may stakeholder	When aware immediately escalate to Project Board and gain assistance from Project Sponsor to resolve the conflict.
12	-	Business Case becomes obsolete or is undermined by external or internal changes.	Y		Low	Yes	Yes	Project Sponsor	No ability to reduce likelihood, but make sure early warning is given by reviewing business case on regular basis with the Project Board.	External or internal causes may change the business case	Initiate escalation and project close down procedure.
13	-	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		Medium	Yes	Yes	Project Manager	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.	Material supply may b interrupted	Consider insurance to cover costs and alternative supplier as a back up.
14	Nov-19	Added workload or time requirements because of new direction, policy, or statute		Y	Low	Yes	Yes	Project Sponsor	No ability to reduce likelihood.	New directions or policy may change with time	Consider insurance and use Project Board to get advance notice if possible.
15	Nov-19	Inadequate customer testing leads to large post go live snag list.	Y		High	No	No	Project Manager	Ensure customer prepares test cases/quality checks and protect testing/quality assurance window.	QA/QC may have hurdles	Raise risk immediately and raise issue if it is clear testing inadequate. Customer could extend testing & bring in additional resource.
16	Jan-20	Legal action delays or pauses project.		Y	Low	Yes	Yes	Project Sponsor	Ensure all contracts signed before starting the project.	Legal issues may arise with time	Escalate to Project Board who will notify legal department. Follow instructions from legal.
17	Feb-20	Customer refuses to approve deliverables/milestones or delays approval,		Y	Medium	No	Yes	Project Manager	Ensure customer decision maker with budgetary authority is identified before project start and is part of the project board.	Customer decisions may change	Escalate to project Board and recommend action e.g. to stop the project.

		putting pressure on project manager to 'work at risk'.								Communicate dates for sign-off points up front.		
18	Different Dates	Theft of materials, intellectual property or equipment.	Y			Low	Yes	No	Project Manager	Follow security procedures, ensure Non-Disclosure Agreements (NDAs), & compliance certificates are in place. Verify all physical security measures in place. Secure insurance.	Security personnel may be compromised	Notify appropriate authorities e.g. police, project board and initiate internal investigations.
19	-	Acts of God for example, extreme weather, leads to loss of resources, materials, premises etc.	Y			Low	Yes	Yes	Project Manager	Ensure insurance in place. Familiarise project team with emergency procedures. Where cost effective put back up systems in place e.g. generators.	Acts of god can not be stopped in earlier stages	Notify appropriate authorities. Follow health and safety procedures. Notify stakeholders and Project Board.
20	May-20	Stakeholder action delays project.	Y			Low	Yes	Yes	Project Manager	Identify stakeholders, analyse power and influence and create a stakeholder engagement plan. Project Board to authorise the plan.	Stakeholders may deviate in their actions	Notify appropriate authorities and follow internal procedures e.g. for activist demonstrations.

## QUESTION 2.

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

## ANSWER.

### **COST BENEFIT ANALYSIS:**

A cost-benefit analysis (CBA) is a systematic process in which decisions relating to proposals are analyzed to determine whether the benefits outweigh the costs, and by what margin.

Cost benefit analysis is a process used primarily by businesses that weighs the sum of the benefits, such as financial gain, of an action against the negatives, or costs, of that action.

### **EXPLANATION:**

Whenever you need to make a business decision, invariably you have to weigh one choice against another. Sometimes, the choice is between Project A and Project B, and sometimes the choice is between Project A and doing nothing at all. A cost-benefit analysis is the simplest way of comparing your options to determine whether to go ahead with a project. The idea is to weigh up project costs against benefits, and identify the action that will give you the most bang for your buck.

It helps in predicting whether the benefit of a project is more than its cost and by how much. If the CBA is accurate then it helps in choosing the alternative that increases welfare from a utilitarian point of view.

As an assessment tool, CBA is of more value for smaller construction projects with a length of time to completion that is short to intermediate. This is because greater accuracy in the cost estimating can be achieved. Larger projects with a long Programme may be exposed to more cost uncertainties (e.g. interest rates, inflation, availability of labour, price of materials, etc.). For these larger and more uncertain projects, analysis models that may be more suitable include net present value (NPV) and internal rate of return (IRR).

### **Ratio of Cost to Benefit:**

If the ratio of Cost to Benefit is more than 1, then the project is more beneficial as compared to the incurred cost.

### **THE PURPOSE OF COST BENEFIT 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.

There are two main purposes in using CBA:

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.



## **EFFECTIVENESS OF CBA IN A PROJECT:**

The effectiveness of CBA is explained below in reference to the PRIP Projects of Communication and works department. The cost benefit analysis is effective for the project in the following ways:

1. **It defines the goals and objectives of the Project.** The cost to benefit analysis were carried out in the start of the project and updated with the flexible nature of the construction work in PRIP Projects to determine and maintain the desired and designed goals and objectives.
2. **It defines alternate actions for the execution of works.** In the Projects of PRIP, many of the changes led the parties to find alternate actions under the proposed cost and desired benefits.
3. **It Analyses all cost types, Direct costs, Indirect costs, Intangible costs and Alternative costs.** All types of costs were considered in the Cost Benefit Analysis meeting of Donor and Clients of PRIP. After a detailed analysis the cost was approved for the project.
4. **It identifies the stakeholders of the project.** In PRIP project the main stakeholders are the Client, consultants, contractors and the Donor i.e. Asian Development Bank. The cost is managed by the client and donor and execution is carried out by contractors and supervised by consultants. The total cost includes the services of all the stakeholders.
5. **It evaluates whether a capital investment is worth it for the project.** The capital investment is from the Asian Development Bank to the Government of KP Government. The cost analysis of the project is carried out by both the parties and reviewed throughout the execution of work. As per the cost of the project the loan is approved by the parties.
6. **It decides whether to hire new employees for the project.** In PRIP, through cost benefit analysis the number and needs of employees were justified to the clients and Asian Development Bank. The required number of employees were hired and paid for their jobs on their respective sites.
7. **It determines whether a project or operating change is feasible.** The operating change in any project is directly related to the increase or decrease of a Project Cost and Benefit. The addition of sites in PRIP Increased the cost of the overall project and hence the loan of ADB is increased along with it. The ultimate benefit is to the public.
8. **It develops a benchmark for comparing projects.** PRIP projects are executed by consultants and Contractors to make sure and maintain the quality of the work. Hence based on its analysis of cost and the benefits to the public, these projects are considered as a benchmark of comparison for other projects in the province.
9. **It weighs up one marketing initiative against another.** Civil Engineers and Project Managers are expected to find a great proposal, of less cost and greater benefits of a project. Through Cost Benefit analysis this objective is achieved and the projects weighs up in marketing perspective against other running projects. The experts in the CnW Department and ADB had established a cost-effective project this way.

10. **It appraises the desirability of a proposed policy.** The desired designs were prepared under the cost benefit analysis to no exceed the proposed budget by the stakeholders of PRIP.
11. **It prioritizes investments, so you're focusing on the actions that return the most value first.** Execution Cost, Services Cost, Planning Costs and all other costs were priorities in PRIP and focused according through the CBA. Execution returns the most value back, therefore is considered the top priority in the PRIP Projects.
12. **It Analyze potential risks and its impacts on the project.** The risk register is use for this purpose and to evaluate the intensity of the risks. The risks are minimized after the analysis to increase the benefit and decrease the cost of a project. In PRIP the use of quality material is ensured to minimize the risk and decrease the maintenance cost in the later stage.
13. **It quantifies the effects that a change initiative would have on stakeholders.** Any change in the cost, affects the stakeholders and thus affect the project and public in large. In PRIP if any change is initiated without considering CBA, it would affect the cost of the project and thus the parties would be disturbed specifically the Asian Development Bank and CnW Department.
14. **It establishes goals for the project itself, for example, to set time, productivity or cost restraints on a project you've analysed and approved.** The Time, Productivity and restraints etc. are also considered during the CBA. The time for the projects were set for 2 years from the day of mobilization for the PRIP Projects except Mardan Swabi Road. The more the time, the more the cost would be required and the less benefit to the users.

## 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)

Part (a): What is Normal Probability distribution?

## ANSWER.

### THE NORMAL DISTRIBUTION

Normal distribution, also known as the Gaussian distribution, is a probability distribution that is symmetric about the mean, showing that data near the mean are more frequent in occurrence than data far from the mean. In graph form, normal distribution will appear as a bell curve.

The Normal Probability Distribution is very common in the field of statistics.

Whenever you measure things like people's height, weight, salary, opinions or votes, the graph of the results is very often a normal curve.

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$

The parameter  $\mu$ , is the mean or expectation of the distribution (and also its median and mode); and  $\sigma$ , is its standard deviation. The variance of the distribution is  $\sigma^2$ . A random variable with a Gaussian distribution is said to be normally distributed and is called a normal deviate.

### PROPERTIES OF A NORMAL DISTRIBUTION

- The normal curve is symmetrical about the mean  $\mu$ ;
- The mean is at the middle and divides the area into halves. Exactly half of the values are to the left of centre and exactly half the values are to the right.
- The total area under the curve is equal to 1;
- It is completely determined by its mean and standard deviation  $\sigma$  (or variance  $\sigma^2$ )
- The mean, mode and median are all equal.

Part (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.

### GIVEN DATA:

Mean  $\mu = 60000$  PKR

Standard Deviation,  $\sigma = 15000$  PKR

$S < 45000$

### SOLUTION:

Let  $S$  be the random variable of a salary of employee (in PKR),

$S \sim N(60000, 15000)$ .

Then the random variable  $X = \frac{S - 60000}{15000} \sim N(0,1)$ .

$P(S < 45000)$

$$= P\left(X < \frac{45000 - 60000}{15000}\right)$$

$$= P(X < -1.0)$$

$$= \Phi(-1.0)$$

$$= \mathbf{0.15866}$$
 (Answer is highlighted in the Table below)

Here  $\Phi(x)$  denotes the cumulative distribution function of a standard normal distribution.

**Answer: The probability of a randomly selected employees earning less than 45000 PKR annually is 15.87%**

**Table 2**  
**STANDARD NORMAL DISTRIBUTION: Table Values Represent AREA to the LEFT of the Z score.**

<b>Z</b>	<b>.00</b>	<b>.01</b>	<b>.02</b>	<b>.03</b>	<b>.04</b>	<b>.05</b>	<b>.06</b>	<b>.07</b>	<b>.08</b>	<b>.09</b>
-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

<b>Z</b>	<b>.00</b>	<b>.01</b>	<b>.02</b>	<b>.03</b>	<b>.04</b>	<b>.05</b>	<b>.06</b>	<b>.07</b>	<b>.08</b>	<b>.09</b>
<b>0.0</b>	.50000	.50399	.50798	.51197	.51595	.51994	.52392	.52790	.53188	.53586
<b>0.1</b>	.53983	.54380	.54776	.55172	.55567	.55962	.56356	.56749	.57142	.57535
<b>0.2</b>	.57926	.58317	.58706	.59095	.59483	.59871	.60257	.60642	.61026	.61409
<b>0.3</b>	.61791	.62172	.62552	.62930	.63307	.63683	.64058	.64431	.64803	.65173
<b>0.4</b>	.65542	.65910	.66276	.66640	.67003	.67364	.67724	.68082	.68439	.68793
<b>0.5</b>	.69146	.69497	.69847	.70194	.70540	.70884	.71226	.71566	.71904	.72240
<b>0.6</b>	.72575	.72907	.73237	.73565	.73891	.74215	.74537	.74857	.75175	.75490
<b>0.7</b>	.75804	.76115	.76424	.76730	.77035	.77337	.77637	.77935	.78230	.78524
<b>0.8</b>	.78814	.79103	.79389	.79673	.79955	.80234	.80511	.80785	.81057	.81327
<b>0.9</b>	.81594	.81859	.82121	.82381	.82639	.82894	.83147	.83398	.83646	.83891
<b>1.0</b>	.84134	.84375	.84614	.84849	.85083	.85314	.85543	.85769	.85993	.86214
<b>1.1</b>	.86433	.86650	.86864	.87076	.87286	.87493	.87698	.87900	.88100	.88298
<b>1.2</b>	.88493	.88686	.88877	.89065	.89251	.89435	.89617	.89796	.89973	.90147
<b>1.3</b>	.90320	.90490	.90658	.90824	.90988	.91149	.91309	.91466	.91621	.91774
<b>1.4</b>	.91924	.92073	.92220	.92364	.92507	.92647	.92785	.92922	.93056	.93189
<b>1.5</b>	.93319	.93448	.93574	.93699	.93822	.93943	.94062	.94179	.94295	.94408
<b>1.6</b>	.94520	.94630	.94738	.94845	.94950	.95053	.95154	.95254	.95352	.95449
<b>1.7</b>	.95543	.95637	.95728	.95818	.95907	.95994	.96080	.96164	.96246	.96327
<b>1.8</b>	.96407	.96485	.96562	.96638	.96712	.96784	.96856	.96926	.96995	.97062
<b>1.9</b>	.97128	.97193	.97257	.97320	.97381	.97441	.97500	.97558	.97615	.97670
<b>2.0</b>	.97725	.97778	.97831	.97882	.97932	.97982	.98030	.98077	.98124	.98169
<b>2.1</b>	.98214	.98257	.98300	.98341	.98382	.98422	.98461	.98500	.98537	.98574
<b>2.2</b>	.98610	.98645	.98679	.98713	.98745	.98778	.98809	.98840	.98870	.98899
<b>2.3</b>	.98928	.98956	.98983	.99010	.99036	.99061	.99086	.99111	.99134	.99158
<b>2.4</b>	.99180	.99202	.99224	.99245	.99266	.99286	.99305	.99324	.99343	.99361
<b>2.5</b>	.99379	.99396	.99413	.99430	.99446	.99461	.99477	.99492	.99506	.99520
<b>2.6</b>	.99534	.99547	.99560	.99573	.99585	.99598	.99609	.99621	.99632	.99643
<b>2.7</b>	.99653	.99664	.99674	.99683	.99693	.99702	.99711	.99720	.99728	.99736
<b>2.8</b>	.99744	.99752	.99760	.99767	.99774	.99781	.99788	.99795	.99801	.99807
<b>2.9</b>	.99813	.99819	.99825	.99831	.99836	.99841	.99846	.99851	.99856	.99861
<b>3.0</b>	.99865	.99869	.99874	.99878	.99882	.99886	.99889	.99893	.99896	.99900
<b>3.1</b>	.99903	.99906	.99910	.99913	.99916	.99918	.99921	.99924	.99926	.99929
<b>3.2</b>	.99931	.99934	.99936	.99938	.99940	.99942	.99944	.99946	.99948	.99950
<b>3.3</b>	.99952	.99953	.99955	.99957	.99958	.99960	.99961	.99962	.99964	.99965
<b>3.4</b>	.99966	.99968	.99969	.99970	.99971	.99972	.99973	.99974	.99975	.99976
<b>3.5</b>	.99977	.99978	.99978	.99979	.99980	.99981	.99981	.99982	.99983	.99983
<b>3.6</b>	.99984	.99985	.99985	.99986	.99986	.99987	.99987	.99988	.99988	.99989
<b>3.7</b>	.99989	.99990	.99990	.99990	.99991	.99991	.99992	.99992	.99992	.99992
<b>3.8</b>	.99993	.99993	.99993	.99994	.99994	.99994	.99994	.99995	.99995	.99995
<b>3.9</b>	.99995	.99995	.99996	.99996	.99996	.99996	.99996	.99996	.99997	.99997