

Section A — answer all these questions.

1) Which of the following are characteristics of a project but **not** characteristics of exploration? Mark **all** answers that apply.

(3 mark)

| | | |
|----|--|--|
| a. | | Clearly defined deliverable |
| b. | | Open-ended deadline |
| c. | | Ambiguous success criteria |
| d. | | Individual with overall responsibility |
| e. | | Fixed budget |
| f. | | Iterative testing without a final goal |
| g. | | Specific time frame |
| h. | | Flexible objectives |

Correct answers: **a, e, g** – full mark; 0.5 if anything out place – but 2 correct; only one marked receive 0.2 mark.

2) In a large-scale project, which person or group is responsible for making key strategic decisions to ensure the project aligns with organisational goals?

(1 mark)

| | | |
|----|--|-----------------|
| a. | | Steering group |
| b. | | Project manager |
| c. | | Sponsor |
| d. | | Investor |

Correct answer: **a** – full mark

3) In a large-scale project, which person or group is responsible for making key operational decisions to ensure the project's daily progress?

(1 mark)

| | | |
|----|--|-----------------|
| a. | | Steering group |
| b. | | Project manager |
| c. | | Sponsor |
| d. | | Investor |

Correct answer: **b** – full mark.

4) Mark **one** 'X' in **each** row to indicate the most appropriate type of scale for the data examples provided. *Note that some scale types may be used multiple times, while others may not be used at all.*

| | Data examples | Ordinal | Ratio | Nominal | Interval |
|----|---|---------|-------|---------|----------|
| a. | Language in which an application was developed (e.g. Java, C++) | | | | |
| b. | Development methodology adopted for a project (e.g. waterfall, incremental prototype) | | | | |
| c. | Measure of difficulty when assessing a user interface feature (e.g. very easy, quite easy, quite difficult) | | | | |
| d. | Probability of being awarded a contract (e.g. 0.25, 0.75) | | | | |
| e. | Rating of programmer expertise (e.g. novice, experienced, expert) | | | | |

(5 mark)

Answers:

a. Nominal; b. Nominal; c. Ordinal; d. Ratio; e. Ordinal. All correct full mark; otherwise, 0.2 each correct.

5) Which of the following options best describes a key difference between PRINCE2 and Step Wise planning?

| | | |
|----|--|---|
| a. | | PRINCE2 allows overlapping phases, while Step Wise follows a strict, sequential order. |
| b. | | PRINCE2 has defined stages and roles; Step Wise is more informal and ad-hoc. |
| c. | | PRINCE2 includes stages like planning and control, while Step Wise moves linearly from feasibility to execution. |
| d. | | PRINCE2 focuses on risk and quality control, while Step Wise covers the full lifecycle, including budgeting and stakeholders. |

(1 mark)

Correct answer: c

6) Which of the following best reflects a core Agile principle?

| | | |
|----|--|--|
| a. | | Following a strict project plan without changes. |
| b. | | Prioritising comprehensive documentation over collaboration. |
| c. | | Completing all project phases before any testing begins. |
| d. | | Responding to change over following a fixed plan. |

(1 mark)

Correct answer: d

7) A project team is monitoring the progress of a software development project. Midway through, they observe that key tasks, especially in development and testing, are falling behind schedule compared to the original plan. What would be the most effective approach to address the project's current progress issues?

| | | |
|----|--|--|
| a. | | Increase communication with stakeholders, keeping the timeline unchanged. |
| b. | | Adjust the timeline, reallocate resources, and set regular progress check-ins. |
| c. | | Stick to the schedule and address delays in the final review. |
| d. | | Shift resources from testing to development to prioritise completion. |

(2 mark)

Correct answer: b

8) In Agile Scrum, which of the following best describes the primary responsibilities of the Product Owner?

| | | |
|----|--|---|
| a. | | The Product Owner oversees the development team's daily tasks, ensuring they complete each task on time. |
| b. | | The Product Owner is responsible for removing any obstacles that the development team faces during a Sprint. |
| c. | | The Product Owner organises and facilitates all Scrum events, including Daily Standups and Sprint Retrospectives. |
| d. | | The Product Owner collaborates with stakeholders to define and prioritise the product backlog, ensuring the team works on tasks that deliver the highest value. |

(2 mark)

Correct answer: d

9) In software development, different types of prototyping serve specific purposes. Which of the following best describes a throwaway (or disposable) prototype?

| | | |
|----|--|---|
| a. | | A prototype created to serve as the initial foundation for the final system, continuously improved until completion. |
| b. | | A high-fidelity prototype built to closely resemble the final product, often used for detailed user testing and feedback. |
| c. | | A prototype designed to explore specific aspects of functionality or design, discarded after requirements are clarified. |
| d. | | A low-fidelity prototype intended to provide a working model of the entire final system, reused throughout development. |

(2 mark)

Correct answer: c

10) In a given CS Undergraduate final-year Individual project (FYP), some Scrum principles can provide valuable structure and efficiency, even without a full team.

Mark the option below that would NOT effectively support an individual in managing their project.

| | | |
|----|--|---|
| a. | | Conducting regular self-reflections on progress and process improvements to adapt work habits and enhance productivity. |
| b. | | Working independently without seeking feedback, as Scrum primarily emphasises self-organisation. |
| c. | | Prioritising tasks based on their impact on project goals, focusing on high-value tasks first. |
| d. | | Setting time-boxed goals or "Sprints" to manage short-term objectives within the overall project timeline. |
| e. | | Maintaining transparency by periodically updating a project log or status report, even if only for personal tracking. |

(2 mark)

answer: b

Total 20 marks

END OF SECTION A

January – 2025

This examination is subject to the Examination Regulations for Candidates

Section B — choose TWO of the THREE questions.

Question B1

A tech company is developing a new customer relationship management (CRM) system with multiple phases. The project begins with a two-day 'planning and requirements-gathering' phase. Following this phase, three separate modules—Data Processing (D1), User Interface (UI), and Reporting (R)—need to be developed, each with specific stages that can run independently.

The Data Processing module (D1) requires a three-day data validation phase followed by a seven-day development phase. The User Interface module (UI) also begins with a three-day design phase, after which it has a five-day development phase. Meanwhile, the Reporting module (R) requires only a six-day development phase and does not need a design or validation phase.

After D1 and UI modules are fully developed, they undergo a two-day compatibility test to ensure they interact smoothly. Finally, all three modules (D1, UI, and R) are integrated into the CRM system in a final integration phase, which takes three days to complete.

1) DRAW an activity network for the project described above, including only the essential activities required to form a complete project plan.

Each activity should include the following fields, clearly identifiable in the network diagram:

- A suitable name
- A duration
- Earliest start time
- Earliest finish time
- Latest start time
- Latest finish time
- Float

(15 marks)

3 marks for identifying all 6 activities (**1 mark per 3** if partially-identified) - Some students may identify 8 activities – **not keeping them on only essential to the plan – receives 2.5 marks.**

2 marks for correctly placing all links (ignoring those connected to start/end nodes), minus 1 mark per missing, superfluous, or incorrectly-placed link; one mark also to be subtracted for each activity in the wrong place.

5 marks for all top rows being correct (start, duration, end); each column in model answer above is worth one mark; don't penalise twice if an error is correctly propagated to the right

5 marks for all bottom rows being correct (start, float, end); each column in model answer above is worth one mark; don't penalise twice if an error is correctly propagated to the left

MAX 14 if any errors not covered above

2) Identify both the critical path and the earliest finish time for the project.

(4 marks)

2 marks: critical path

Marks can be awarded if the correct answer is based on an incorrect diagram, but only if it is clearly an attempt at the full diagram.

2 marks earliest finish time correct. Marks can be awarded to avoid penalising twice as above.

3) Consider the following events on the project. Assume that each event occurs independently, so while analysing one event, assume that no other events are taking place.

What is the effect of each event on the critical path and project duration?

MARK the **correct** answer for each Event with an 'X'.

Event 1: On day four of the project, it was discovered that the Data Processing module (D1) requires an additional two days for validation due to unexpected data complexities.

| | | |
|----|--|--|
| a. | | The critical path is shortened by two days, reducing the project duration. |
| b. | | The critical path is extended by two days, and the project duration is extended by two days. |
| c. | | The critical path remains the same, but the project duration increases by two days. |
| d. | | The critical path remains the same, and the project duration is unaffected. |

(3 marks)

Correct Answer: b.

Event 2: On day 6 of the project, a breakthrough in design resulted in the User Interface module (UI) development phase being reduced from 5 days to 3 days.

| | | |
|----|--|--|
| a. | | The critical path shortens, allowing compatibility testing to begin sooner, decreasing the project duration by two days. |
| b. | | The critical path is extended, increasing the project duration by two days. |
| c. | | The critical path remains the same, and the project duration remains the same. |
| d. | | The critical path remains the same, but the project duration decreases by two days. |

(3 marks)

Correct Answer: c.

Event 3: On day 4 of the project, a new requirement was introduced that the Reporting module (R) needs an initial one-day configuration phase before its six-day development phase can start.

| | | |
|----|--|--|
| a. | | The critical path is extended by one day, increasing the project duration by one day. |
| b. | | The critical path is extended by one day, while the project duration remains the same. |
| c. | | The critical path shortens, allowing for an earlier project finish. |
| d. | | The critical path remains the same, and the project duration remains the same. |

(3 marks)

Correct Answer: d.

Event 4: On day 8 of the project, a staff absence means that the development phase of the Data Processing module (D1) will take one day longer than originally planned.

| | | |
|----|--|---|
| a. | | The critical path shortens, reducing the project duration by one day. |
| b. | | The critical path is extended by one day, increasing the project duration by one day. |
| c. | | The critical path is extended by two days, increasing the project duration by two days. |
| d. | | The critical path remains the same, and the project duration remains the same. |

(3 marks)

Correct Answer: b.

4) Based on the following two adjustments that occurred in the project, evaluate their effects on resource allocation, dependencies, and project timeline.

1. A key development task, which is part of the critical path, has been delayed by two days due to unexpected complexities.
2. An additional team member is reassigned to another module, reducing its task duration by one day.

MARK with an 'X' the **correct** expected effect of these adjustments:

| | | |
|----|--|--|
| a. | | Adding resources to the delayed critical task may prevent delays on the critical path, and shortening the other task allows dependent tasks to start sooner. |
| b. | | Adding resources to the delayed critical task will still result in an extended project timeline, and shortening another task has minimal impact on overall dependencies. |
| c. | | Shortening the duration of an unrelated task can help compensate for the delay without directly addressing the delayed critical task. |
| d. | | Reallocating resources from the delayed critical task to start dependent tasks earlier will reduce the overall project duration despite the initial delay. |

(4 marks)

Correct Answer: a

Adding resources to the delayed task can accelerate its completion and prevent critical path delays. Shortening another task, especially if it impacts dependent tasks or the critical path, allows those tasks to start sooner, potentially improving the timeline.

Why other options are incorrect?

- b. Adding resources to the delayed task could help mitigate the delay, not necessarily extend the timeline. Shortening a task could have a significant impact if it affects dependencies or is on the critical path.
- c. If the delayed task is on the critical path, unrelated tasks won't offset its delay. Only tasks affecting the critical path or dependencies can help compensate.
- d. Reallocating resources away from a delayed critical task would likely worsen its delay, further impacting the project timeline.

5) DISCUSS the advantages and disadvantages of using an off-the-shelf solution – as opposed to a bespoke solution – when creating an online learning platform.

(5 marks)

An off-the-shelf solution for an online learning platform offers quick setup, lower costs, regular updates, and technical support. However, it limits customisation, creates dependency on the provider, may include unwanted features, and could struggle with scalability. In contrast, a bespoke solution is fully tailored to specific needs but requires more time, expense, and maintenance.

End of Question B1 - TOTAL 40 MARKS

Question B2

1) Mark each correct answer with an 'X':

Which of the following calculations would result in an answer whose unit is cost?
Assume that C = cost, E = effort, p = 'per'.

(2 marks)

| | | |
|----|--|-----------|
| a. | | CpE / E |
| b. | | $CpE * E$ |
| c. | | EpC / E |
| d. | | $EpC * E$ |

Correct answer: b

Which of the following types of variables describes the set of values that can only take specific values on a scale? For example: 4 is valid, 5 is valid, 4.5 is not valid.

(2 marks)

| | | |
|----|--|------------|
| a. | | Ratio |
| b. | | Continuous |
| c. | | Discrete |
| d. | | Absolute |

Correct answer: c

Given estimates that are best-case (B), worst-case (W) and likely-case (L), which of the following is the correct calculation for a Delphi average?

(2 marks)

| | | |
|----|--|--------------------|
| a. | | $(B + W + 4L) / 6$ |
| b. | | $(B + W + 6L) / 6$ |
| c. | | $(B + W + L) / 3$ |
| d. | | $(B + W + 6L) / 3$ |

Correct answer: a

Which estimation technique entails examining similar *previous* projects as a basis for predicting attributes of a *future* project?

(2 marks)

| | | |
|----|--|--------------------|
| a. | | Group estimation |
| b. | | Task decomposition |
| c. | | Analogy |
| d. | | Formal modelling |

Correct answer: c

A project is expected to take 20 ± 3 working days to complete. If five such projects are undertaken in sequence, what is the best-case number of working days to complete all five?

(2 marks)

| | | |
|----|--|-----|
| a. | | 17 |
| b. | | 23 |
| c. | | 85 |
| d. | | 97 |
| e. | | 103 |
| f. | | 115 |

Correct answer: c

2) One manager measures spoilage by dividing the number of hours spent fixing bugs by the total number of hours spent on the project.

What is the maximum value for this measure of spoilage? EXPLAIN your answer.

(2 marks)

The maximum value is 1 (1 mark)

...because that's the value returned if all hours were spent fixing bugs (1 mark)

3) A project manager has assessed a new project as requiring 200 person-days to complete. The client has specified a deadline three weeks from now.

Assuming a five-day working week, how many people will we need in order to meet this deadline?

(4 marks)

200 / 5 = 40 person-weeks (2 marks)

40 / 3 = 13.3 = 14 people (2 marks – 1.5 if they round down)

4) A director wishes to reward their most productive developers, but is unsure how to measure productivity. SUGGEST **three** ways in which productivity might be measured, and describe a **different** disadvantage for each measure.

(6 marks)

1 mark for each valid measure (e.g. SLOC, number of classes, complexity, some combination of these)

1 mark for a valid disadvantage mapped to a measure (e.g. programmers might artificially inflate SLOC, some classes are more complex than others, complexity is difficult to quantify)

The same advantage cannot be credited more than once.

5) A project P2 is currently underway, which is similar to an earlier project P1. Project P1 comprised 30,000 SLOC.

On project P1, the team produced code at a rate of 750 SLOC/person-month.

Project P2 is estimated to be 54,000 \pm 3,500 SLOC. However, the team includes some new developers, which the current team leader estimates will add fifteen percent to the effort required.

Given that the team comprises twelve full-time employees, how long should project P2 take to complete?

Your answer should be in the form:

(best-case, likely-case, worst-case)

(10 marks)

1 mark for each calculation, 1 mark for answer, don't penalise a carried forward mistake twice

$30,000 / 750 = 40$ person-months (2 marks)

$40 / 30,000 * 54,000 = 72$ person-months (2 marks)

$72 * 1.15 = 82.8$ person-months (2 marks)

$82.8 / 12 = 6.9$ months (2 marks)

(6.45, 6.9, 7.35) (2 marks)

6) A new team is being formed within a company, with the plan being for that team to work together on many software projects.

The team leader is keen to gather measurements of early projects, in order to increase the accuracy of predictions within later projects.

IDENTIFY **two direct** measurements and **two indirect** measurements that might be collected from earlier projects. For each **indirect** measurement, EXPLAIN how it would increase the accuracy of predictions within later projects.

(8 marks)

Examples of direct measurements: SLOC, person-months (or similar), cost (2 marks)

Examples of indirect measurements: any calculation that uses another measurement as an input, such as cost per person-month (2 marks)

Valid description of use in informing predictions, with (1 mark) for a valid use and (1 mark) for explaining that use, e.g.:

- Cost per person-month would allow effort to be predicted (1 mark) by dividing the cost of a later project by the cost-per-person-month of the earlier project (1 mark)
- SLOC per £1,000 would allow SLOC to be predicted (1 mark) by dividing SLOC-per-£1000 by SLOC (1 mark)

End of Question B2 - TOTAL 40 MARKS

Question B3

1) Based on the software development project scenario described below.

PLACE each identified risk in the appropriate position on the Risk Matrix (Likelihood vs. Impact) and PROVIDE a brief justification for each placement.

Project scenario: a healthcare software development, which has strict regulatory requirements, a hands-on client, a fixed budget, and reliance on third-party integration.

Identified risks:

1. Scope creep due to changing client requirements.
2. Budget overruns due to underestimated costs.
3. Team burnout or turnover midway through the project.
4. Minor delays in receiving non-critical client feedback.
5. Need for additional training on new tools or technology.

Instructions: Use the provided Risk Matrix to assign each risk to the correct position, categorising each by Likelihood (Low or High) and Impact (Low or High).

| <u>Risk Matrix</u> | High Impact | Low Impact |
|--------------------|-------------|------------|
| High Likelihood | 1,2,3 | 5 |
| Low Likelihood | 3 | 4 |

Justifications:

2 marks for each risk: correctly placed (1 mark) with justification (1 mark)

Possible justifications:

1.HH/ With a hands-on client, there is a high likelihood that requirements may evolve, leading to scope creep. In a healthcare project with strict regulatory requirements, any scope changes could significantly impact the timeline and compliance, making the impact high.

2.HH/ Given the fixed budget, the risk of budget overruns is high if initial cost estimations are off, especially with additional regulatory and integration requirements. Budget overruns would directly threaten project completion or force cuts in quality, so the impact is also high.

3.H/H/ In a high-stakes healthcare project with strict deadlines, regulatory pressure, there is a high chance of team burnout. Team burnout could lead to delays and knowledge gaps, impacting the project's progress significantly.

OR 3. L/H / if managed effectively (with proactive strategies like workload balancing, adequate rest periods, and team support, the likelihood of burnout or turnover could be minimised; If burnout/turnover does occur, it would have a significant impact, potentially leading to delays, knowledge loss, drop in productivity, all of which could jeopardise the project's timeline and quality)

4.L/L/ Since the feedback is “non-critical,” minor delays here are less likely to affect the project’s timeline or major deliverables. The impact of such delays would be minimal, and it is reasonable to assume these delays will occur less frequently.

5.H/L/ Given the likelihood of new tools in a tech-driven healthcare project, training needs are relatively high. However, since training can be planned for and mitigated without directly impacting the project’s main deliverables, the impact on overall project success is low.

(10 marks)

2) Consider the risks below identified in CS Final Year Projects (FYP).
LIST **two** effective mitigation strategies for each risk that could help minimise its impact or likelihood in a software development project.

Risk 1: Lack of technical skills needed for implementation

Risk 2: Insufficient testing leading to undetected errors

Risk 3: Poor time management leading to missed deadlines

(9 marks)

Possible solution **1.5 mark each strategy / 3 marks per risk evaluation**

1. Identify required skills early, dedicate time to self-learning, seek mentorship. Allocating a few hours each week for learning essential tools and technologies; these can help build necessary skills gradually rather than encountering gaps later in the project....etc...
2. Develop testing plans with milestones for regular unit testing, integration testing, and final/other testing. Setting up automated tests (where possible); peer reviews will help on quality checks and reduce the risk of major errors near the project deadline...
3. Create a detailed project schedule with clear milestones, breaking down tasks into manageable weekly goals, e.g. Regularly review and adjust the timeline, using tools like Gantt charts or task management software to stay on track. Scheduling weekly check-ins with a supervisor or peer can also provide accountability and help identify potential delays early.

3) Which of the following options best represents effective risk management practices?

MARK with an 'X' the most accurate answer:

| | | |
|-----------|--|---|
| a. | | Identifying risks at the beginning of the project only, as risks discovered later may not affect the project. |
| b. | | Regularly reviewing and updating the risk management plan throughout the project to address new or changing risks, with specific mitigation strategies for high-impact risks. |
| c. | | Avoiding risk assessments in the early stages of a project to avoid potential delays and costs associated with risk planning. |
| d. | | Focusing solely on high-likelihood risks, as low-likelihood risks are unlikely to impact project outcomes. |

(3 marks)

Correct answer: b

4) A company has identified a cybersecurity threat, and is considering purchasing a software tool that would reduce that threat.

The threat relates to a specific type of injection attack, which has a 10.5% likelihood of taking place, and would result in a loss of revenue of £150,000. If the tool is purchased, at a cost of £5,000, the likelihood of such an attack drops to 6.9%.

Perform an analysis to ascertain the cost-effectiveness of purchasing the software tool. You should show all of your working, and you should make a clear go/no-go decision, with a justification of that decision.

(6 marks)

1 mark for any attempt to multiply impact by probability

1 mark for RE(before) as £15,750

1 mark for RE(after) as £10,350

1 mark for subtraction operation (even if input values are incorrect)

1 mark for a go decision – can only be awarded if there is a meaningful attempt at the calculation (not for a lucky guess)

1 mark for justification (5,400 > 5,000 or leverage = 1.08, or similar)

5) The following table relates to estimates for durations of project phases. The critical path consists of all phases shaded in grey.

| Task | Description | Depends on | Duration Estimates (days) | | |
|----------|-----------------------|------------|---------------------------|--------|-------------|
| | | | Optimistic | Likely | Pessimistic |
| A | Knowledge elicitation | N/A | 5 | 7 | 9 |
| B | Ethics application | A | 1 | 2 | 3 |
| C | Ethics processing | B | 7 | 10 | 18 |
| D | Documentation | A | 10 | 12 | 14 |
| E | Verification | C | 2 | 4 | 5 |
| F | Unit tests | D, E | 1 | 1 | 2 |
| G | Iterative development | F | 12 | 14 | 18 |
| H | Performance tests | G | 1 | 2 | 3 |
| I | Reporting | G | 3 | 4 | 6 |

Conduct a PERT analysis of this project to calculate the probability that all work will be complete within **42 days**. You should use the Z-score table in the appendix, and you should show all your working.

(12 marks)

1 mark for an attempt to calculate Delphi averages (7, 2, 10.83, 3.83, 1.17, 14.33, 4.17)

1 mark for correct values for Delphi averages

1 mark for attempt to calculate variances

1 mark for correct variances (0.444, 0.111, 3.361, 0.25, 0.028, 1, 0.25)

1 mark for total expected duration (43.33)

1 mark for total variance (5.44)

1 mark for an attempt to calculate a Z-score based on totals

1 mark if correct calculation is used (even if incorrect inputs)

1 mark for correct result (-0.571)

1 mark for looking up student's z-score correctly on table

1 mark for finding 0.7157 on table (by implication OK if answer correct)

1 mark for correct answer: ~28.43%

[illegible]

End of Question B3 - TOTAL 40 MARKS

END OF QUESTIONS

TOTAL: 140 marks

END OF PAPER

Formulas:**PERT technique**

Activity expected time $t_e = (L + 4M + U) / 6$

Activity variance $v = ((U - L) / 6)^2$

For a sequence/chain of activities:

$t_e = t_e(A1) + t_e(A2) + \dots + t_e(An)$ and $v = v(A1) + v(A2) + \dots + v(An)$

For activities running concurrently:

$t_e = \max(t_e(A1), t_e(A2), \dots, t_e(An))$ and $v = \max(v(A1), v(A2), \dots, v(An))$

Given a target deadline T , the z value for an activity, a set of activities or an entire project is given by $z = (T - t_e) / \sqrt{v}$, where t_e and v are the PERT expected time and variance respectively.

Measurement, estimation and data analysis

Effort = $S \times EpS$

Effort = S/SpE

Cost = $S \times CpS$

Cost = Effort $\times CpE$

New Project Effort = Old Project Effort $\times (Rf1 \times Rf2 \times \dots) + (Af1 + Af2 + \dots)$

Z-score table

| <i>z</i> | .00 | .01 | .02 | .03 | .04 | .05 | .06 | .07 | .08 | .09 |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.0 | .5000 | .5040 | .5080 | .5120 | .5160 | .5199 | .5239 | .5279 | .5319 | .5359 |
| 0.1 | .5398 | .5438 | .5478 | .5517 | .5557 | .5596 | .5636 | .5675 | .5714 | .5753 |
| 0.2 | .5793 | .5832 | .5871 | .5910 | .5948 | .5987 | .6026 | .6064 | .6103 | .6141 |
| 0.3 | .6179 | .6217 | .6255 | .6293 | .6331 | .6368 | .6406 | .6443 | .6480 | .6517 |
| 0.4 | .6554 | .6591 | .6628 | .6664 | .6700 | .6736 | .6772 | .6808 | .6844 | .6879 |
| 0.5 | .6915 | .6950 | .6985 | .7019 | .7054 | .7088 | .7123 | .7157 | .7190 | .7224 |
| 0.6 | .7257 | .7291 | .7324 | .7357 | .7389 | .7422 | .7454 | .7486 | .7517 | .7549 |
| 0.7 | .7580 | .7611 | .7642 | .7673 | .7704 | .7734 | .7764 | .7794 | .7823 | .7852 |
| 0.8 | .7881 | .7910 | .7939 | .7967 | .7995 | .8023 | .8051 | .8078 | .8106 | .8133 |
| 0.9 | .8159 | .8186 | .8212 | .8238 | .8264 | .8289 | .8315 | .8340 | .8365 | .8389 |
| 1.0 | .8413 | .8438 | .8461 | .8485 | .8508 | .8531 | .8554 | .8577 | .8599 | .8621 |
| 1.1 | .8643 | .8665 | .8686 | .8708 | .8729 | .8749 | .8770 | .8790 | .8810 | .8830 |
| 1.2 | .8849 | .8869 | .8888 | .8907 | .8925 | .8944 | .8962 | .8980 | .8997 | .9015 |
| 1.3 | .9032 | .9049 | .9066 | .9082 | .9099 | .9115 | .9131 | .9147 | .9162 | .9177 |
| 1.4 | .9192 | .9207 | .9222 | .9236 | .9251 | .9265 | .9279 | .9292 | .9306 | .9319 |
| 1.5 | .9332 | .9345 | .9357 | .9370 | .9382 | .9394 | .9406 | .9418 | .9429 | .9441 |
| 1.6 | .9452 | .9463 | .9474 | .9484 | .9495 | .9505 | .9515 | .9525 | .9535 | .9545 |
| 1.7 | .9554 | .9564 | .9573 | .9582 | .9591 | .9599 | .9608 | .9616 | .9625 | .9633 |
| 1.8 | .9641 | .9649 | .9656 | .9664 | .9671 | .9678 | .9686 | .9693 | .9699 | .9706 |
| 1.9 | .9713 | .9719 | .9726 | .9732 | .9738 | .9744 | .9750 | .9756 | .9761 | .9767 |
| 2.0 | .9772 | .9778 | .9783 | .9788 | .9793 | .9798 | .9803 | .9808 | .9812 | .9817 |
| 2.1 | .9821 | .9826 | .9830 | .9834 | .9838 | .9842 | .9846 | .9850 | .9854 | .9857 |
| 2.2 | .9861 | .9864 | .9868 | .9871 | .9875 | .9878 | .9881 | .9884 | .9887 | .9890 |
| 2.3 | .9893 | .9896 | .9898 | .9901 | .9904 | .9906 | .9909 | .9911 | .9913 | .9916 |
| 2.4 | .9918 | .9920 | .9922 | .9925 | .9927 | .9929 | .9931 | .9932 | .9934 | .9936 |
| 2.5 | .9938 | .9940 | .9941 | .9943 | .9945 | .9946 | .9948 | .9949 | .9951 | .9952 |
| 2.6 | .9953 | .9955 | .9956 | .9957 | .9959 | .9960 | .9961 | .9962 | .9963 | .9964 |
| 2.7 | .9965 | .9966 | .9967 | .9968 | .9969 | .9970 | .9971 | .9972 | .9973 | .9974 |
| 2.8 | .9974 | .9975 | .9976 | .9977 | .9977 | .9978 | .9979 | .9979 | .9980 | .9981 |
| 2.9 | .9981 | .9982 | .9982 | .9983 | .9984 | .9984 | .9985 | .9985 | .9986 | .9986 |
| 3.0 | .9987 | .9987 | .9987 | .9988 | .9988 | .9989 | .9989 | .9989 | .9990 | .9990 |
| 3.1 | .9990 | .9991 | .9991 | .9991 | .9992 | .9992 | .9992 | .9992 | .9993 | .9993 |
| 3.2 | .9993 | .9993 | .9994 | .9994 | .9994 | .9994 | .9994 | .9995 | .9995 | .9995 |
| 3.3 | .9995 | .9995 | .9995 | .9996 | .9996 | .9996 | .9996 | .9996 | .9996 | .9997 |
| 3.4 | .9997 | .9997 | .9997 | .9997 | .9997 | .9997 | .9997 | .9997 | .9997 | .9998 |