



NCSBN
Leading Regulatory Excellence

REx-PN™ Academic Workshop Webinar Series Part 3: Computerized Adaptive Testing (CAT)



Presenter

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Objectives

By the end of the session, participants will be able to:

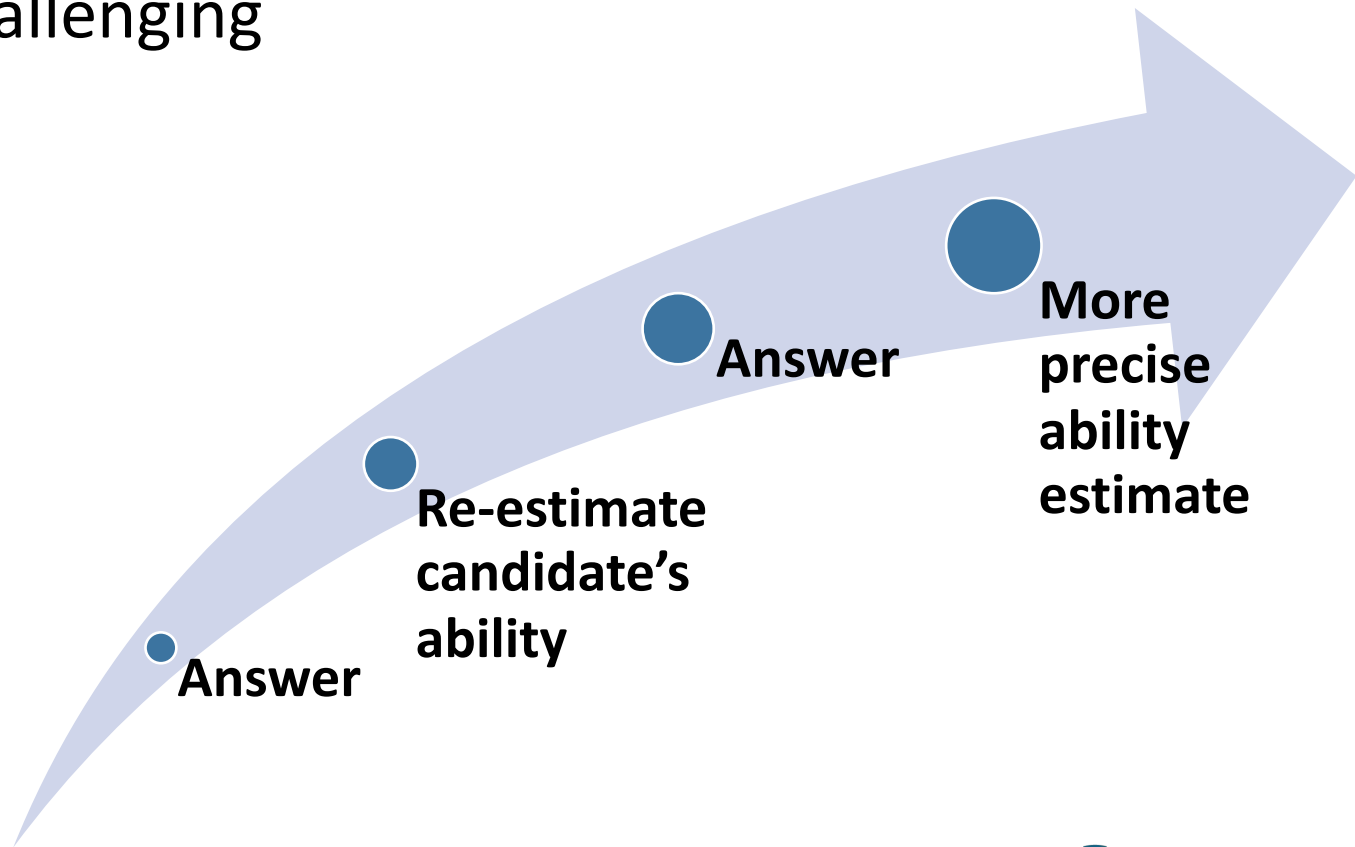
- Explain how CAT (computerized adaptive testing) works in REx-PN.
- Discuss why candidates receive variable-length CAT exams.
- Describe how CAT exam assure content balancing.
- Explain how pass/fail decision is made for the REx-PN.

Terminology

- Candidates: graduates, students, examinees
- Items: test questions with scoring rules
 - Operational (OP) items:
test questions used to score candidates
 - Pretest (PT) items:
newly developed items not used to score candidates

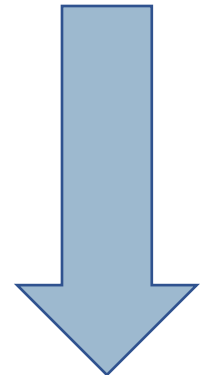
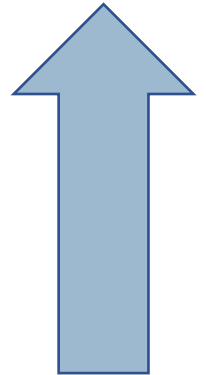
What is an Adaptive Test?

The computer algorithms select (from a large bank of items) an item that candidates should find challenging



Tailoring the Examination

- **High-ability** candidates will receive more difficult items
 - Easy items provide little information about a high performer's ability
- **Low-ability** candidates will receive fewer difficult items
 - Avoid guessing on items that are too difficult



Item Difficulty

- Items targeted to the candidate's ability
- Computer selects the next item that the candidate has a 50/50 chance of a correct response
- To select items to match your ability, the difficulty of an item is already identified.
 - Before REx-PN exam goes live → Field testing
 - After REx-PN exam goes live → Item Pretesting

Item pretesting

- Newly developed items **not** being used to score candidates
- 30 pretest items on every exam
- Randomly intermixed with operational items in the exam
- Indistinguishable from operational items

Variable Length exam

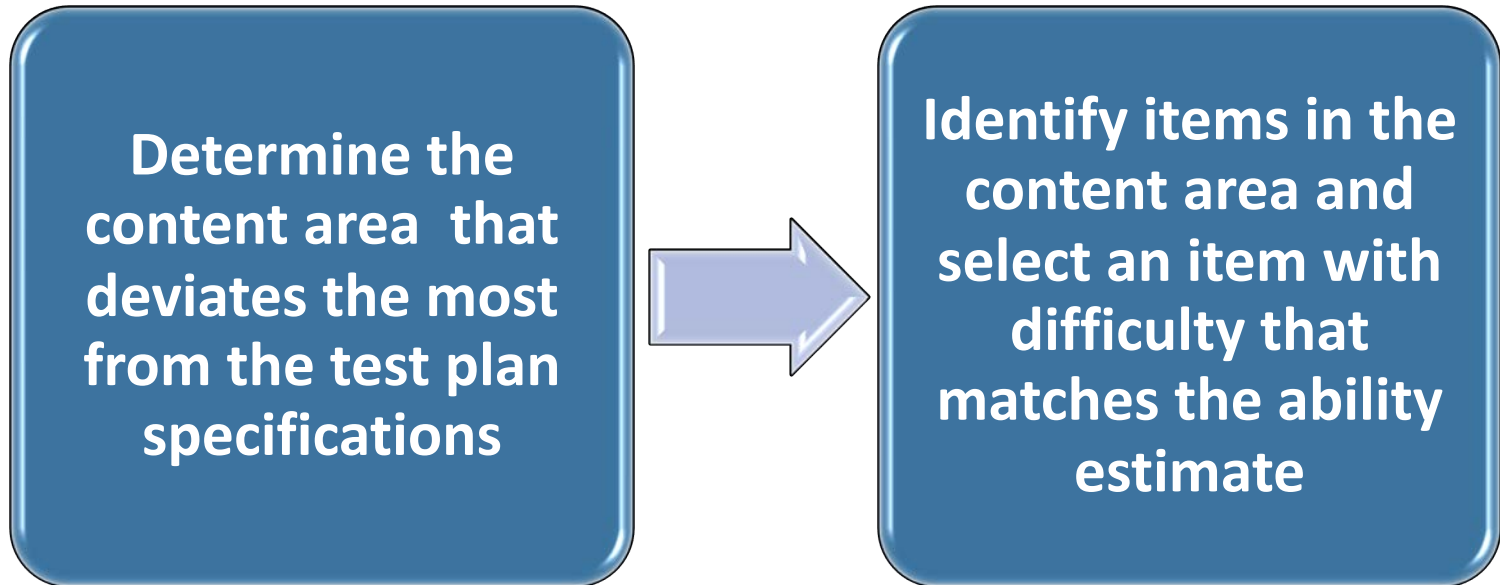
- Exam time is 4 hours
- Test Length
 - Minimum: 90 (60 OP + 30 PT) items
 - Maximum: 150 (120 OP + 30 PT) items
 - All stand-alone items
- Number of questions depends upon the abilities
 - ability “close” to the passing standard
Longer length exam
 - ability is “far” from the passing standard
(clearly above or clearly below)
Shorter length exam

Content Balancing

- The Test Plan dictates a specific percentage of the operational items in each content area

Client Needs	Percentage of Items (questions) from each Category/Subcategory
Safe and Effective Care Environment	
■ Management of Care	18–24%
■ Safety and Infection Control	10–16%
Health Promotion and Maintenance	6–12%
Psychosocial Integrity	8–14%
Physiological Integrity	
■ Basic Care and Comfort	6–12%
■ Pharmacological and Parenteral Therapies	14–20%
■ Reduction of Risk Potential	8–14%
■ Physiological Adaptation	6–12%

Content Balancing

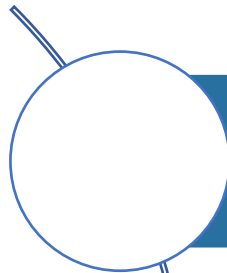


Note: item type is **not** part of the selection algorithms

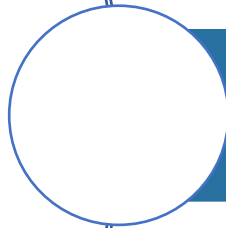
Pass/Fail Decisions

- Ability estimate: calculated based on all previously answered items
- Passing standard: represents what minimally competent candidates would perform on the REx-PN exam.
- Beginning with the 60th OP item, the candidate's ability estimate is compared to the passing standard.

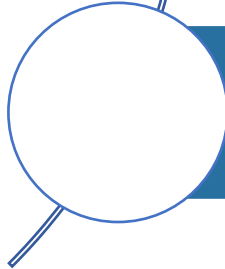
Passing Standard



Criterion based standard for minimal competency



Established with input from a Panel of Judges



Pass/fail decision based on being clearly above or below the standard

Pass/Fail Decisions

- Pass/fail decisions are made when:
At least **60 OP** items have been answered within the 4-hour exam time
- Three stopping rules will be used to terminate an exam and make the pass/fail decision.

Stopping Rule #1: 95% Confidence

PASS

If candidate ability is **clearly above** the passing standard, the candidate passes.

FAIL

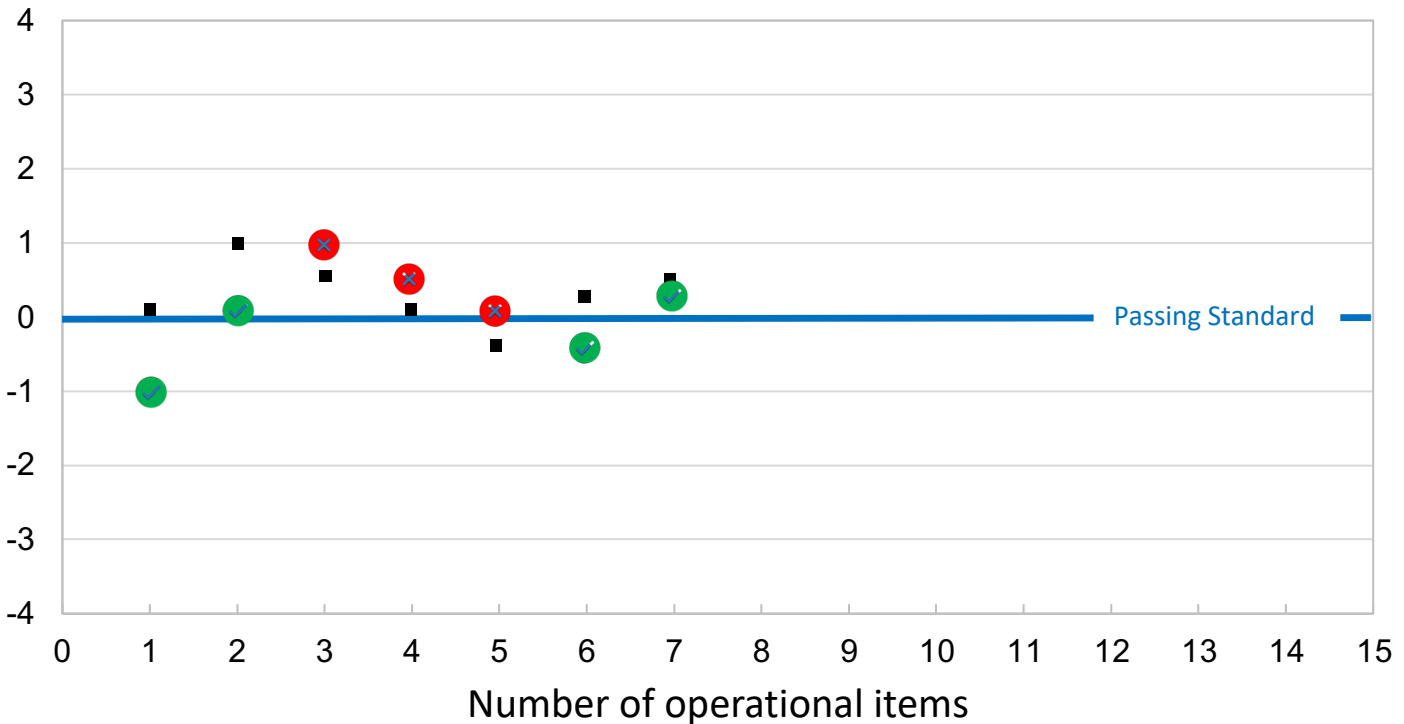
If candidate ability is **clearly below** the passing standard, the candidate passes.

Note: “clearly” means the computer has 95% confidence that this person can pass

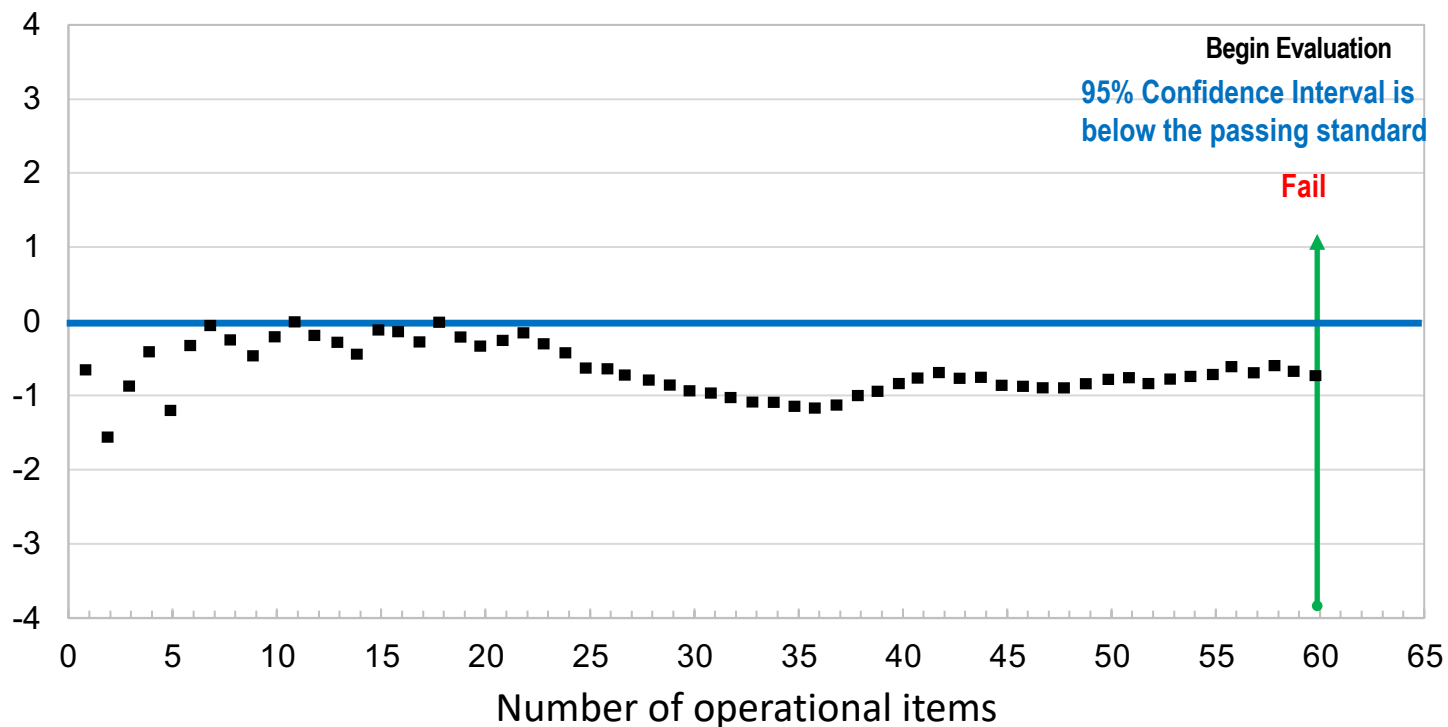
Example of CAT

- Item administered
- Ability estimate
- ✓ Correct response
- ✗ Incorrect response
- 95% Confidence interval
- ✗ Incorrect response

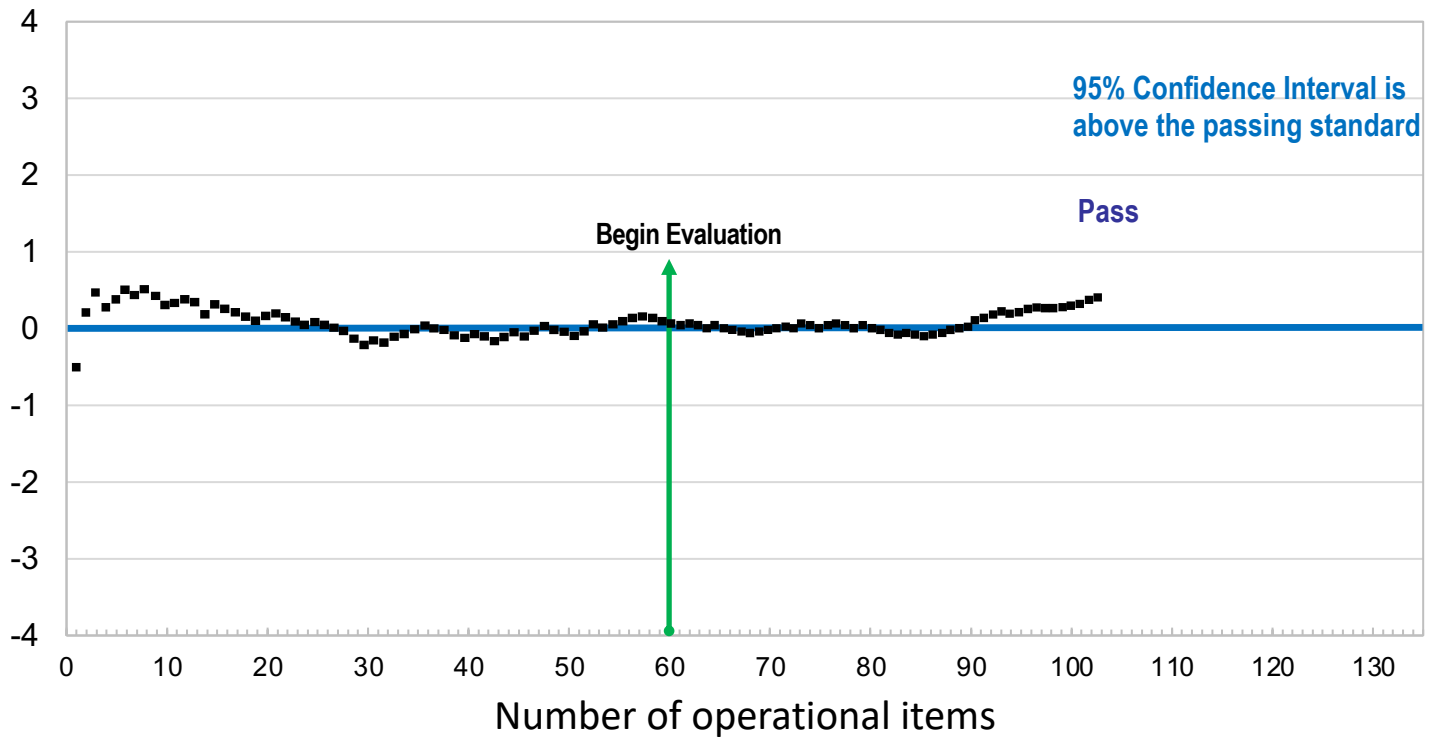
Hard High
Item difficulty
Candidate ability
Easy Low



Sample REx-PN[®] Minimum Item Fail Chart



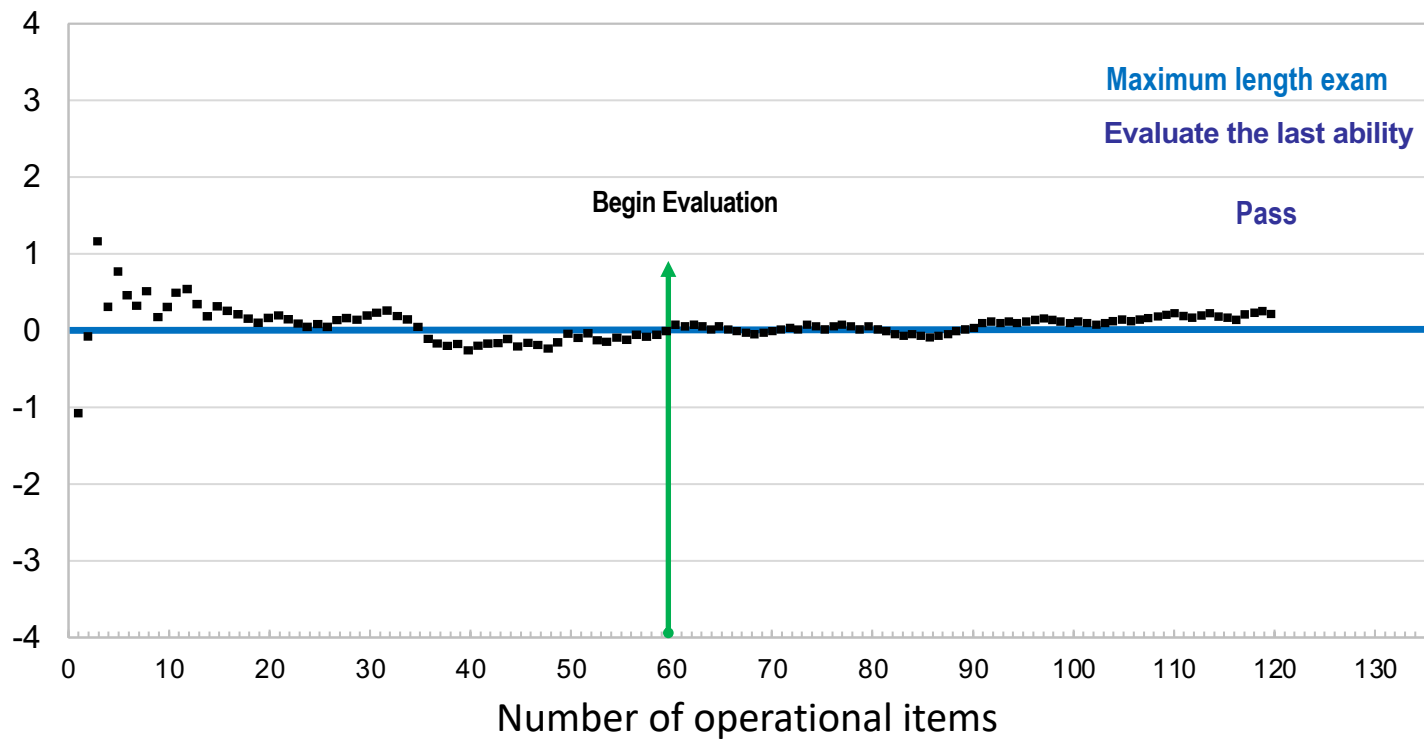
Sample REx-PN[®] Medium Length Pass Chart



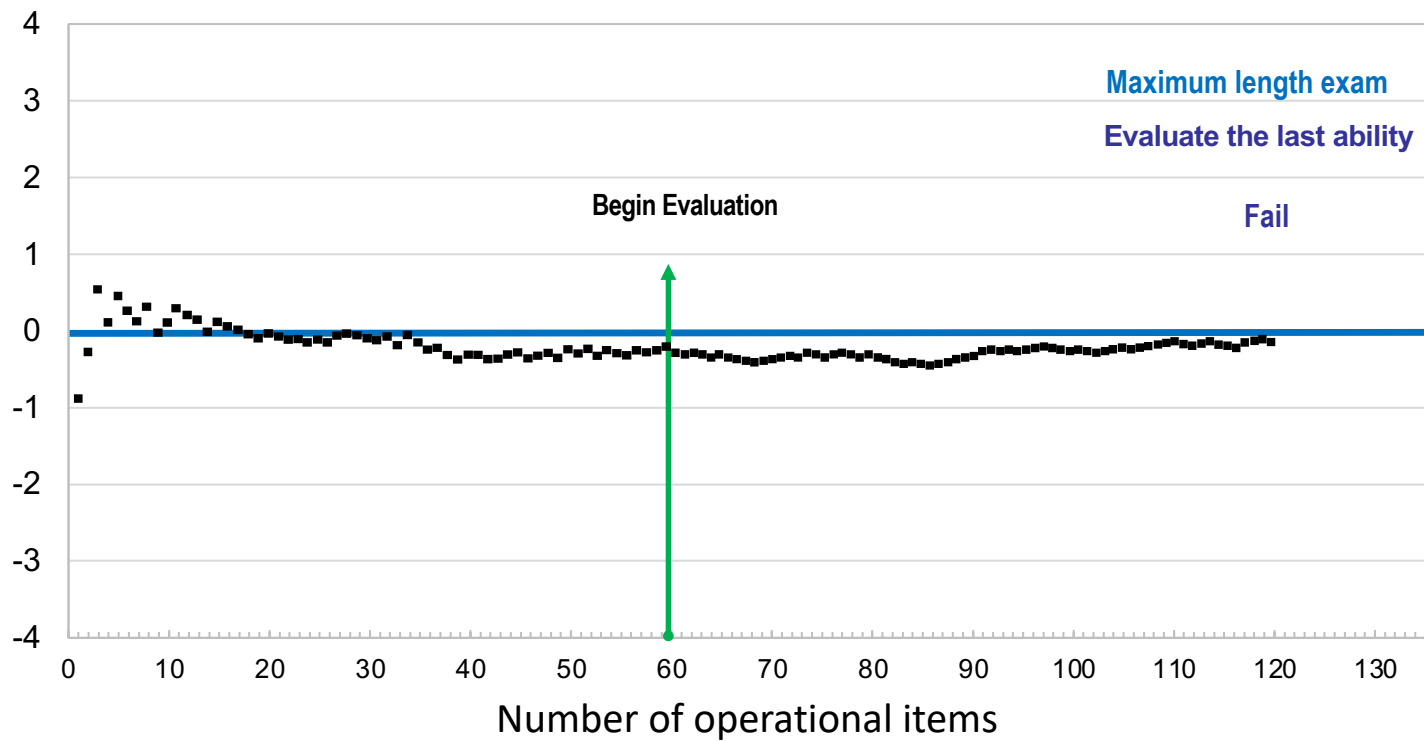
Stopping Rule #2: Maximum Length

- Number of questions depends upon the abilities.
- What happens if a candidate answered all 120 OP items?
- The computer disregards the 95% confidence rule
- Outcome depends on the **final ability estimate**
 - ABOVE the passing standard → **PASS**
 - AT or BELOW the passing standard → **FAIL**

Sample REx-PN[®] Maximum Length Pass Chart



Sample REx-PN[®] Maximum Length Fail Chart



Stopping Rule #3: Run-Out-Of-Time

A candidate spend 4 hours on the exam but the exam has not been terminated.

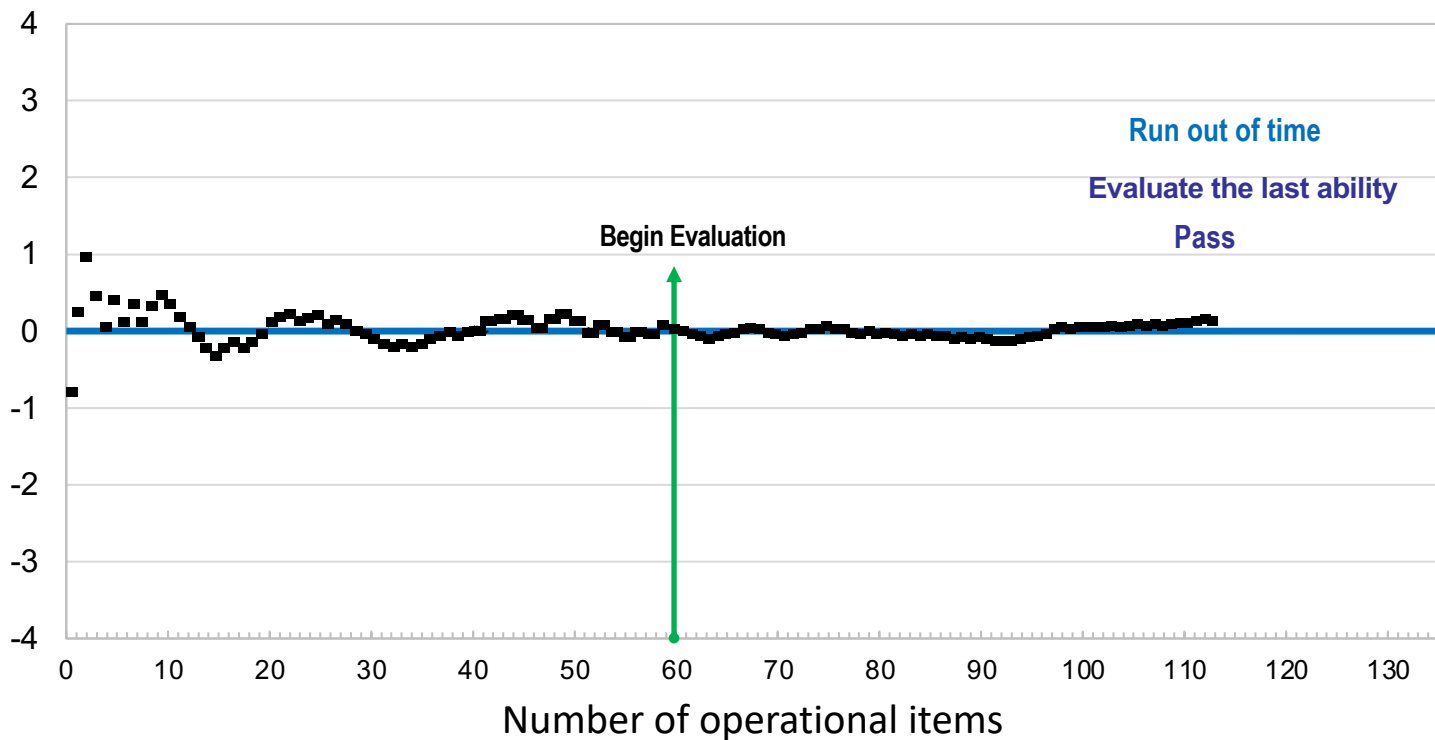
PASS

Responded to 60 OP items AND the final ability estimate is above the passing standard

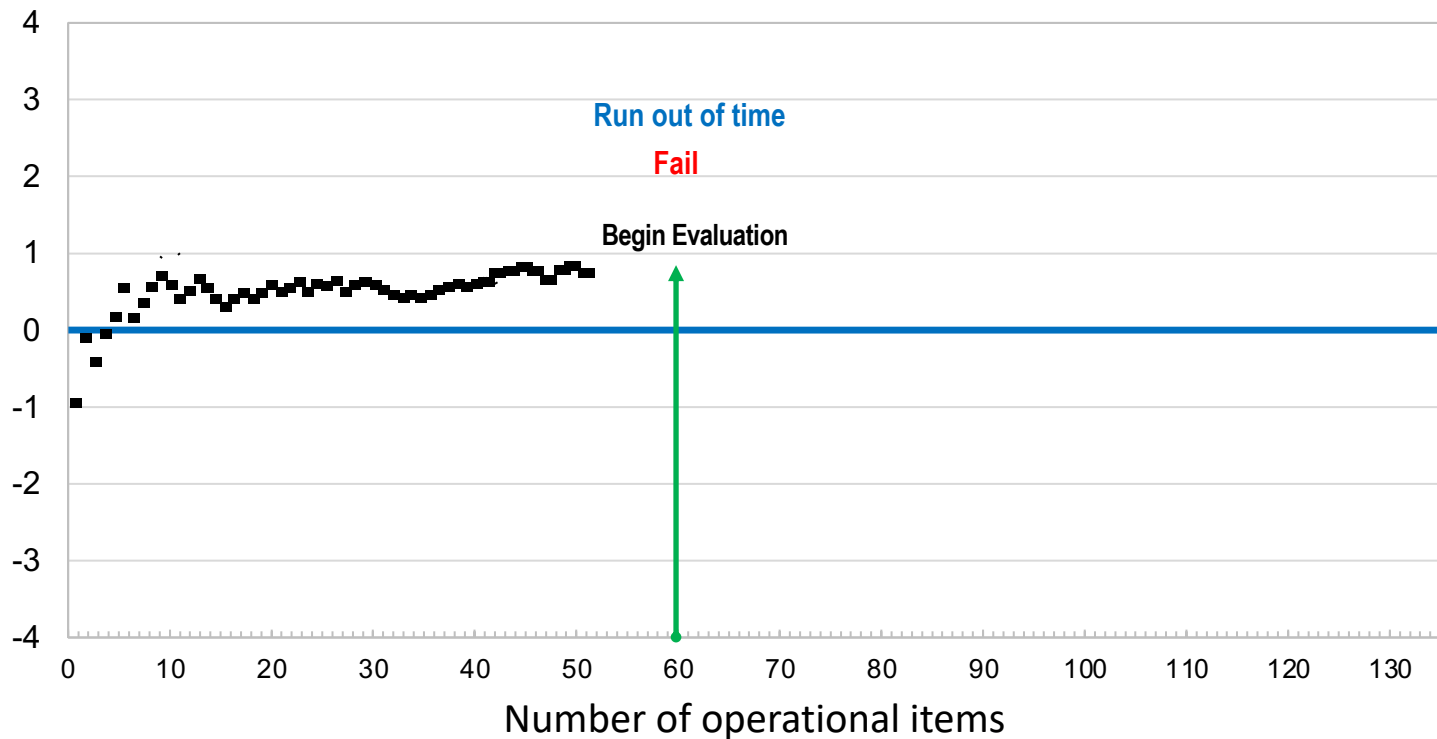
FAIL

- Responded fewer than 60 OP items
- The final ability estimate is at or below the passing standard

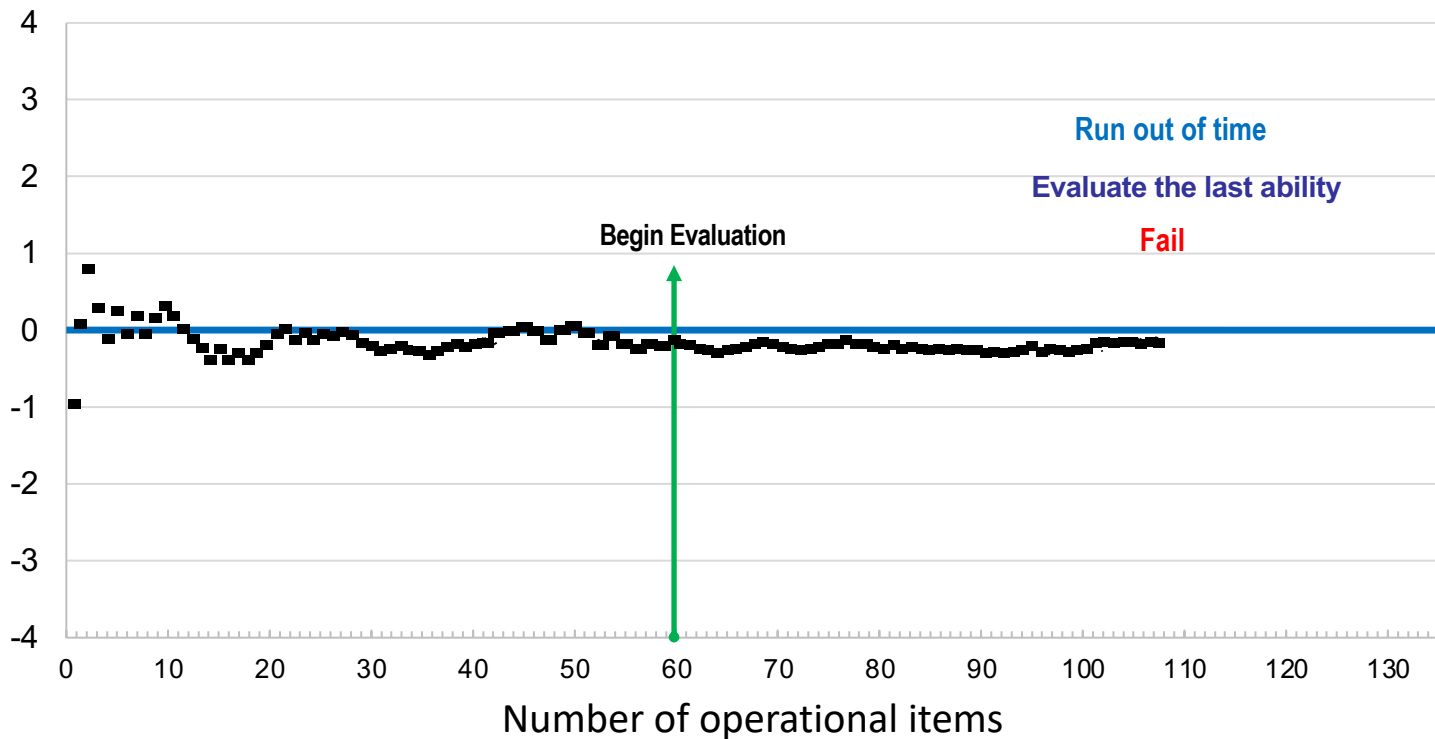
Sample REx-PN[®] Run-Out-Of-Time Pass Chart



Sample REx-PN[®] Run-Out-Of-Time Fail Chart



Sample REx-PN[®] Run-Out-Of-Time Fail Chart



REx-PN Using CAT



<https://www.ncsbn.org/14811.htm>

REx-PN Web Resources

REx-PN Detailed Test Plans

REx-PN Practice Analysis

REx-PN CAT Recording

REx-PN FAQs

NCSBN Learning Extension

- Test Development and Item Writing
- Assessment of Critical Thinking

<https://www.ncsbn.org/rex-pn.htm>

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Regulatory Exam - Practical Nurse (REx-PN)



Regulatory Exam - Practical Nurse

The REx-PN is a new Canadian Practical Nurse exam developed for the British Columbia College of Nursing Professionals (BCCNP) and the College of Nurses of Ontario (CNO).

BCCNP and CNO have partnered with NCSBN to develop the REx-PN. NCSBN is dedicated to developing psychometrically sound and legally defensible nurse licensure and certification examinations consistent with current practice.

The REx-PN exam will launch in January 2022.



2022 REx-PN Test Plan

EFFECTIVE JANUARY 4, 2022

The REx-PN test plan includes an in-depth overview of the content categories, details about the administration of the exam and REx-PN style item writing exercises.

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[REx-PN: un Examen Adaptatif Informatisé](#)

Summary

- Computerized adaptive testing selects items for the person taking it.
- People with different abilities will receive different number of items.
- All exams comply with the test plan regardless of the test length and ability.
- Three stopping rules are used to make the pass/fail decision.
- More resources are available on the website.

QUESTIONS?