This is a commentary on the NCEA Numeracy 2022 32406 Use mathematics and statistics to meet the numeracy demands of a range of situations pilot.

Overall, I think It is a good draft -- but I would hope that further work would be done on improving the quality of the test so that it is fairer assessment for all candidates.

PROBLEMS WITH THE FIRST PAGE

There is a statement 'quality for the future world' that should strike fear into the hearts of our children that this test has something to do with disqualifying them from the future world. I do not see why this statement (or why the NZQA logo) needs to take up space on the first page of the booklet. Try and keep irrelevant information (distractors) to a minimum so it is easier for people to focus on the content of the examination.

I do not see why there needs to be a statement of the learning outcomes for a similar reason. Do you really want students to be spending their time right before the examination starts reading the intended learning outcomes?

The instructions are a useful reminder. The examination does not say what the 'usual or normal or standard' amount of time is that the assessment is supposed to take. Is it a 50 minute examination or a 3 hour examination or a group activity to be done over the course of one week or a semester long collaboration between teachers and classmates?

The supervisors's job should be to collect the booklet. It should not be the students job to get the booklet to the supervisor. If the supervisor is claiming not to have received a booklet from the student (say) then it is the supervisors job to account for that.

The first page is not numbered. That is ambiguous or potentially confusing. The page numbers of the subsequent pages are on the top centre. It is more conventional to have page numbers at the bottom of the pages. If the first page is not numbered then it would be unambigous to start the second page with the number 1. By not numbering the title page and starting the first page of questions with a prominent number 2 at the very top of the very next page you start off creating cognitive dissonance. Right after the upset of students having no future, the upset of supervisor having discretion to refuse to acknowledge that the student has handed them an assessment, you have the upset of the pages being blank rather than containing questions that can be answered or missing pages. I do understand that it then says 'Question one' so students can see that page 2 is the first contentful page – but there was no need to have created that question in their minds in the first place. It is unnecssarily unsettling and not setting students up where they are likely to perform at their best.

PAGE 2. THE FIRST PAGE OF CONENT

QUESTION ONE

It is not usual or standard convention to write a number with a + to mean or to represent a number with > or > or = to. Students who do know the convention are at an advantage

compared to those who don't because they are able to see that what they have here is a different way of representing that same information.

(1a)
If more than one of the answers are correct then there is dissonance between the question which says 'what grade is' rather than 'which grades are'.

(1b) The picture is an irrelevant or unnecessary distractor.

(1c) There is no reference for the newspaper headline. Is it realistic that this actually is a newspaper headline? This question poses an unnecessary distractor. You want to teach students to expect references for statements such as these.

At this point I find myself wondering if I am allowed to make use of the information that one year is 365 or 364 days on a leap year (since it was provided in the previous question that one dozen was 12 eggs maybe the omission of comparable information in this question means I am not allowed to make use of this in my reasoning an answer to this question).

So I find myself set up to thinking about how I would answer this question without assuming that one year is 365 or 364 days.

Now I find myself wondering if I am overthinking the question and maybe they simply are testing my knowledge of whether 365 days is roughly a standard year. That could have been better assessed with a simple multi-guess question, however, so that probably isn't going to be it.

We are not told how many people are under the age of 2, say. We are not told that most people follow Ministry of Health Guidelines not to give egg to children under the age of 2, say. How many people are vegan or whatever. I suppose that all of this is irrelevant? They just want to see you divide 250 eggs into 5 million people? If that is the case why not ask that in a multiple choice format?

QUESTION TWO

There is a reason why recipes call for cups rather than weighted amounts. You could say that 'Aloma weighs a cup of the flour that she has and finds it weighs 125 grams'. Then ask the question as to how many cups she can probably fill from her 1.5kg pack of flour.

The 'best buy' is determined by the cheapest possible unit price only (never mind the amount of plastic in the packaging or other factors of slavery in the supply chain etc). Maybe don't ask what is the 'best buy' ask for the 'cheapest unit price' since that is what in fact you want to know. Don't try and teach the students that the 'cheapest unit price' is the 'best buy'. That isn't making maths meaningful in any kind of way that we should be doing or teaching maths.

It may be worth explicitly stating that students are allowed to assume that the information provided in question one is true (we have no reason to believe that it is because there is no

reference. Maybe it was made up hypothetical not to be relied upon in any other question. I mean to say that it doesn't indicate that people cannot make inferences when it is unclear to people whether they are allowed to use that information in making inferences or not.

QUESTION THREE

So, now we have gone from questions about how some people (presumably) sort eggs into grades so that other people can make more food than they need and distribute that food to other people to questions about how and why it is that some people don't get enough sleep. Maybe because they are too busy sorting eggs, right? Maybe that will be your fate if the supervisor decides they don't want to accept an examination script from you.

Hours and minutes are not usually measures of distance or length. How 'long' does a person sleep for is not the usual way of thinking about durations of time or elapsed time. I suppose this is convention but there is no accompanying graph, say, showing time to be represented by a length, even. You could just ask 'How many hours and minutes has Dallas been asleep?' That way the question would seem less strange.

There is no reference for the Ministry of Health's assertion. Firstly (1) Is it true that the Ministry of Health asserted that. (2) Why did the Ministry of Health Assert that? Presumably they got their information from somewhere that they are relaying to the people because the people are presumed too stupid to follow the information from their source instead they rely on the Ministry of Health as a secondary source. You also can't get an 'ought' from an 'is' so whether the Ministry is correct even if they said it in fact (and that is dubious without a reference) is a further distractor from the question. You could just ask 'does it follow from the graph that only half of the students in the sample get 8 to 10 hours sleep per night? Why junk up a maths test with so much irrelevant 'information'?

QUESTION FOUR

Do you want people to 'explain' or show their calculations? Do you want the students to calculate whether a 1 or 2 adult family with 1, 2, or 3 children would save money buying the family pass or not? Then why not ask them to do just that? You could say 'if a park has this as their standard pricing and this as a particular offer then…' That way you wouldn't be making up stories or be needing to provide references.

Same again 'if a student needed three notebooks and notebooks cost then would it be cheaper for the student to buy the units individually or in bulk.

Do we care so much about percentages because we are trying to train a population to only buy during Briscoes or Farmers sales? Is that the idea?

I don't know if Zoi provided permission for NZQA to modify or adapt various things about her for use in the assessment. The question could have been posed hypothetically without being a worse math test because of it.

Intersting that you choose to use that to get students used to information being redacted. References (e.g., for the photograph or photographer whose work is being reproduced and used for a purpose other than that intended or permitted by the author) at the point where they occur in the text is a good practice. I don't know why the math test is trying to teach students that it is acceptable to take anything you find from the internet and put a hyperlink to it (without so much as a date and time of access) as a reference at the back. This is not standard practice on how to reference or how to seek permission for reproducing photographs, particularly. There is no reference for the engineering plans if that is in fact what they are. What is the diagram? There is no title.

We are supposed to question what a presenter says but not what the Ministry says.

I have no idea why maths examinations need people to 'explain' anything.

The simplest kinds or types of questions are multiple choice. It is easier to identify it when you see it or know it when you see it than pull it completely out of your head. I don't understand why they aren't trying to write as simple questions as possible with the standard usual typical or normal 1 correct answer out of 5 multiple choice examination format. Let the kids focus on the maths and keep the language aspect of the maths test as simple as possible.

I imagine that the very very very best kids in maths will walk away from a test like that being 'I don't really know how I will be graded on that because who knows what the hell they want me to say, what their grading crierion is etc. I can know the math – but it wasn't really a test of math. It was a message to kids that they have no future is what it was.

Now we have a question about several hour commute times. Not a loaded question about some people's future, at all.

Who reads a schedule? You type where you want to go into your Auckland Transport App – right? Who 'likes to get to work early' compared to being fired or not paid if they do not?

50% is a percentage. 50 in 100 or 1 in 2 is a chance.

Who cares to the nearest cent? We have Swedish Rounding.

Explain how the line or describe how the line? Again, the simplest tests involve use of multiple choice. Can people use the line to do what you want them to do with it is a simpler task than having them describe what they are doing or try and explain why it is an acceptable method. That isn't what you want them to do, is it? You want them to explain how a visual graphical method may be used to extrapolate or reason rather than a formula, table, or equation? Really? What level is this math test, again?

Question 8. No reference on the 'information'. How much is claimed or successfully obtained? You lodge a claim and they approve it or not – right?

The phrasing is odd or strange. 'people had to stay away from work for one week or more' is more natural. I thought they were saying they had to stay away from ACC!!!

I would want to see their references because my understanding was that construction and foresty are the most dangerous jobs.

Is the only kind of injury that you can have to muscle 'strain or tear'? That makes a difference to whether or not that statement is true or not, on the basis of the information provided. Say 'most injuries are muscle injuries' if that is what you mean to say.

Note how that was a bad question because whether you get it right or not is not dependent on your understanding or knowledge of math. I don't think it is dependent on your knowledge of whether there are muscle injuries other than strain or tear, either. Swelling, for example, atrophy, fatigue, the prevalence of these. I don't know what the person/s who wrote the test was (or was not) thinking.

'Flat surface' is same as 'fall on same level'. I suppose. Really? We are doing this in a maths test?

'Getting hit by objects' is the same as 'hitting objects'. No. It is not. The cause of injury is different. Right? We are doing this in a math test?

No reference for the graph again (and it is false – right? It is intentionally presenting false information about hazardous occupations to people who are supposed to have no future in New Zealand or globally when you look at the NCEA picture – right?)

Now we are supposed to wax on about 'heavy objects' in various occupations? Seriously? In the math test?

Isn't there a standard internationally accepted convention on what a compass is supposed to look like? For clarity? I mean, that's the reasoning behind it. I can't see the picture that is provided (whether there are logitude or latitude lines on it. The compass seems intentionally designed to be very unhelpful for looking at flight paths over or across a curved surface. I can't see the map. It's been redacted from the online test?

'Explain how to calculate'? Really? Or do you mean to write down how one could calculate? There are different ways of doing it. Right? Explain how to calculate? Really?

Now we move into garages as sleepouts. Insulation involves getting carpet squares from the internet. We are provided with height (for cubic meters) but the equation we are provided with for calculating the heat pump is not the one that is provided in legislation. Right? We are being handed fibsies known as the 'general rule' (not to be confused with the 'secondar rule' in law).

'Explain' the answer – or show a way to calculate the answer? Is this a test of how to do calculations that might be useful to you in your life? Is that what it is aiming for?

And then a lot of extra space to make people feel concerned they may not have written enough to pass a basic maths test.

I don't know how much time students get to sit the test. Asking for an 'explanation' is a set-up. That's the problem, really.

They do it in biology, too. They ask the most junior students to 'explain photosynthesis' for example.

You know who or what explains photosynthesis pretty well? Campbell's Biology. But, presumably, they don't want students launching into a Campbell's Biology level understanding of photosynthesis. What do they actually want students to do? Do they want them to reproduce a relatively straightforward diagram of photosynthesis? Then say that.

I suppose the kids in the 'high quality schools' get provided with a few answers to the question. Then the teacher takes time explaining why each of those answers is a perfect answer even though they are not all the same. Then students are in the position to develop their very own answer ensuring they keep the features that were important to getting the best grade.

I suppose the kids in the 'low quality schools' get told to break out into groups and write up answers as a group. Then get told 'I can't do it for you if you can't do it then maybe you should just drop out and go away'.

We know that intelligence isn't particularly innate or so very much determined by genetics and sociocultural environment. Know the best answer as to why it is that we know that? Because of all the energy and effort and work that goes into muddying or mixing the message or the signal with respect who has to the capacity to do what, now.