

Assessing mathematical skills

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Introduction

In the last ten years the employment bureau were not content with the tests that they have used in their daily practice. Mostly they used so called pen and paper tests, that did not predict very well the behaviour of the candidates in jobs or education. These false predictions mean many candidates did not finish their training or failed at their new jobs. The national organisation for employment wants to have an assessment method, that gives better help with the decisions; which training or job fits the candidate the best? The employment office gave our institute CINOP, that is a Centre for Innovation of Education and Training, the contract to make the exercises for this assessment procedure. In this paper I will tell more about the assessment method and the mathematical exercises.

The assessment method

The essential principle of the assessment method is that behaviour predicts behaviour. In an assessment test it is therefore necessary that the candidate really must do things. To make only exercises with pen and paper is not sufficient, in our exercises for example he had to make figures from electric wire. The other starting point of the assessment method in general is that the testing is not only about school skills but also about real life experiences. The assessment method consists of four parts:

1. Language skills ,
The most important part of these exercises refer to reading and writing skills
2. Social skills
In this part the candidates had to make an exercise together with other candidates
3. Practical skills
In this part the candidates had to make wooden figures after a drawing and last but not least
4. Mathematical skills
We tell more about that later on.

The mathematical principles

When making the exercises we have three educational starting points:

1. Functional mathematics
We think it is very important that we use mathematics in realistic situations that

- the candidates could understand. The candidate must not only know the mathematical skills he must also be able to apply these skills.
2. Handy calculation.
The candidates have to be flexible in the way they use the mathematics because the use of math is always different in every practical situation.
 3. The use of models
We always try to teach mathematics by making it visual. That is the reason we often use models in the exercises, for example the number line and the relation table.

The mathematical components of the assessment method

1. Basic Skills;
In this part we have many counting exercises for the candidates, because counting is possible on every level and because the candidates have to show real behaviour.
2. Relations;
In this part the candidates have to calculate distances on a road map.
3. Logic;
We also include some logic puzzles, because some candidates like to do this. We have included the Tower of Hanoi in this test, because the candidates can find an answer to the puzzles by trying it themselves.
4. Geometry;
They have to make a drawing after an example. They can ask for support and then they get a step by step plan on how to make such a drawing.
(See figure 1)
5. Measure;
The candidates have to find out the relation between different formats of paper, like A4 and A5 for example.
6. Tables and graphics;
The candidates must send a parcel and a letter to an office. They have to choose the correct amount of stamps and address it well.

The assessment method

The candidates have six one-hour sessions to complete the mathematical exercises. They work in groups of twelve persons. There is an instructor, who tells the candidates, what they have to do but there is also an assessor. The assessor has five tasks:

1. To observe.
The assessor must have a very close look at the behaviour of the candidates. In assessment it is the behaviour of the candidate that is the base of it all and that's why it is so important to observe the behaviour very exactly.
2. To record.
The next step for the assessor is to record the behaviour of the candidates. It is important that the observer at this moment only records and does not give any judgements about the behaviour of the candidates.

3. To judge.
After the observation the assessor judges the behaviour. For example he distinguishes between self-reliant candidates or candidates who frequently ask for help.
4. To evaluate.
The assessor evaluates his judgements together with the candidate.
5. To report.
At the end the assessor has to report to the principal, who has ordered the assessment and he gives advice on the track the candidate should follow.

Conclusion

Many arithmetic tests only give sums like 19×3 or $728 - 624$. We think that is not enough when you want to say something about the track a candidate has to follow. In that case you need more information and specially more information about the behaviour of the candidate in more practical situations. In an assessment method you should use mathematics in realistic situations.

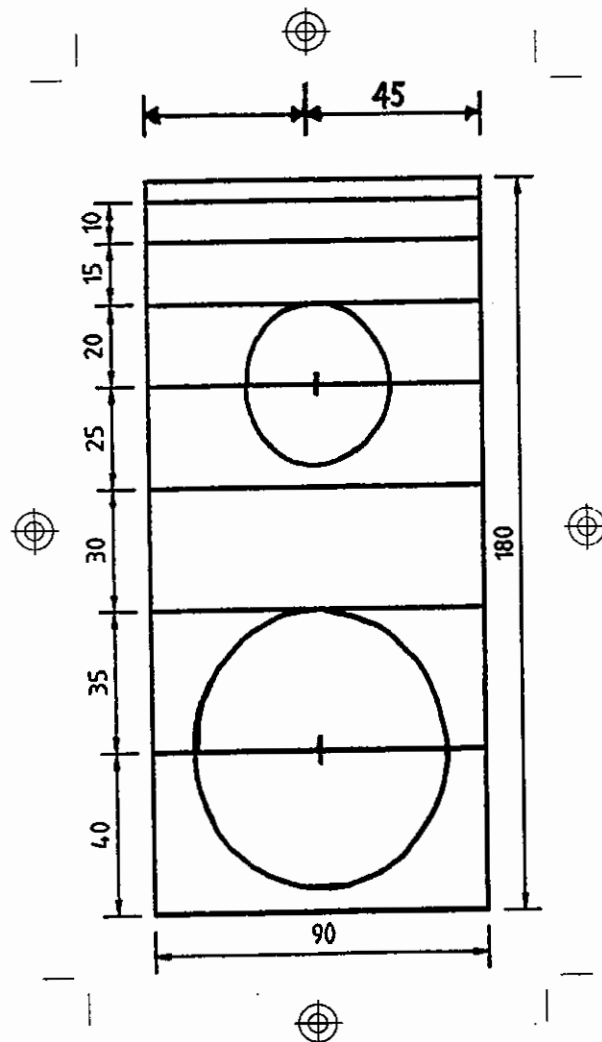


Figure: Example of a task, making a circle with wire.