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## Automatic Formative Assessment Strategies for the Adaptive Teaching of Mathematics

### **This is the author's manuscript**

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\$ X W R P D W L F ) R U P D W L Y H \$ V V H V V P H Q W 6 W U D W H J L H V I R U W K H \$ G D S W L Y

7 K L V L V W K H D X W K R U V P D Q X V F U L S W

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The 1 euro coin and the Turkish 50 cents lira coin have the same dimensions, colors and measures. Mario has 3 one-euro coins and 2 Turkish fifty-cent lira coins in his pocket.



Without looking, he takes a coin out of his pocket and then another. What is the probability that the first coin is fifty cents of a lira and the second coin is one euro?

- 15%
- 20%
- 25%
- 30%

Fig. 9.


¶

‡ .

Justifying dimension.

I O R R U ¶ V

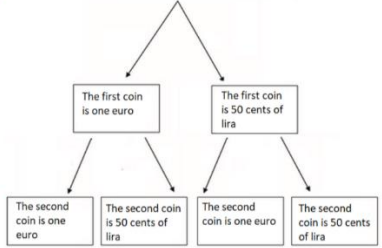
**✘** The 1 euro coin and the Turkish 50 cents lira coin have the same dimensions, colors and measures. Mario has 6 one euro coins and 3 Turkish fifty cents lira coins in his pocket.



Without looking, he takes a coin out of his pocket and then another.

What is the probability that one coin is 1 euro and the other 50 cents of lira?

**✔** The following diagram can help you



What is the probability that the first coin is 1 euro and the second 50 cents of lira?  
Remember that after the first draw, the number of coins has decreased by one

✔  
Correct response: 1/4±0.05

What is the probability that the first coin is 50 cents of lira and the second is 1 euro?  
Remember that after the first draw, the number of coins has decreased by one

✔  
Correct response: 1/4±0.05

So what is the probability that one coin is 1 euro and the other 50 cents of lira?

✔  
Correct response: 1/2±0.05

Fig. 10

### 5.3 Observations on students' answers to questions created by teachers

#### Solving problems dimension.



✓ Floor tiles can have different shapes, represented by regular polygons.  
 What is the regular polygon with the smallest number of sides that cannot be used for tessellation?  
 ✓  
 Correct response: pentagon

↓

✗ The justification for the correct answer starts from the reflection on the measurement of the internal angle of a pentagon.  
 The sum of the internal angles of a pentagon is:


- 720°
- 180°
- 360°
- 540°

Correct response: 540°

✓ To find the measure of an internal angle of a pentagon it is necessary to consider the sum of its internal angles and  
 ✓  
 Correct response: divide by

✓  
 Correct response: 5

Since three pentagons must compete in a summit, there would be an empty space of:



✓  
 Correct response: 36

Fig. 11.

‡

· G L P H Q V L R Q

Show all attempts

Your response	Correct response
<p>A peeled jar is 8 cm tall and the base diameter measures 5.8 cm.</p> <p>What is the volume of the peeled jar?</p> <p>Find the correct answer:</p> <ul style="list-style-type: none"><li><input checked="" type="radio"/> 211.2592000cm<sup>3</sup></li><li><input checked="" type="radio"/> 211.2592000cm<sup>3</sup></li><li><input checked="" type="radio"/> 211.2592000cm<sup>3</sup></li></ul>	<p>A peeled jar is 8 cm tall and the base diameter measures 5.8 cm.</p> <p>What is the volume of the peeled jar?</p> <p>Find the correct answer:</p> <p>211.2592000cm<sup>3</sup></p>
<p>What is the total surface area of the peeled jar?</p> <p>Answer:</p> <ul style="list-style-type: none"><li><input checked="" type="radio"/> 188.7</li><li><input checked="" type="radio"/> 191,6656</li><li><input checked="" type="radio"/> 191,66 cm<sup>2</sup>.</li></ul>	<p>What is the total surface area of the peeled jar?</p> <p>Answer: 198.5108000 cm<sup>2</sup>.</p>
<p><math>1.0 \times 1/2 + 1.0 \times 1/2 + 1.0 \times 1/2 + 0.0 \times 1/2 + 0.0 \times 1/2 + 0.0 \times 1/2 = 0.50</math></p>	
<p>To calculate the volume the formula is that of cylinder</p> <ul style="list-style-type: none"><li><input checked="" type="radio"/> We must therefore calculate the value dell'area di base that is: 26.4074 cm<sup>2</sup>.</li><li><input checked="" type="radio"/> The value of the volume is: 211.2592 cm<sup>3</sup>.</li></ul>	<p>To calculate the volume the formula is that of cylinder</p> <ul style="list-style-type: none"><li><input checked="" type="radio"/> We must therefore calculate the value dell'area di base that is: 26.40740000 cm<sup>2</sup>.</li><li><input checked="" type="radio"/> The value of the volume is: 211.2592000 cm<sup>3</sup>.</li></ul>

Fig. 12



‡



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† ·

Justifying dimension.

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† ·

I O R R U ¶ V

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‡ . ‡ . ‡ . ‡ .

‡ . ‡ .  
‡ .

D S R O \ J R Q ¶ V

‡ .

W K H S H Q W D J R Q ¶ V L Q W H U Q D O D Q J O H P X O W L S O \ L W

#### 5.4 Observations on the experimentation with students

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‡ . ‡ .

Table 2

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O H D Q R I W H D

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---

W K H V W X G H Q W V ¶ D Q V Z H U V ¶ V R Q H V  
‡ . ‡ .  
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## 5.5 Teachers' observations on the training module

‡ . ‡ .

Table 3

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O	H	D	Q	R	I	W	H	D
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‡ . ‡ .

Table 4

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O	H	D	Q	R	I	W	H	D
---	---	---	---	---	---	---	---	---

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Table 5

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	O	H	D	Q	R	I	W	H	D
--	---	---	---	---	---	---	---	---	---

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X

X

X

X

X

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‡ .

‡

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‡  
. ‡  
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‡ .  
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## 6 Conclusions

LFDWLRQ¶V REMHFWLYH

GHQWV¶ GLIILFXOWLHV DOG QHHG

VWXGHQWV¶ DFWLYLWLVWXGHQWV¶ EHKDYLRU

WKHP WR WKH VWXGHQWV¶ QHHGV DOG WR LPSURYH WKH

HDFKHUV¶ WUDLQLQJ

DFWLYLWLHV 7KH UHVHDUFKHUV¶ SUHVHQFH



WKH VWXGHQWV¶

## References

, & 7V WR 5HGXFH WKH 6FKRRO )DLOXUH LQ WKH 3URMHFW †6

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LFRO ' - ODFIDUODQH('LFN ' )RUPDWLYH DVVHVVPHQW