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SPECIFIC PROPERTIES OF EXACT SQUARE ROOTS OF NINE PERFECT SQUARES FORMED BY THREE DIGITS

Rildo Alves do Nascimento

Municipal and State Education Networks,
Santa Maria da Boa Vista - PE

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Abstract: Exact square roots are those that have an integer result and no decimals. There are nine numbers formed by three digits that are perfect squares, that is, they are obtained by calculating the square roots of the hundreds and units' digits, respectively. These numbers are: 100, 121, 144, 169, 400, 441, 484, 900 and 961. By extracting the exact square root of these numbers, we can verify specific properties, through the factorization of the perfect square trinomial to find the result more efficiently. In this work, we will discuss these properties and how they can be applied to obtain the exact square root of these nine perfect squares formed by three digits.

Keywords: Specific properties, Perfect squares, Exact square roots, Perfect square trinomial.

MATERIALS AND METHODS

The method for calculating the exact square roots of the nine perfect squares formed by three digits was developed from the factorization of the perfect square trinomial.

$$\begin{array}{c}
 \sqrt{a^2bc^2} \\
 \downarrow \downarrow \\
 \sqrt{a^2} \sqrt{c^2} \\
 \downarrow \downarrow \\
 a \quad c \\
 \swarrow \searrow \\
 2 \cdot a \cdot c = b
 \end{array}$$

Source: Elaborated by the author

RESULTS AND DISCUSSION

- The units' digits are: 0, 1, 4, 9 (sequence of the first perfect square numbers).
- The tens digits are: 0, 2, 4, 6 or 8 (sequence of the first even numbers).

REFERENCES

NASCIMENTO, R. A. *Você sabia ... Eureka*, 10, Rio de Janeiro, p. 51.

- The hundred digits, sequence of the first perfect square numbers, except 0 (zero), are: 1, 4, 9. The hundreds digit must not be 0 (zero), as this would be a two-digit number.
- In all perfect squares, the tens digit is twice the product of the square roots of the unit's digit and the hundreds digit: 100, 121, 144, 169, 400, 441, 484, 900, 961.
- The tens digit is the product of the unit's digit and the hundreds digit: 100, 144, 400, 441, 900.
- The tens digit is twice the units or hundreds digit: 121, 484.
- The hundreds digit is 1, 4, or 9 when the numbers end in (00 or 44): 100, 144, 400, 900.
- The tens digit is 4 (the unit's digit is 1 and the hundreds digit is 4, and vice versa): 144, 441.
- The tens digit is 6 (the unit's digit is 1 and the hundreds digit is 9, and vice versa): 169, 961.

CONCLUSION

The objective of this strategy was to provide a better understanding of the processes of obtaining the exact square root of nine perfect squares formed by three digits. It is important to note that the method of factoring the perfect square trinomial applies only to exact square roots of three digits.