

Real Quiz # 8 for Dr. Z.'s MathHistory

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Email DrZlinear@gmail.com as soon as I tell you (around 3:15pm)

Subject: q8

with an attachment called

q8FirstLast.pdf (e.g. q8PaulErdos.pdf)

1. (2 points) What is Laplace's partial differential equation? Who derived it before Laplace?

$$\frac{\partial^2 V}{\partial x^2} + \frac{\partial^2 V}{\partial y^2} + \frac{\partial^2 V}{\partial z^2} = 0$$

Euler

2. (2 points) What is the name of the city where Carl Friedrich Gauss was born? What was the occupation of his father?

Brunswick Germany

Day Laborer

3. (2 point) Can the side-length of a regular polygon of 17 sides (inscribed in a circle of radius 1) be constructed with compass and ruler alone? Who proved (or disproved) it?

Yes, Gauss

4. (4 points altogether)

Consider the set

$$G = \{0, 1, 2, 3, 4, 5\}$$

where the "multiplication", let's call it "*", is addition modulo 6, for example: $2 * 3 = 5$, $4 * 5 = 3$.

- a (1 point) Show that it is a group.

So any 2 elements g_1 and g_2 are also in G . $2 * 3 = 5$, $5 * 1 = 0$ All numbers fall within
 You get a cycle of 0, 1, 2, 3, 4, 5, no matter how you multiply
 $5 * 1 = 0$
 $0 = e$ b/c $0 * g = g$ - All elements have inverses
 $1 * (2 * 3) = 0 = (1 * 2) * 3$ [5, 1] [2, 4] [3, 3]

- b (1 point) Is the subset $\{1, 3, 5\}$ of G a subgroup of G ? Explain!

No because it is not a group bc $1 * 3 = 4$ so $h_1 * h_2$ does not exist in H

c (1 point) Show that $H = \{0, 2, 4\}$ a subgroup of G .

$$0 * 2 = 2 \text{ Identity } e = 0$$

$$0 * 4 = 4$$

$2 * 4 = 0$ this shows inverses are present

Any $h_1 * h_2$ is also in H

$$(0 * 2) * 4 = 0 = 0 * (2 * 4)$$

d (1 point) Find the coset decomposition of G with respect to H .

$$G = 1H \cup 3H \cup 5H$$