Real Quiz # 9 for Dr. Z.'s MathHistory

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

Subject: q9

with an attachment called

q9FirstLast.pdf (e.g. q9PaulErdos.pdf)

1. (2 points) What is the name of the French mathematician who did fundamental work in Number Theory independently, and at the same time, as Gauss, and what is the name of the innovative Geomery textbook that he wrote, that broke away from Euclid?

Felix Klein, "Elements de geometric" (1794).

2. (2 points) Who was the most original pupil of Gaspard Monge, and what is the name of the book that he wrote? What does it contain?

Victor Poncelet, "Traite des proprietes projectives des figures" (1822) talked about concepts underlying a new form of geometry.

3. (1 point) What was the position of Evariste Galois's father?

Mayor of a small town.

4. (1 point) What is the name of the famous French author that shared Cauchy's conservative political views, as well his capacity for an infinite amount of work?

Laplace

5. (4 points total) (a) (1 point) What is

$$\int_{-\infty}^{\infty} e^{-x^2/2}\,dx \quad ? = \sqrt{2\pi}$$

(b) (3 points) Prove it!

Let $c := \int_{-\infty}^{\infty} e^{-x^2/2}\,dx$

$$c^2 = \int_{-\infty}^{\infty} e^{-y^2/2}\,dy \int_{-\infty}^{\infty} e^{-x^2/2}\,dx = \int_{-\infty}^{\infty}\int_{-\infty}^{\infty} e^{-(x+y^2)/2}\,dy\,dx$$

If we convert this to polar coordinates,

$$c^2 = \int_0^{\infty}\int_0^{\infty} re^{-r^2/2}\,d\theta\,dr = 2\pi \int_0^{\infty} re^{-r^2/2}\,dr$$

$$\int_0^{\infty} re^{-r^2/2}\,dr = -e^{-r^2/2}\Big|_0^{\infty} = 1$$

$$c^2 = 2\pi(1)$$

$$c = \sqrt{2\pi}$$