Real Quiz # 6 for Dr. Z.'s MathHistory

NAME: (print!) _Vivian Choong_

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

Subject: q6

with an attachment called

q6FirstLast.pdf (e.g. q6BritannySpears.pdf)

1. (2 points) Who was the author of the 'Discorsi'? What year was it published?

Machiavelli , 1531

2. (1 points) Who unified Algebra and Geometry? What year was the book describing this unification published?

Decartes , 1637

3. (2 point) What are the names of the two persons who discovered the differntial calculus? Who was first to *discover* it? Who was the first to *publish* it?

Issac Newton and G.W. Leibniz

Leibniz discovered it first, Newton published first.

4. (5 points) Use Cardano's method (no credit for other methods!) to find the three roots of the cubic equation

$$x^3 + 6x - 7 = 0 \quad .$$

$x = u + v \rightarrow (u+v)^3 + 6(u+v) - 7 = 0$

$u^3 + 3u^2v + 3uv^2 + v^3 + 6(u+v) - 7 = 0$

$u^3 + v^3 + (3u^2v + 3uv^2 + 6u + 6v) - 7 = 0$

$u^3 + v^3 + (3uv(u+v) + 6(u+v)) - 7 = 0$

$u^3 + v^3 + (3uv + 6)(u+v) - 7 = 0$

$3uv + 6 = 0$

$uv = -2$

$(uv^3) = (u^3v^3) = (-2)^3 = -8$

$u^3 + v^3 = 7$

$x^2 - 7x - 8 = 0$

$(x+1)(x-8) = 0$

$x = -1, 8$

$u^3 = -1 \rightarrow u = -1$

$v^3 = 8 \rightarrow v = 2$

$x = u + v$

$x = -1 + 2 = 1$

$$\left(-\tfrac{1}{2} + i\tfrac{\sqrt{3}}{2}\right)(-1) + \left(-\tfrac{1}{2} - \tfrac{i\sqrt{3}}{2}\right)(2) \Rightarrow \tfrac{1}{2} - \tfrac{i\sqrt{3}}{2} \quad -1 - \tfrac{2i\sqrt{3}}{2}$$

$$-\tfrac{1}{2} - \tfrac{3i\sqrt{3}}{2}$$

$$\left(-\tfrac{1}{2} - \tfrac{i\sqrt{3}}{2}\right)(-1) + \left(\tfrac{-1}{2} + \tfrac{i\sqrt{3}}{2}\right)(2) \Rightarrow \tfrac{1}{2} + \tfrac{i\sqrt{3}}{2} \quad -1 + \tfrac{2i\sqrt{3}}{2}$$

$$-\tfrac{1}{2} + \tfrac{3i\sqrt{3}}{2}$$

$$\boxed{x = 1, \quad -\tfrac{1}{2} - \tfrac{3i\sqrt{3}}{2}, \quad -\tfrac{1}{2} + \tfrac{3i\sqrt{3}}{2}}$$