MATH PART I:
(5 points) Verify a result of Descartes that the sum of the reciprocal of the roots of an arbitrary quadratic equation written \(1 + c_1x + c_2x^2 = 0\) is equal to \(-c_1\). [HINT: Recall that the quadratic equation in the form \((x - a)(x - b) = 0\) has roots at \(a\) and \(b\).]

MATH PART II:
(10 points) Consider \(y = \sqrt{x}\). Use either Newton's method of fluents and fluxions or Leibniz' method of differentials to show that \(\frac{\dot{y}}{2\sqrt{x}}\) or \(\frac{dy}{dx} = \frac{dx}{2\sqrt{x}}\). [For half-credit you can use the modern limit definition of the derivative to differentiate the given function.] Show all your work!
HISTORY PART I: LONG-ANSWER QUESTION (5 points).
(5 points) If Newton or Leibniz had never been born, who do you think would have invented Calculus? WRITE LEGIBLY and provide a full paragraph (i.e. multiple sentences) to support your answer!

HISTORY PART II: SHORT-ANSWER QUESTIONS (5 points)
Write down whether the following sentences are either TRUE or FALSE.

A. ______ Newton and Leibniz were uninterested in who received final credit for the invention of Calculus.

B. ______ Fermat was able to build upon the work of Viète to solve algebraic problems.

C. ______ Kepler was always a stickler for matching theory to experimental observations.

D. ______ Galileo was able to build upon the work of the Bernouilli brothers to solve the catenary problem.

E. ______ Descartes believed geometry and algebra were two distinct, unrelated fields of study.

HISTORY PART III: MATCH QUESTION (5 points)
Match the concept, symbol or equation with the name of the one Mathematician most closely associated with it.

A: The integral or $\int$

1. 1: Isaac Newton
2. Gottfried Leibniz

B: logarithms
3. Joseph-Louis Lagrange
4. Pierre-Simon Laplace
5. Leonhard Euler

C: Solution of $x^3 + cx = d$
6. Rene Descartes
7. Pierre de Fermat

D: Parabolic motion of projectiles
8. John Napier
9. Gerolamo Cardano

E: $\Sigma$
10. Galileo Galilei
11. Johannes Kepler