Boston University
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Number Theory
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Quiz I

student:
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Question 1: Diophantus lived during in the city of Alexandria, in what is nowdays Based on a surviving riddle about his life, he lived to be years old.

Hints The end the Ice Age, around 10,000 BC; The Ancient World, around 250 AD; The Renaissance, around 1500 AD; Between WWI and WWII, around 1930; China;Egypt;France;Germany

. . . his boyhood lasted 1/6th of his life; he married after 1/7th more; his beard grew after 1/12th more, and his son was born 5 years later; the son lived to half his father's age, and the father died 4 years after the son. This is a riddle describing the life of Diophantus. How long was his life in years?

Question 2: There are diophantine equations with
A) No solutions.
B) Unique solution.
C) Many solutions.
D) All of the above.
E) I don't know.

Question 3: Which of the diophantine equations is without solutions:
A) $30x - 21y + 7 = 0$.
B) $x^2 + y^2 + z^2 = 47$.
C) $x^2 - 6x + y^2 + 12 = 0$.
D) All of the above.
E) I don't know.

Question 4: Which of the following equations has $(x, y) = (2, 3)$ amongst its solutions:
A) $3x + 5y - 17 = 0$.
B) $x^2 + y^2 = 12$.
C) $y^2 = x^3 + 1$.
D) None of the above.
E) I don't know.

Question 5: What does $\sum_{k=0}^{9} 2^k = 1 + 2 + \cdots + 512$ equals to?
Answer:

Question 6: Circle the ones that CAN NOT be rational roots of the equation

$$50x^4 + 25x^3 - 43x^2 - 9x + 9$$

Answer: -2, $\frac{-5}{3}$, -1, $-\frac{3}{5}$, $\frac{1}{2}$, $\frac{3}{5}$, $\frac{7}{2}$, 5