Calculocked

Having survived your first week of the semester, you and your fellow group mates are dismayed to find that the doors to math class have locked and you are trapped inside. In order to escape the room you must utilize only your calculator to correctly solve several math problems. Once you have answered all the questions the doors will open revealing the grand prize.

Instructions

- Each group member has a slightly different problem to solve

- Each problem is meant to be solved using only your calculator

- Once each member has solved their problem, add every member's solution together

- Give this answer to your UTA
  - If correct they will provide you with the next clue
  - If incorrect work together to figure out the correct response

Clue 1: Order of Operations

Evaluate the following expression:

$$\frac{a + b^c - d}{e - g + h^2} + \frac{i - j}{k^3}$$

All answers should be rounded to the thousandths place

Possible expressions we can use:

$$\frac{40 + 34^2 - 32}{22 - 31 + 47^2} + \frac{30 - 47}{9^3}$$

$$\frac{15 + 22^4 - 25}{29 - 2 + 39^2} + \frac{41 - 2}{49^3}$$

$$\frac{39 + 11^4 - 50}{28 - 35 + 15^2} + \frac{47 - 8}{46^3}$$

$$\frac{20 + 17^3 - 34}{25 - 24 + 44^2} + \frac{16 - 28}{2^3}$$

$$\frac{25 + 11^4 - 17}{29 - 10 + 15^2} + \frac{16 - 23}{4^3}$$

$$\frac{28 + 24^2 - 1}{49 - 3 + 43^2} + \frac{45 - 24}{11^3}$$

$$\frac{33 + 40^2 - 25}{11 - 17 + 47^2} + \frac{2 - 19}{11^3}$$

$$\frac{47 + 26^2 - 26}{48 - 42 + 46^2} + \frac{30 - 40}{48^3}$$

$$\frac{3 + 39^2 - 22}{13 - 45 + 24^2} + \frac{34 - 45}{24^3}$$

$$\frac{25 + 10^5 - 6}{50 - 4 + 26^2} + \frac{46 - 49}{4^3}$$

Clue 2: Fractions and Decimals and Numbers Oh My!

Simplify the following expression:

$$\frac{-a}{b} + \frac{c}{d}$$

The final answer should be a simplified fraction

Note: When I was trying some of these on my calculator it was difficult to find fractions that will convert back to fractions (once the denominators get to big) for this one we might have them give us the individual fractions on their own
Possible expressions we can use:

$$\frac{-29}{84} + \frac{36}{77}$$

$$\frac{-23}{42} + \frac{80}{81}$$

$$\frac{-61}{93} + \frac{2}{77}$$

$$\frac{-21}{64} + \frac{77}{85}$$

$$\frac{-73}{91} + \frac{16}{25}$$

$$\frac{-30}{88} + \frac{79}{97}$$

$$\frac{-36}{86} + \frac{66}{81}$$

$$\frac{-19}{81} + \frac{2}{48}$$

$$\frac{-38}{61} + \frac{91}{99}$$

$$\frac{-31}{89} + \frac{24}{37}$$

Clue 3: Roots roots roots

Evaluate the following expression:

$$\sqrt[a]{b} + \sqrt{c} + \sqrt[3]{-d}$$

All answers should be rounded to the thousandths place

Possible expressions we can use:

$$\sqrt[27]{36} + \sqrt{74} + \sqrt[3]{-19}$$

$$\sqrt[7]{86} + \sqrt{97} + \sqrt[3]{-11}$$

$$\sqrt[19]{81} + \sqrt{73} + \sqrt[3]{-43}$$

$$\sqrt[30]{82} + \sqrt{7} + \sqrt[3]{-55}$$

$$\sqrt[17]{66} + \sqrt{33} + \sqrt[3]{-3}$$

$$\sqrt[19]{65} + \sqrt{5} + \sqrt[3]{-34}$$

$$\sqrt[15]{15} + \sqrt{75} + \sqrt[3]{-21}$$

$$\sqrt[22]{61} + \sqrt{45} + \sqrt[3]{-22}$$

$$\sqrt[19]{50} + \sqrt{47} + \sqrt[3]{-36}$$

$$\sqrt[10]{55} + \sqrt{68} + \sqrt[3]{-99}$$

Clue 4: Everybody loves graphing

Graph the following equation:

$$y = ax^k + bx^l + cx^m + \cdots + dx + e$$

- Choose a window so that the entire graph can be seen between $x = -20$ and $x = 20$
- Find the maximum y-value between $x = -20$ and $x = 20$

All answers should be rounded to the thousandths place

Possible equations we can use:

$y = -2.12x^4 - 27.43x^2 + 301.48x + 180$

$y = -0.025(x - 15)(x + 4)^2(x - 3)^2(x + 16)$

$y = 0.5(x - 15)(x + 4)^2(x - 3)(x + 16)$

$y = (x + 10)(x - 13)(x + 4)^2(x - 6)$

$y = 0.02(x + 18)^2(x - 3)(x + 3)(x - 16)^2$

$y = -0.02(x - 3)(x + 3)(x - 5)(x + 5)^2(x - 18)$

$y = -(x + 18)(x - 1)^2(x - 10)$

$y = -(x + 15)^2(x - 1)^2(x - 10)$

$y = -0.003(x + 3)^2(x - 4)(x - 18)(x + 18)^2$

$y = -(x + 15)(x - 3)^2(x - 17)$

Clue 5: Everybody loves graphing 2

Graph the following equation in the standard window:

$$\frac{ax^p + bx^r + c}{dx^q + ex^s + f}$$

Find the x-intercept.

All answers should be rounded to the thousandths place

Possible equations we can use:

$$\frac{7x^3 + 5x - 6}{3x^2 - 2x + 7}$$

$$\frac{5x^9 + 3x - 16}{10x^5 - x + 4}$$

$$\frac{2x^2 + 10x^7 - 1}{7x^5 - 6x - 1}$$

$$\frac{4x^5 - 2x^2 - 1}{4x^5 - 6x - 1}$$

$$\frac{3x^3 + 9x - 2}{2x^5 - 5x^2 - 2}$$

$$\frac{3x^7 + x^2 - 2}{5x^6 - 9x^3 - 4}$$

$$\frac{6x^9 + 7x^2 - 9}{9x^7 - x^5 + 9}$$

$$\frac{9x^5 + 9x^3 - 6}{4x^4 + 6x^1 - 9}$$

$$\frac{5x^6 + 5x^7 - 7}{8x^4 + 8x - 1}$$

$$\frac{4x^7 + 9x^3 - 8}{6x^7 + 2x^2 - 1}$$