7 HARD Problems for the DEC 2023 DSAT (Problem Sette #4)

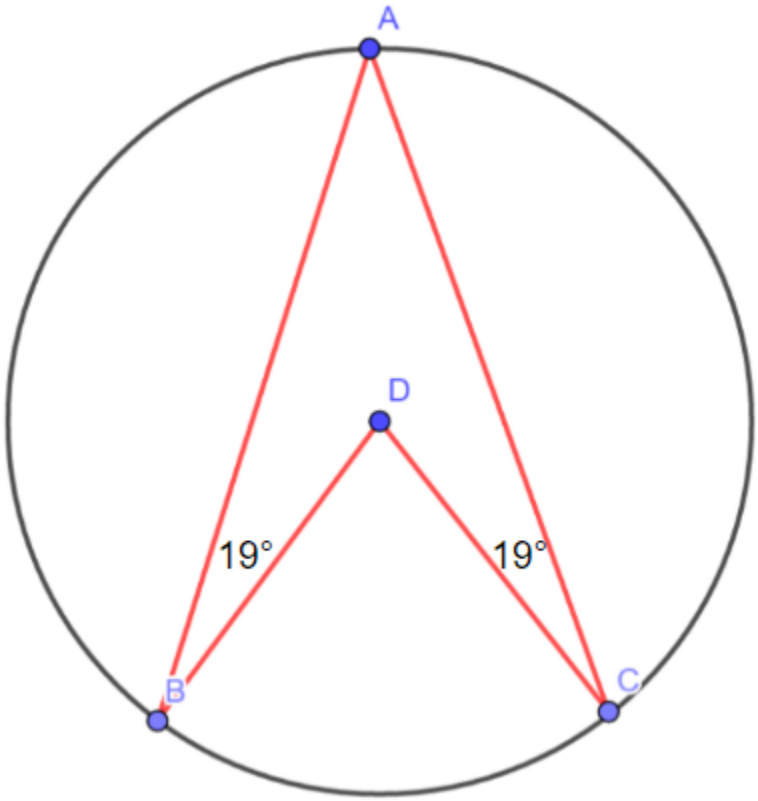
Video Solutions at: https://youtu.be/9uV4DQQZ8aQ

Question 1

$$x^2 - 12x + 7 = 0$$

One solution to the given equation can be written as $j - \sqrt{k}$, where *j* and *k* are constants. What is the value of *jk* ? (lol!)

Question 2



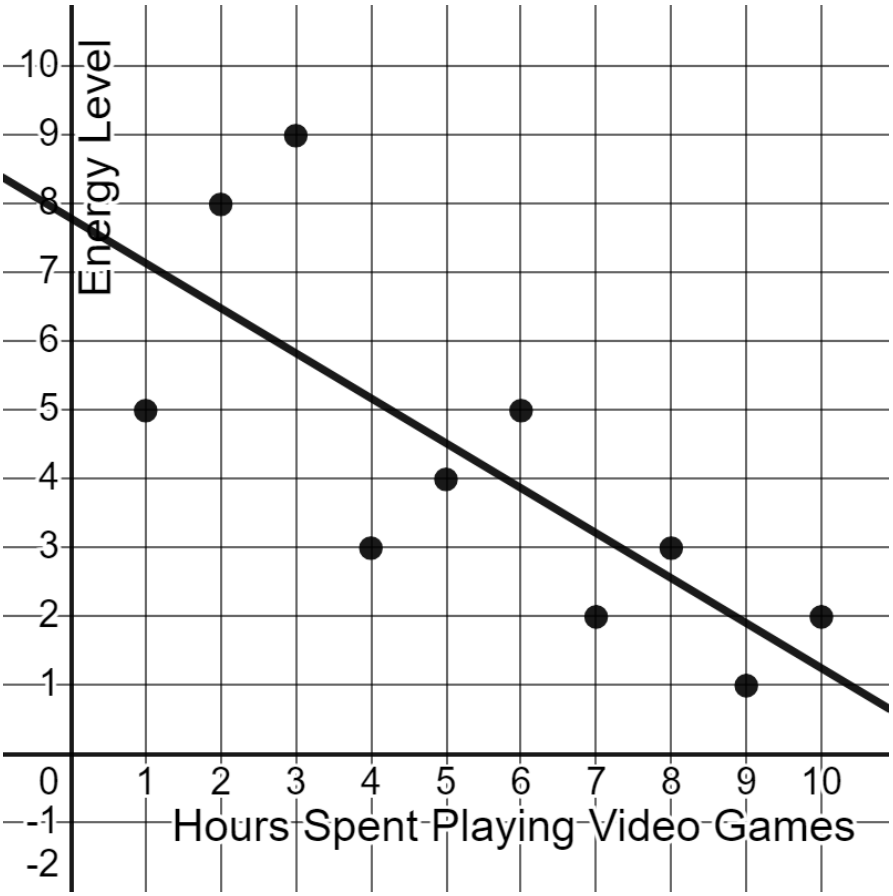
The measure of angle *BDC*, in radians, is equal to $\frac{a\pi}{b}$ where *a* and *b* are positive integer constants. What is the smallest possible value of $a + b$?

Question 3

$$f(x) = |8 - 5x|$$

The function *f* is defined by the given equation. For what value of *k* does $f(k) = 6k + 3$?

Question 4



In a certain pasta-themed YouTube community, 10 students were selected at random for a study on energy levels and video games. The data was plotted in a scatterplot, along with the line of best fit. The line of best fit underestimates one student's reported energy level by more than 3 points. What was this student's reported energy level?

Question 5

$$K = \frac{RT^2M}{1000H}$$

The given equation relates the molal boiling point elevation constant *K,* the ideal-gas constant *R*, the solvent boiling point *T*, the solvent molecular weight *M*, and the molal heat of vaporization *H*. Which equation correctly expresses the solvent boiling point in terms of the other quantities?

A) $T = \frac{1000^2H^2K^2}{R^2M^2}$

B) $T = 10\sqrt{\frac{10HK}{RM}}$

C) $T = \sqrt{1000HK - R - M}$

D) $T = 1000\sqrt{\frac{HK}{RM}}$

Question 6

$sin(a^\circ) = cos(b^\circ)$ where *a* and *b* are positive constants. The number *a* is 70% greater than the number *b*. What is the value of *a*?

Question 7

For groups of 28 or more people, an arcade charges $9 per person for the first 28 people and $15 for each additional person. How many total people were in attendance if the group paid $447 to go to the arcade?