Sooner Math Bowl Overtime!

November 18, 2008
ROUND 1!
Question 1:
If

\[ 20137828x3102 \]

is a palindrome, what is \( x \)?

Answer:

\[ x = 7 \]
Question 2:
If
\[ f(x) = 3x + 9, \]
then what is
\[ f^{-1}(42) =? \]

Answer:
\[ f^{-1}(42) = 11 \]
Question 3:
What is $x$?

Answer:

$x = 16$
Question 4:
A test has 4 True/False questions. If you randomly guess, what is the probability that you will get all 4 questions correct?

Answer:
1 in 16
Question 5:
If you cut a square cake with three straight cuts, what is the maximum number of pieces you can have at the end? ¹

Answer:
7 pieces if you only allow vertical cuts.
8 pieces if you also allow horizontal cuts.

¹The question as written is ambiguous. One normally uses only vertical cuts to cut a cake, but horizontal cuts were not strictly forbidden. Sorry.
Round 1

Question 6:
What is $x^2$?

Answer:

$x = \sqrt{20} = 2\sqrt{5}$

$^2$There was a typo in the problem on Math Day but it had no affect on the outcome. The corrected version is given above. Sorry.
Question 7:
What is the largest prime number which is less than 100?

Answer:
97
Round 1

Question 8:
How many squares are in the following picture?

Answer:
6 squares
Round 1

Question 9:
If $n$ is a natural number, what is the smallest possible positive number given by the following expression?

$$(n - 1)(n - 2)(n - 3)(n - 4) - 2$$

Answer:

22

(when $n = 5$)
Question 10:
Say $0 \leq \theta \leq \pi$ is an angle which satisfies

$$3 \sin^2(\theta) + 3 = 6 \sin(\theta).$$

What is $\theta$?

Answer:

$$\theta = \pi/2 \text{ or } \theta = 90^\circ$$