MATH 1000 READING CHECK 5

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Name:

These questions concern Chapter 4 of *How Not to Be Wrong* by Jordan Ellenberg, titled "How Much is That in Dead Americans?"

(1) What did the US House of Representatives mean in 2001 when they said that 26 people killed in a series of attacks in Israel were the "equivalent" of 1200 American deaths?

  a) The average Israeli citizen has nearly 50 times the impact on the global economy as the average American, so the comparison was in terms of total economic impact.
  b) 1200 American soldiers based in Israel died in the same series of attacks.
  c) The 26 Israelis represent the same proportion of Israel's total population as 1200 Americans represent of the total U.S. population.

(2) Which summarizes why it is NOT surprising that North and South Dakota had amongst the lowest and highest rates, respectively, of brain cancer per 100,000 people?

  a) North Dakota borders Canada, so its residents can easily travel to receive free medicine and care across the border, whereas for South Dakota the journey is much longer.
  b) Despite being neighboring states, the demographics in the Dakotas are quite different, and North Dakota is much wealthier.
  c) Both Dakotas have very low populations, and in terms of proportions, smaller samples give a higher likelihood for extreme results in either direction.

(3) What is the name of the mathematical fact that says that if you continue to flip more and more coins, then the proportion of your total flips that are heads will, with increasing likelihood tending toward certainty, get increasingly close to 50%?

  a) The Principle of Large Samples
  b) The Law of Large Numbers
  c) The Theorem of Averages

(4) Two polls for a presidential election, call them A and B, were con-
    ducted with identical methodology, except that Poll B surveyed 100
    times as many people as Poll A. The expected error for Poll B is
    about one tenth of what it is for Poll A. Why?

  a) Because 10 is the square root of 100, and expected error decays
     with the square root of the number of trials.
  b) Because 10 is the largest factor by which the expected error can
     be decreased, and increasing the sample size by a factor of 100
     is more enough to reach this optimum.
  c) This is not a conclusion that can be made with the given in-
     formation, the person who came to this conclusion must know
     more than is provided here.

(5) Suppose you flip a fair coin 15 times and every flips lands heads.
    Which of the following correctly describes how the principle from
    Question 3 applies to this situation?

  a) Because the proportion of heads will almost certainly level off
     toward 50% in the long run, it is more likely that the upcoming
     flips will be tails than heads.
  b) Every flip of the fair coin is completely independent, and is in no
     way influenced by the results of the previous flips. The principle
     in Question 3 does not say that the 15 flips will be canceled out,
     but rather takes into account that they will make up a smaller
     and smaller proportion of the total as the flips continue.
  c) The principle in Question 3 essentially guarantees that the coin
     was actually unfair in the first place.

(6) If 26 people are killed in a terrorist bombing in a foreign country, how
    does Jordan recommend you conceptualize the impact of that event?

  a) Compute the proportion of that country's population that those
     26 deaths account for, and compute that same proportion of the
     population of the U.S.
  b) Compute the proportion of that city's population that those 26
     deaths account for, and compute that same proportion of the
     population of your hometown.
  c) Imagine that the same number, 26 people, were killed in a ter-
     rorist bombing, not in a foreign country, but in your hometown.