Official Common Dispute Document

Geometry

1) Given a rectangle (with length L and width W), calculate the area of a surrounding border of uniform width x.   The solution: $2Lx + 2Wx + x^2 \bullet \pi$

2) Unless explicitly stated otherwise by the author of a test:

a) No diagram may be assumed to be drawn to scale.

b) The definition of a trapezoid is exclusive (which means a trapezoid by definition has **exactly** one pair of parallel sides - parallelograms **are not** trapezoids.)

c) When an object is stated to be a given shape, it is that shape and is not a degenerate case. A circle may not be a point, a quadrilateral may not be a triangle, etc.

Algebra

1) The y, or x-intercept is to be interpreted as asking for the y (or x) coordinate (not the ordered pair).

Pre Calculus

1) All inverse trigonometric functions, unless otherwise stated, all denote the function with its **traditional** restricted range.

2) In regards to the phase shifts of trigonometric graphs, on team questions, answers should voice the shift that is closest to 0 (unless otherwise specified). That is to say, consider a team question that has one part that reads: B = the phase shift of sin (x + P); the calculations for the correct answer ought to use –P as the shift, not a positive coterminal shift. For individual questions, it would be prudent to specify the direction of the shift rather than using a positive or negative sign (e.g. P units to the left, versus – P).

Calculus

1) Consider a function f(x) whose derivative is greater than zero for all real values of x on the interval $[a,\infty)$, except for a single point at x = b where the derivative is equal to zero. Is this function increasing on the interval (a,∞) or $(a,b) \cup (b,\infty)$?

Solution: $[a,\infty)$ because the definition for a function to increase on an interval is that for all b and c, c > b, on the interval, f(c) > f(b), which the function described above obeys (assuming it is differentiable everywhere on

the interval). However, f(x) is not increasing at the point x = c.

2) $0^0 = 1$ (not "undefined") if asked in the form: " What is 0^0".

a) This question is only subject to be asked in the Calculus division.

b) Of course, in a limit-based context, a form of 0^0 may take on values other than 1.

3) When calculating the maximum error, use of differentials is not implied (the use of which must be stated within the question). In dispute, cite Taylor's theorem.

4) Solutions to limits that diverge to infinity should be written as $\pm\infty$, as appropriate. When a limit does not converge to a finite real number and does not diverge to infinity, then the solution should be written as DNE.

Examples: $\lim_{x \to \infty} x^2 = \infty$, $\lim_{x \to 0} \sin\left(\frac{1}{x}\right) = DNE$, $\lim_{x \to \infty} (-1)^x = DNE$

5) The notation for the nth derivative of the function f(x) is to be written with parentheses surrounding the n.

a) Correct format: $f^{(n)}(x)$

b) Incorrect format: $f^n(x)$, *which is to be interpreted as the function raised to the nth power*

6) A function which is not integrable on an interval A is not integrable on any interval B, where B contains A. I.e. no "the negative signs cancel" arguments.

Statistics

1) Given a deck of cards, face cards only include Kings, Queens and Jacks. (Aces are not included in the subset).

2) Consider a set of numbers ordered in increasing order. Calculate the IQR.

a) Even number of elements in the set: Solution: Q_1 is calculated based on the lower half of the set while Q_3 is calculated based on the upper half.

b) Odd number of elements in the set: Solution: Q_1 *and* Q_3 are calculated as stated above with the exclusion of the Q_2 (median of the set).

3) A standard deck of cards is to be assumed as a standard 52-card deck.

4) A "die" is to be assumed as a fair 6-sided die unless otherwise stated.

5) Unless otherwise stated (or with information to suggest otherwise), a set of data is to be treated as a sample set.

Number Theory

1) For a given integer, find the set of factors.

a) Positive Integer Solution: The set of positive integral factors.
b) Negative Integer   Solution: The set of positive integral factors and -1.

General/Overall
1) Concerning Pascal's triangle, the "first row" is considered to be "Row 0", which is a 1
2) A question involving possible rounding should specify and abide within the question; never round unless instructed to do so (exact answers).
3) A student should not have to assume what the test meant to say in the case of a misprint.
4) Unless there are parentheses, $\sum$ *or* $\prod$ notations only include the sucessive terms that contain the counter-variable. Take $\sum\limits_{n=a}^{n} n + c \left(or \prod\limits_{n=a}^{b} n + c \right)$:

Solution: this is to be interpreted as $[a + (a + 1) + \ldots + (b - 1) + b] + c$.
This is **NOT TO BE INTERPRETED AS** $[(a + c) + (a + c + 1) + \ldots + (b - 1 + c) + (b + c)]$. The correct notation for the latter of these two expressions is $\sum\limits_{n=a}^{b} (n + c)$.