

Mathematics 1110H (Section A) – Calculus I: Limits, Derivatives, and Integrals
TRENT UNIVERSITY, Fall 2024

Quiz #7
Qualitative Analysis/Curve Sketching
Wednesday, 6 November.*

1. Find the domain and any and all intercepts, horizontal and vertical asymptotes, intervals of increase and decrease, local maximum and minimum points, intervals of concavity, and inflection points of $y = x^2e^{-x}$, and sketch its graph based on this information. [5]

Let us now praise prime numbers
With our fathers that begat us:
The power, the peculiar glory of prime numbers
Is that nothing begat them,
No ancestors, no factors,
Adams among the multiplied generations.
None can foretell their coming.
Among the ordinal numbers
They do not reserve their seats, arrive unexpected.
Along the line of cardinals
They rise like surprising pontiffs,
Each absolute, inscrutable, self-elected.
In the beginning where chaos
Ends and zero resolves,
They crowd the foreground prodigal as forest,
But the middle distance thins them,
Far distance to infinity
Yields them as rarely returning comets.
O prime improbable numbers,
Long may formula-hunters
Steam in abstraction, waste to skeleton patience:
Stay non-conformist, nuisance,
Phenomena irreducible
To system, sequence, pattern or explanation.

By Helen Spalding, appearing in the December 1980 issue of *Scientific American*.

* Please submit your solutions, preferably as a single pdf, via Blackboard's Assignments module before midnight. If that fails, please submit them to the instructor on paper or via email to sbilaniuk@trentu.ca as soon as you can.