UNIVERSITY OF TORONTO SCARBOROUGH

Department of Computer and Mathematical Sciences

STAC67H3F: Regression Analysis

Quiz 1: written part

TUT0001 · Tuesday September 29, 2026

Instructions

- **Quiz 1 has two parts.** This **written part** (25 minutes, 12 points) comes first, on paper. The **Quercus part** (25 minutes, 8 points) follows, on your laptop, once this paper has been collected. Quiz 1 is marked out of 20.
- **Keep your laptop closed and your phone away** until this paper has been collected. A non-programmable calculator is permitted; no other aids.
- Answer in the space provided on pages 2 and 3. This booklet is scanned: anything written elsewhere is not marked. **Do not write on the QR codes** at the top of the pages.
- Show your work: a number with no supporting work receives no credit.
- Round *final* answers to 2 decimal places; do not round intermediate quantities.

Good luck!

1. A property manager records, for each of $n = 24$ one-bedroom flats in the same building, the **floor area** x (in m^2) and the **monthly rent** Y (in dollars). The floor areas range from 33.3 to 82.0 m^2. Assume the simple linear regression model $Y_i = \beta_0 + \beta_1 x_i + \varepsilon_i$ for $i = 1, \ldots, 24$, under the usual Gauss–Markov conditions. The following summary statistics are available.

$n = 24$	$\sum x_i = 1444.2$	$\sum Y_i = 31854.0$
$S_{xx} = 3288.2$	$S_{YY} = 1004896.3$	$S_{xY} = 51465.3$

(a) Compute $\hat{\beta}_1$ and $\hat{\beta}_0$, and write down the fitted regression line. [4]

(b) Interpret $\hat{\beta}_1$ in the context of these data. [2]

(c) The residuals are $e_i = Y_i - \hat{Y}_i$, and $SSE = \sum_{i=1}^{n} e_i^2$. Show that [6]

$$SSE = S_{YY} - \frac{S_{xY}^2}{S_{xx}}.$$

Hint: in e_i, replace $\hat{\beta}_0$ by its formula.