The University of Texas at Austin
In-Class Work 16

M339D Introduction to Financial Mathematics

November 02, 2026

Instructions: Provide your complete solution to the following problems. Final answers only, without appropriate justification, will receive zero points even if correct.

The de Moivre-Laplace Theorem.

Problem 16.1: *According to the Pew research center, 64% of Americans say that social media have a mostly negative effect on things (see https://pewrsr.ch/3dsV7uR). You take a sample of* 1000 *randomly chosen Americans. What is the approximate probability that at least* 650 *of them say that social media have a mostly negative effect on things?*

Problem 16.2: *According to a Gallup survey, only 22% of American young adults rate their mental health as* excellent*:*

https://www.gallup.com/education/328961/why-higher-education-lead-wellbeing-revolution.aspx.

You sample 6000 *randomly chosen American young adults. What is the approximate probability that at most* 1400 *of them rate their mental health as* excellent*?*

Problem 16.3: *You toss a fair coin* $10,000$ *times. What is the approximate probability that the number of* Heads *exceeds the number of* Tails *by between* 200 *and* 500 *(inclusive)?*