GROUP QUIZ 7 QUESTIONS

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YOU MUST EVALUATE YOUR INTEGRALS WITHOUT A CALCULATOR.

YOU MUST USE ONLY THE TECHNIQUES COVERED IN THIS CLASS SO FAR TO FIND ANTI-DERIVATIVES.

SUMMARIZE ALL ANSWERS TO WORD PROBLEMS USING COMPLETE SENTENCES.

[1] **A highly contagious virus is spreading through the population of a large metropolis. People are being infected with the virus, recovering, and then being reinfected repeatedly. Let X be the fraction of city employees that will have the virus on Thanksgiving. (X can be viewed as a continuous random variable.) The population density function for X is $p(x) = k(x - x^3)$ on the appropriate interval.**

[a] **Find the probability that more than 80% of city employees will be infected on Thanksgiving.**

[b] **Find the probability that there will be more uninfected employees than infected employees.**

[2] **A continuous random variable X has the probability density function $p(x) = \frac{5-x}{4}$ on the interval [2, 4].**

[a] **Find the median value of X.**

[b] **Find the mean value of X.**

[3] **Evaluate the following integrals.**

[a] $\int \frac{4x}{8 + 4x + x^2}\, dx$

[b] $\int \frac{6x}{10 - 2x + x^2}\, dx$

[c] $\int \frac{3}{\sqrt{4x - x^2}}\, dx$

[d] $\int \frac{3}{\sqrt{7 - 6x - x^2}}\, dx$

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