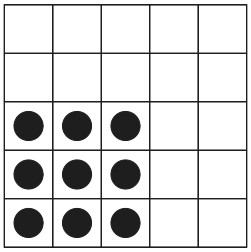
STAT 2290 Exam 3 (Practice), April 2026

- Exam 3 covers Lessons 13-16 on random variables, sampling distributions, and confidence intervals.
- Lesson 17 on confidence interval with unknown σ will not appear on Exam 3.
- Below are additional problem types that may be similar to what appears on your exam.

Some R outputs: The following R outputs may be useful for various problems.

```
pnorm(-1.5) = 0.0668072012688581
pnorm(-1) = 0.158655253931457
pnorm(-0.5) = 0.308537538725987
```

Problem 1. You are the only player to play Bingo where there are 16 numbers left to be announced, corresponding to each of the 16 empty squares in your Bingo card. You will win \$100 if you can get 5 filled squares in a row, column, or diagonal within the next two turns. Otherwise, you will lose \$50. Let X be the monetary amount that you will win or lose.



(a) Find the expected value of X.
(b) Find the variance of X.
(c) Find the standard deviation of X.

Problem 2. Suppose that a random variable X has PDF given by $f(x) = |x|$ for $-1 \leq x \leq 1$ and $f(x) = 0$ otherwise.
(a) Verify that f is a valid PDF.
(b) Find the CDF of X.
(c) Find the expected value, variance, and standard deviation of X.
(d) Graph the sampling distribution of the sample means obtained by sampling the value of X independently 36 times.

Problem 3. Suppose that a population of fish have weights which are normally distributed with $\mu = 10$ lbs. and $\sigma = 3$ lbs.
(a) Graph the sampling distribution of the sample means for the sample size $n = 100$.
(b) Find the probability that a sample of size $n = 100$ taken from this population produces a sample mean of ≤ 6.5 lbs.