Big idea: \( \bar{X} \) has mean \( \mu \), variance \( \sigma^2/n \), and (if \( n \) is large) is approximately normal.

1. Distributions of sums of random variables.
   (a) \( E(Y + Z) = E(Y) + E(Z) \)
   (b) \( E(cY) = cE(Y) \)
   (c) If \( Y \) and \( Z \) are independent, \( \text{Var}(Y + Z) = \text{Var}(Y) + \text{Var}(Z) \).
   (d) If \( Y \) and \( Z \) are normal and independent, \( Y + Z \) is normal.

2. The distribution of \( \bar{X} \).
   (a) \( E(\bar{X}) = E(X) = \mu \).
   (b) \( \text{Var}(\bar{X}) = \text{Var}(X)/n \)
   (c) If \( X \) is normal, \( \bar{X} \) is normal.

3. The Central Limit Theorem.

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**Homework - to turn in Tuesday, March 31**

1. Read Section 5.2.
2. Do problem 5.3, 4, 5, 6.

**Useful R**

```r
> m2=combn(x,2,mean)
> histogram(m2)
```