

Homework Key 26

- 4th Bullet - mean and standard deviation for six sided die - equal probability on each probability = $\frac{1}{6}$

$$\text{mean} = \sum xP(x) = 1\left(\frac{1}{6}\right) + 2\left(\frac{1}{6}\right) + 3\left(\frac{1}{6}\right) + 4\left(\frac{1}{6}\right) + 5\left(\frac{1}{6}\right) + 6\left(\frac{1}{6}\right) = 3.5$$

$$\text{standard deviation} = \sum (x - \mu)^2 P(x) = \sum x^2 P(x) - \mu^2 = 1\left(\frac{1}{6}\right) + 4\left(\frac{1}{6}\right) + 9\left(\frac{1}{6}\right) + 16\left(\frac{1}{6}\right) + 25\left(\frac{1}{6}\right) + 36\left(\frac{1}{6}\right) - (3.5)^2 = 2.917$$

- 5th Bullet - mean and standard deviation for 60% of 100 + 10000 tosses of a coin that came out as heads

$$\text{mean for 100 tosses: } \mu = np = 100(.5) = 50$$

$$\text{standard deviation for 100 tosses: } \sigma = \sqrt{np(1-p)} = \sqrt{100(.5)(.5)} = 5$$

$$\text{mean for 10,000 tosses: } \mu = np = 10000(.5) = 5,000$$

$$\text{standard deviation for 10,000 tosses: } \sigma = \sqrt{np(1-p)} = \sqrt{10,000(.5)(.5)} = 50$$

- Additional simulation: RANDINT(1,6,1)

6,6,1,4,3,5,1,3,6,2

5,6,2,3,1,6,1,1,4,6

6,2,2,1,1,5,1,3,2,6

1,6,4,2,6,5,2,2,6,6

1,1,5,6,4,2,1,6,2,3

1,2,6,3,4,4,1,1,1,5

5,6,3,1,3,6,5,4,4,6

5,5,4,3,2,4,6,1,3,3

2,5,6,3,3,2,4,4,5,5

3,6,4,3,3,5,6,2,5,3

mean from bullet 4 = 3.5

mean from simulation = $\frac{358}{100} = 3.58$

• close means only difference would be the .08