

1. Find the mean, variance and standard deviation for each of the values of n and p when the conditions for the binomial distribution are met.

a. $n = 100, p = 0.75$
 b. $n = 300, p = 0.3$
 c. $n = 20, p = 0.5$

d. $n = 50, p = \frac{2}{5}$
 e. $n = 36, p = \frac{1}{6}$

d) $\mu = (50)(\frac{2}{5}) = 20$
 $\sigma^2 = (50)(\frac{2}{5})(\frac{3}{5}) = 12$
 $\sigma = \sqrt{12} = 3.46$
 e) $\mu = (36)(\frac{1}{6}) = 6$
 $\sigma^2 = (36)(\frac{1}{6})(\frac{5}{6}) = 5$
 $\sigma = \sqrt{5} = 2.24$

a) $\mu = (100)(.75) = 75$
 $\sigma^2 = (100)(.75)(.25) = 18.75$
 $\sigma = \sqrt{18.75} = 4.33$
 b) $\mu = (300)(.3) = 90$
 $\sigma^2 = (300)(.3)(.7) = 63$
 $\sigma = \sqrt{63} = 7.94$
 c) $\mu = (20)(.5) = 10$
 $\sigma^2 = (20)(.5)(.5) = 5$
 $\sigma = \sqrt{5} = 2.24$

2. **Restaurant Smoking** In a restaurant, a study found that 42% of all patrons smoked. If the seating capacity of the restaurant is 80 people, find the mean, variance, and standard deviation of the number of smokers. About how many seats should be available for smoking customers?

$\mu = (80)(.42) = 33.6$
 $\sigma^2 = (80)(.42)(.58) = 19.49$
 $\sigma = \sqrt{19.49} = 4.41$
≈ 34 seats

3. **Federal Government Employee E-mail Use** It has been reported that 83% of federal government employees use e-mail. If a sample of 200 federal government employees is selected, find the mean, variance, and standard deviation of the number who use e-mail.

Source: USA TODAY

$\mu = (200)(.83) = 166$
 $\sigma^2 = (200)(.83)(.17) = 28.22$
 $\sigma = \sqrt{28.22} = 5.31$

4. **Social Security Recipients** A study found that 1% of Social Security recipients are too young to vote. If 800 Social Security recipients are randomly selected, find the mean, variance, and standard deviation of the number of recipients who are too young to vote.

Source: Harper's Index

$\mu = (800)(.01) = 8$
 $\sigma^2 = (800)(.01)(.99) = 7.92$
 $\sigma = \sqrt{7.92} = 2.81$

5. **Defective Calculators** If 3% of calculators are defective, find the mean, variance, and standard deviation of a lot of 300 calculators.

$\mu = (300)(.03) = 9$
 $\sigma^2 = (300)(.03)(.97) = 8.73$
 $\sigma = \sqrt{8.73} = 2.95$

6. **Watching Fireworks** A survey found that 21% of Americans watch fireworks on television on July 4. Find the mean, variance, and standard deviation of the number of individuals who watch fireworks on television on July 4 if a random sample of 1000 Americans is selected.

Source: USA Snapshot, USA TODAY

$\mu = (1000)(.21) = 210$
 $\sigma^2 = (1000)(.21)(.79) = 165.9$
 $\sigma = \sqrt{165.9} = 12.88$

7. Find the mean, variance, and standard deviation for the number of heads when 20 coins are tossed.

$\mu = (20)(.5) = 10$
 $\sigma^2 = (20)(.5)(.5) = 5$
 $\sigma = \sqrt{5} = 2.24$