Lesson 6.3.2

6-92. a. Geometric setting, $p = 0.60$; $P(X = 3) = 0.096$

b. Binomial setting, $n = 8, p = 0.60$; $P(X = 5) = 0.2787$

c. Geometric setting, $p = 0.60$; $P(X > 4) = 0.0256$

d. Binomial setting, $n = 12, p = 0.60$; $P(5 \le X \le 8) = 0.7174$

6-93. a. Normal setting, $\mu = 8$ ft, $\sigma = 0.003$ ft, $P(X < 7.995) = 0.0478$

b. Binomial setting, $n = 120, p = 0.0478$; $P(X > 5) = 0.5139$

c. Geometric setting, $p = 0.0478$; $P(X \le 4) = 0.1778$

d. Normal setting, $\mu = 8$, $\sigma = 0.003$; $P(X > 8.002) = 0.2525$

e. Normal setting, $\mu = 16$, $\sigma = \sqrt{0.003^2 + 0.003^2}$; $P(X > 16.01) = 0.0092$

6-94. a. Geometric setting, $p = 0.031$. Expected value = $\frac{1}{0.031}$ = 32.26 walleyes.

b. Binomial setting, $n = 80, p = 0.031$. Expected value = 2.48 fish, standard deviation = 1.55 fish.

c. No. We only expect 2.48 “yes” results. This needs to be at least 10.

d. Binomial setting, $n = 80, p = 0.031$; $P(X = 4) = 0.1334$

e. Binomial setting, $n = 80, p = 0.031$; $P(X > 5) = 0.0381$

f. Binomial setting, $n = 80, p = 0.031$; $P(X \le 2) = 0.5470$

6-95. a. $\frac{1}{6}$

b. Binomial setting, $n = 10, p = \frac{1}{6}$; $P(X = 4) = 0.0543$

c. Binomial setting, $n = 20, p = \frac{1}{6}$; $P(4 \le X \le 8) = 0.4306$

d. Binomial setting, $n = 10, p = \frac{1}{6}$; $P(X < 3) = 0.7752$

e. Geometric setting, $p = \frac{1}{6}$; $P(X > 4) = 0.4823$

f. The number of trials n is large enough to expect 50 “yes” results and 250 “no” results—both more than 10. Normal setting, $\mu = 50$, $\sigma = 6.455$. $P(X < 45) = 0.2193$ or 0.1971 with continuity correction.

6-96. a. (320)(0.1) = 32 defective items

b. $\sigma_X = \sqrt{320(0.1)(1-0.1)} \approx 5.3666$ items

c. 1 standard deviation below 32 items is 27 items. Binomial distribution, $n = 320$, $p = 010$; $P(X < 27) = P(X \le 26) = 0.1522$

d. Because students expect more than 10 defective and 10 non-defective items (32 and 288 respectively), the normal approximation applies. The empirical rule now says that 1 standard deviation below the mean should be roughly 16%.

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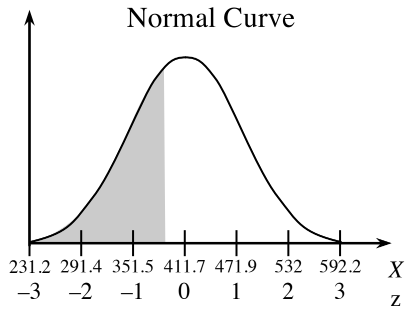
6-97. P(dog food and cash) = $\frac{2}{6} \cdot \frac{1}{2} = \frac{2}{12} = \frac{1}{6}$. See sample two-way table below.

	$P(\text{Cash}) = \frac{1}{2}$	$P(\text{Credit}) = \frac{1}{2}$
$P(\text{C}) = \frac{3}{6}$	$\text{C} \cap \text{Ca}$ $\frac{3}{12} = \frac{1}{4}$	$\text{C} \cap \text{Cr}$ $\frac{3}{12} = \frac{1}{4}$
$P(\text{D}) = \frac{2}{6}$	$\text{D} \cap \text{Ca}$ $\frac{2}{12} = \frac{1}{6}$	$\text{D} \cap \text{Cr}$ $\frac{2}{12} = \frac{1}{6}$
$P(\text{S}) = \frac{1}{6}$	$\text{S} \cap \text{Ca}$ $\frac{1}{12}$	$\text{S} \cap \text{Cr}$ $\frac{1}{12}$

6-98. 35[th] percentile:

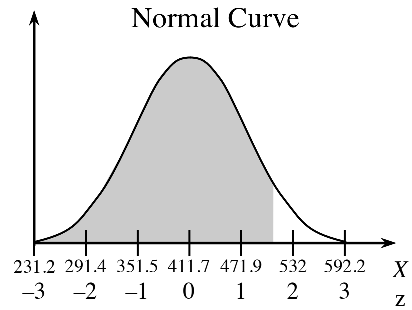


Using an inverse normal probability density function or table:

$z_1 = -0.38536$

$388.527 = \text{mean} + (-0.38536)\text{stDev}$

94[th] percentile:



Using an inverse normal probability density function or table:

$z_2 = 1.55487$

$505.251 = \text{mean} + (1.55487)\text{stDev}$

Solving the system of equations gives: mean = 411.71 lbs, sd = 60.16 lbs

6-99. a. Observational study. It would be wrong to tell a group of students that they could not eat breakfast before school.

b. Obtain a simple random sample of students and ask them what score they received on their last test and whether or not they ate breakfast that day.

c. Example: The nutritional value of the breakfast the students ate could affect the outcome.

6-100. (a) 0, (b) 0.9, (c) 0.7, (d) –0.7. The correlation coefficient itself is only useful when the form of the graph is linear; graphs (a) and (d) in the plots below both have stronger associations than r would imply, they are just not linear in form!

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