

Use the following sample data for the next three questions. A study by Medtronic, a manufacturer of a cardiac resynchronization device, on 813 patients with severe heart failure yielded the following data:

	Drugs with Electrical Cardiac Device	Drug Therapy Only
Hospitalized/ Died	159	224
Not Hospitalized/ Survived	250	180

409

404

1. Find the value of the absolute risk reduction for patients hospitalized or died in the drug therapy and the drugs with electrical cardiac device groups.

$$\left| \frac{159}{409} - \frac{224}{404} \right| \approx \underline{.166} \quad (1.5)$$

2. Find the odds ratio for patients hospitalized or died in the drug therapy group only compared to the drugs with electrical cardiac device group.

$$\frac{159/250}{224/180} = .511 \quad \text{or} \quad \frac{224/180}{159/250} = 1.96 \quad \text{depending on which way} \quad \underline{.511 \text{ or } 1.96} \quad (1.5)$$

3. Interpret the odds ratio in the previous problem in a complete sentence.

The ~~the~~ odds of being hospitalized/dying are 1.96 times greater for those in the drug therapy group than those who also got an electrical cardiac device. (1)

Use the following information for the next two questions. For 2003, the rate of residential recycling was reported as 130 per 1000 households.

4. Find the probability that a randomly selected household recycled.

$$\frac{130}{1000} = \underline{.130} \quad (1)$$

5. If two randomly selected households are selected, find the probability that neither of them recycled.

$$(1 - .130)^2 \approx \underline{.757} \quad (1.5)$$

Use the following information for the next 2 questions: A scientist knows that piñon jays breed in captivity and are released have the ability to find 70% of caches, or hidden sources of food, in the wilds. Assume the scientist releases 15 piñon jays.

6. Find the probability that exactly 10 of these birds will be able find caches. Use a formula and show your work.

$${}^{15}C_{10} (.7)^{10} (.3)^5 = 3003 * (.7)^{10} (.3)^5 \approx \underline{.206} \quad (1.5)$$

7. Find the probability that at least 12 (12 or more) of these birds will be able to find caches. Use a table or a calculator, but explain what you did.

$$P(X \geq 12) = 1 - P(X \leq 11) \approx \underline{.297} \quad (1.5)$$

$$= 1 - \text{binomcdf}(15, .7, 11)$$

Use the following probability distribution for the next four questions. Dental researchers found the following probability values for the dental habits of x , the age children begin brushing their teeth or gums.

x	$P(x)$	$x P(x)$	$x^2 P(x)$
0	.04	0	0
1	.19	.19	.19
2	.22	.44	.88
3	.24	.72	2.16
4	.31	1.24	4.96
		2.59	8.19

8. Find the mean of the probability distribution for the age at which children begin brushing their teeth or gums.

$$\mu = \sum x \cdot P(x) = 2.59 \text{ years}$$

$$\approx 2.6 \text{ years}$$

(2.59 years)

(1.5)

9. Find the standard deviation of the probability distribution for the age children begin brushing their teeth or gums.

$$\sigma = \sqrt{\sum x^2 P(x) - \mu^2} = \sqrt{8.19 - 2.59^2} = \sqrt{1.4819} \approx 1.2 \text{ years}$$

10. Find the probability of child three years or older beginning to brush their teeth or gums.

$$P(x \geq 3) = .24 + .31$$

$$= .55$$

(1.5)

11. Using probability values, determine if it is unusual for a child less than one year old to brush their teeth or gums.

$$P(x < 1) = P(x=0) = .04 \leftarrow \text{yes it is unusual since only 4\% of kids...}$$

(1)