

## Quick Questions 9 Discrete Probability Distributions

I. Place the letter of the appropriate definition or formula next to the concept or value it defines.

1. I    2. H or J    3. A    4. E    5. J or H    6. B    7. D    8. C    9. F    10. G

II. The sales manager of the XYZ Company made the following estimates of next year's sales.

Sales (x) (millions of \$)	P(x)	$x \cdot P(x)$	$x^2$	$x^2 \cdot P(x)$
4	0.2	.80	16	3.20
5	0.4	2.00	25	10.00
5	<u>0.4</u>	<u>2.00</u>	25	<u>10.00</u>
Totals	1.0	4.80		23.20

A. What are expected sales for next year?

$$E(x) = \sum [x \cdot P(x)] = \$4.80$$

B. Calculate the variance for this probability distribution.

$$V(x) = [\sum x^2 \cdot P(x)] - [E(x)]^2$$

$$\begin{aligned} V(x) &= \$23.20 - (\$4.80)^2 \\ &= \$23.20 - \$23.04 \\ &= \$.16 \end{aligned}$$

III. Five percent of the parts coming off an assembly line are defective.

A. Using the binomial formula or your statistics software, calculate the probability of exactly 2 out of 5 parts being defective.

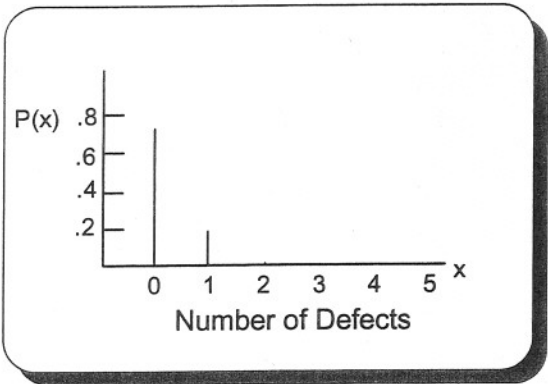
**Given**

p = .05  
q = 1 - p = .95  
n = 5  
x = 2

$$P(x) = \frac{n!}{x!(n-x)!} p^x q^{n-x}$$

$$\begin{aligned} P(2) &= \frac{5!}{2!(5-2)!} \cdot .05^2 \times .95^{5-2} \\ &= \frac{5 \times 4 \times 3 \times 2 \times 1}{2 \times 1 \times 3 \times 2 \times 1} \times .0025 \times .857375 \\ &= 10 \times .0021 = .021 = 2.1\% \end{aligned}$$

B. Determine the distribution of defective parts using a table in the back of this book. Graph the distribution.



Binomial Probability Distribution n = 5, p = .05, and q = 1 - p = .95	
# of sales (x)	P(x)
0	.774
1	.204
2	.021
3	.001
4	.000
5	<u>.000</u>
Total	1.000