

1. Given the probability distribution

x	1	2	3	4	5
p	0.15	0.25	0.20	0.10	0.30

(3 points)

find (a) \bar{x} , the **expected value** of x

(5 points)

(b) σ , the **standard deviation** of x

2. Let X be the number of successes in 7 independent trials, where the probability of success on each trial is $p = 0.65$

(6 points)

(a) Calculate $P(X = 3)$, showing the formula used.

(6 points)

(b) Complete the probability **distribution** table for X , using formula or a program.

(3 points)

(b) Find the **mean** of the distribution.

(4 points)

(c) Find the **standard deviation** of the distribution.

X	p

(10 points) 3. Z has the standard normal distribution. Find, from tables or program,

(a) $P(0 \leq Z \leq 1.45)$

(b) $P(Z \leq 1.45)$

(c) $P(Z \leq -1.45)$

(d) z_0 , so that $P(Z \leq z_0) = 6\%$

(e) z_0 , so that $P(|Z| \leq z_0) = 6\%$

(6 points) 4. The random variable Y is normally distributed, with mean 25 and standard deviation 8.

Find $P(Y \leq 31)$

(3 points.) 5. When is it reasonable to use the normal approximation to the binomial?

6. Let X be the number of successes in $n = 2700$ independent trials where the probability of success on each trial is $p = 0.25$. Find

(3 points) (a) the **mean** value of X

(4 points) (b) the **standard deviation** of X

(10 points) (c) $P(X = 680)$ by using the **normal approximation** to the binomial.

(10 points) (d) $P(653 \leq X \leq 762)$ by using the **normal approximation** to the binomial.

(3 points) 7. When is it reasonable to assume the sampling distribution of the mean is normal?

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(10 points) 8. The diameters of 256 bolts in a sample are measured. If the **population mean** is 0.600 cm with a **population standard deviation** of 0.020 cm, find the probability that the **sample mean** is greater than 0.602 cm.

(7 points) 9. If the **sample mean** is 30 for a sample of size 320, and the population standard deviation is 5.00, find the 90% **confidence interval** for the population mean. Give the endpoints accurate to three or more decimal places.

(7 points) 10. Using a sample of size n , the endpoints of a confidence interval for the population mean are given by $\bar{x} \pm 1.88(r/\sqrt{n})$.

(a) What is the value of α ?

(b) What is the **confidence level**?

(100 points, total.)