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NPTEL (<https://swayam.gov.in/explorer?ncCode=NPTEL>) » Data Science For Engineers (course)



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## Course outline

How does an NPTEL  
online course work? ()

Setup Guide ()

Pre Course Material ()

# Week 3: Assignment 3

The due date for submitting this assignment has passed.

**Due on 2023-08-16, 23:59 IST.**

**As per our records you have not submitted this assignment.**

A six sided die is marked '1' on one face, '2' on two of its faces, and '3' on the remaining three faces. The die is thrown twice. Let  $X$  denotes the total score in two throws.

Based on the above information, answer questions (1), (2).

- 1) Find the value of  $P(X > 2.5 | X < 5)$ . (Enter the answer correct to 2 decimal places).

No, the answer is incorrect.

### Week 0 ()

### Week 1 ()

### Week 2 ()

### Week 3 ()

- ☐ Statistical Modelling (unit? unit=47&lesson=48)
- ☐ Random Variables and Probability Mass/Density Functions (unit? unit=47&lesson=49)
- ☐ Sample Statistics (unit? unit=47&lesson=50)
- ☐ Hypotheses Testing (unit? unit=47&lesson=51)
- ☐ FAQ (unit? unit=47&lesson=52)
- ☐ Practice: Week 3: Assignment 3 (Non Graded) (assessment? name=143)
- ☐ Quiz: Week 3: Assignment 3 (assessment? name=165)
- ☐ Week 3 Feedback Form : Data Science For

Score: 0

Accepted Answers:

(Type: Range) 0.80,0.86

1 point

2) Find the expected value of  $X$ .

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 4

1 point

3) Suppose  $X \sim \text{Normal}(\mu, 4)$ . For  $n = 20$  iid samples of  $X$ , the observed sample mean is 5.2. What conclusion would a  $z$ -test reach if the null hypothesis assumes  $\mu = 5$  (against an alternative hypothesis  $\mu \neq 5$ ) at a significance level of  $\alpha = 0.05$ ? **1 point**

Use  $F_z^{-1}(0.025) = -1.9599$

☐

Accept  $H_0$

☐

Reject  $H_0$

No, the answer is incorrect.

Score: 0

Accepted Answers:

Accept  $H_0$

4) A pharmaceutical company is testing a new drug. The probability that a patient experiencing a side effect from this drug is 0.10. If the drug is given to 5 patients, what is the probability that more than 1 patient will experience the side effect? (Enter the answer correct to 2 decimal places.)

No, the answer is incorrect.

Engineers (unit?  
unit=47&lesson=155)

☐ Week 3: Solution (unit?  
unit=47&lesson=169)

**Week 4 ()**

**Week 5 ()**

**Week 6 ()**

**Week 7 ()**

**Week 8 ()**

**Text Transcripts ()**

**Download Videos ()**

**Books ()**

**Problem Solving  
Session - July 2023 ()**

Score: 0

Accepted Answers:

(Type: Range) 0.05,0.11

**1 point**

5) Suppose  $X \sim \text{Normal}(\mu, 9)$ . For  $n = 100$  iid samples of  $X$ , the observed sample mean is 11.8. What conclusion would a  $z$ -test reach if the null hypothesis assumes  $\mu = 10.5$  (against an alternative hypothesis  $\mu \neq 10.5$ )? **1 point**

☐

Accept  $H_0$  at a significance level of 0.10.

☐

Reject  $H_0$  at a significance level of 0.10.

☐

Accept  $H_0$  at a significance level of 0.05.

☐

Reject  $H_0$  at a significance level of 0.05.

No, the answer is incorrect.

Score: 0

Accepted Answers:

Reject  $H_0$  at a significance level of 0.10.

Reject  $H_0$  at a significance level of 0.05.

6) Let  $X$  and  $Y$  be two independent random variables with  $\text{Var}(X) = 9$  and  $\text{Var}(Y) = 3$ , find  $\text{Var}(4X - 2Y + 6)$ . **1 point**

☐

100

☐

140

☐

156

☐

None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

156

7) The correlation coefficient of two random variable  $X$  and  $Y$  is  $-14$ , their variance is given by 3 and 5. Compute  $\text{Cov}(X, Y)$ . **1 point**

- ☐ -0.854
- ☐ 0.561
- ☐ -0.968
- ☐ None of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
-0.968

8) A sample of  $N$  observations are independently drawn from a normal distribution. The sample variance follows

**1 point**

- ☐ Normal distribution
- ☐ Chi-square with  $N$  degrees of freedom
- ☐ Chi-square with  $N - 1$  degrees of freedom
- ☐  $t$ -distribution with  $N - 1$  degrees of freedom

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*Chi-square with  $N - 1$  degrees of freedom*

9) A car manufacturer purchases car batteries from two different suppliers. Supplier  $X$  provides 55% of the batteries and supplier  $Y$  provides the rest. 5% of all batteries from supplier  $X$  are defective and 4% of all batteries from supplier  $Y$  are defective. You select a battery from the bulk and you found it to be defective. What is the probability that it is from Supplier  $X$ ? **1 point**

- ☐ 0.0455
- ☐ 0.455
- ☐ 0.0275
- ☐ 0.018

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.0275

10) Find the  $t$ -statistic for the sample data, given that the population mean of the distribution is 8.

**1 point**

5	2	8	9	4	6	7	2	4	6
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- ☐ -3.155
- ☐ 8.33
- ☐ -2.99
- ☐ None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

-3.155