

Day Mathematics Final

Winter 2022: Wednesday

201-BZS-05 (Sec. 0000)

Examiner: S. Shahabi.

Student's Full Name:

- Print your name and student ID number
- All questions are to be answered directly in the space provided. Use the back of the booklet for extra space for your answer, use the back of the booklet.
- No book, notes, graphing/programmable calculator, or the Sharp EL-531XG calculator during the examination.
- A Formula Sheet and the relevant Statistics Tables are provided.
- You must show all your work and justify your answers.
- This examination booklet, all the Statistics Tables, and the Formula Sheet are to be returned to the invigilator at the end of the examination.

With Solutions

THIS EXAMINATION
(INCLUDES SOLUTIONS)

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2. [5

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3. [5 pts.]
one of the
function

$$E_i = \{ \omega \mid X_i(\omega) = 1 \}$$
$$1 \leq i \leq n$$

$$P(E_i)$$

$$P(E_i \cap E_j)$$

$$P(E_i \cap E_j \cap E_k)$$

$$P(\text{system works})$$

4. [5 pts.]
Give the

• the

• this

• We

5. [8 pts.]

$f(t) = \frac{1}{12}$
least 4 o.
longer th

$$X =$$

We

where

$$P = \int_{12}^{+\infty}$$

$$= \frac{1}{e^{1.2}} \approx 0.3$$

6. A pair of

(a) [3 p
prob. dis

$$P(\text{sum})$$

$$f(n) =$$

(b) [5 p

$$\sum_n f(n)$$

$$= \frac{1}{18^2}$$

$$= \frac{1}{18^2}$$

7. [8 pts.] A n
a mean break
found to hav
sample supp

$$H_0: \mu =$$

$$\alpha = 0.01$$

$$z_0 = \frac{\bar{X} - \mu}{\sigma / \sqrt{n}}$$

Since



-2.575

Conclu

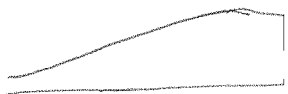
8. [8 pts.] The

regime:

Can we conc.
 $\alpha = 0.05$.

$$H_0: \mu_B - \mu_A$$

$$t_0 = \frac{\bar{d} - \mu_d}{s_d / \sqrt{n}}$$



Cond

t

t

c

11. [8 pts.] The
with mean
probability:

$$\alpha <$$

$$z_{\alpha}$$

12. [8 pts.] A v
machine is o
a Test of Hy

H_0 : The

(H_0 :

$$t_0 = \frac{\bar{X}_0}{S}$$

$$t_{\alpha/2} =$$

(d.f. = 24)

Conclus

13. [8 pts.] A pair of dice is rolled 10 times. The number of times a 10 is rolled is 8. Is the pair of dice fair? Test with $\alpha = 0.05$.

$\begin{cases} H_0: \text{both die} \\ H_a: \text{not as in} \end{cases}$

$$\chi_0^2 = \frac{(8-10)^2}{10} + \frac{(46-50)^2}{50}$$

$$= 2.28\bar{3}$$

Since $\chi_0^2 < \chi_{\alpha}^2$

We don't reject

14. [8 pts.] Using the data in the table, test the hypothesis that age and party are independent. Use $\alpha = 0.05$.

$\begin{cases} H_0: \text{age \& party are} \\ H_a: \text{not as in} \end{cases}$

$$\chi_0^2 = \sum \sum$$

$$\chi_{\alpha}^2 = 9.4$$

$$(2)(2) = 4$$