

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.
- 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)

1. [E
h
t]

• F

the

• A

in

let

are

• The

2. [5

Rmk

the

And

P(

=

=

=

(W

3. [5 pts.] A system composed of one of the components functions with probability p_i , e

E_i = the event i
 $1 \leq i \leq n$ component

$$P(E_i) = 1 - p_i$$

$$E_1 \cap E_2 \cap \dots \cap E_n$$

$$P(E_1 \cap \dots \cap E_n)$$

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

4. [5 pts.] The average number
 Give the probability that the c

• the average # =

• this is a P

• We want P

$$= 1 -$$

$$= 1 -$$

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

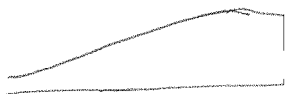
8. [8 pts.] The

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 fair? Test with $\alpha =$

$\left\{ \begin{array}{l} H_0: \text{both die} \\ H_a: \text{not as in} \end{array} \right.$

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

$$= 2.28\bar{3}$$

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

We don't reject

14. [8 pts.] Using the
Use $\alpha = 0.05$.

$\left\{ \begin{array}{l} H_0: \text{age \& party are} \\ H_a: \text{not as in} \end{array} \right.$

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

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

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