

THE UNIVERSITY OF SYDNEY
SCHOOL OF MATHEMATICS AND STATISTICS

Semester 1 MATH1015 (Biostatistics) - QUIZ 1 - PRACTICE PROBLEMS 2012

NOTE: Quiz 1 will be in your tutorial class in week 8 beginning April 30 (ie. 30 April-04 May). There will be 15 questions worth 15% towards your final mark. This is a closed book assessment. However, you may access the course website and R to answer any question.

Required knowledge: Material from week 1 to week 6/7 (both inclusive).

Time allowed: 40 mins.

Instructions: There are five possible answers to each question and only one of them is correct. Mark the answer to each question which you think is correct, in pen.

PRACTICE QUIZ 1

The following data represents the number of CDs owned by 24 students.

Use this data set to answer questions 1 to 4 below:

0 2 13 20 20 20 25 30 35 50 50 50
60 90 100 100 125 150 200 200 220 250 300 450

1. The inter quartile rage (IQR) of this data set is (1 dp):
(a) 55.0 (b) 22.5 (c) 175.5 (d) 152.5 (e) 104.4
2. The LT and UT for this data set are (2 dp):
(a) (0.00,0.12) (b) (-206.25, 403.75) (c) (0.00,450.00) (d) (22.50,235) (e) none of the above
3. The data set has:
(a) no outliers (b) one outlier (c) two outliers (d) 0, and 450 as out liers (e) none of the above
4. The data set is:
(a) left skewed (b) symmetric (c) right skewed (d) binomial (e) none of the above
5. The following data shows the gross annual income(x) (in \$1,000,000) of 13 large companies:

Income, x | 12.2 41.0 5.4 13.0 22.6 35.9 7.2 5.2 55.0 2.4 6.8 29.6 58.7

The mean and the standard deviation of these data are (respectively) (2dp):

- (a) (22.69,384.16) (b) (22.90,400) (c) (23.90,19.60) (d) (6.75,37.17) (e) (22.69,19.60)
6. A child is presented with three word-association problems. With each problem, three answers are suggested and only one is correct. If the child has no understanding of the words whatsoever, and answers each problem by guessing, the probability of getting at least one correct answer is:
(a) $19/27$ (b) $27/8$ (c) $8/27$ (d) 1 (e) none of these
7. The table below are the types and ages of four monkeys in a laboratory for a drug trial.

Monkey	Type	Age
1	baboon	6
2	baboon	8
3	Spider	6
4	Spider	6

Suppose that two monkeys are selected independently one after the other at random for a trial. The probability that the selected monkeys are of the same type is:

- (a) 1 (b) $1/2$ (c) $1/6$ (d) $1/3$ (e) $157/325$

PTO for Q8 to Q15

8. Suppose that an experiment consists of 7 equally likely outcomes $\{e_1, e_2, e_3, e_4, e_5, e_6, e_7\}$. Let $A = \{e_1, e_6\}$ and $B = \{e_2, e_3, e_6\}$ be two events. The conditional probability, $P(A|B)$ is:
- (a) 4/7 (b) 2/7 (c) 3/7 (d) 1/7 (e) 1/3
9. The following table shows the probability distribution of X , where $p_i = P(X = i)$.

i	1	2	3	4	Total
p_i	0.35	0.30	0.25	0.10	1.00

The value of $E(X^2)$ is (2 dp):

- (a) 2.10 (b) 4.41 (c) 5.40 (d) 0.99 (e) 30.00
10. It is known that 80% of a particular population have a systolic blood pressure (SBP) greater than 115. A random sample of 11 members of this population are selected. The probability that at most 5 of them will have SBP greater than 115 is:
- (a) 0.0097 (b) 0.0020 (c) 0.0117 (d) 0.0782 (e) 0.9883
11. It is estimated that 25% of birth at a particular private hospital are by caesarian section. Assume that 35 babies are born in a given week. The probability that exactly five of the babies are delivered by caesarian section is:
- (a) 0.0976 (b) 0.0566 (c) 0.3223 (d) 0.1303 (e) none of these
12. The distribution of heart rate for patients suffering from heart disease is approximately normally distributed with a mean of 97 BPM (beats per minute) and a standard deviation of 18 BPM. The proportion of such patients have heart rate below 124 is:
- (a) 1.5 (b) 0.8443 (c) 0.9334 (d) 0.9332 (e) -1.5
13. Suppose that two independent normal random variables X_1 and X_2 satisfy $X_1 \sim N(5, 2^2)$ and $X_2 \sim N(2, 6.71^2)$ ($6.71^2 = 45$). The $P(X_1 + X_2 > 10.5)$ is:
- (a) 0.3085 (b) 0.6915 (c) 0.5279 (d) 0.4271 (e) 0.9772
14. Suppose that $X \sim B(400, 0.6)$. The exact probability, $P(250 \leq X \leq 300)$ using the R is (4 dp):
- (a) 0.1418 (b) -0.0269 (c) 0.0000 (d) 0.1662 (e) -0.0245
15. The file `PracticeQuiz2012.txt` stored the weights of 160 rats (in g) in a laboratory. Read it using `x=read.table(file=url("http://www.maths.usyd.edu.au/math1015/r/PracticeQuiz2012.txt"))`. The five number summary for these weights are respectively:
- (a) 151.0 189.5 214.0 278.0 456.5 (b) 136.5 120.0 169.5 230.5 431.5 (c) 145.5 195.0 257.5 286.5 310.0
 (d) 125.0 201.5 310.5 335.0 420.5 (e) 135.0 197.5 230.5 256.0 324.0

Comments

If your score is:

- ≤ 6 - Study very hard. Re-do all tutorial & problem sheets.
- 7, 8 - OK, but need constant practice/revise the relevant material.
- 9, 10 - Good, but practice/revise more problems and understand.
- 11 – 13 - Very good. Keep revising. Do additional problems.
- ≥ 14 - Excellent. Maintain this level.