Homework 3 Answers

BSTA 550

Non-textbook problems

- #1 (a) $X \sim binomial(\sum_{i=1}^{m} n_i, p)$ (b) $E(X) = p\sum_{i=1}^{m} n_i$ (c) $Var(X) = p(1-p)\sum_{i=1}^{m} n_i$

Textbook problems

There are answers at the back of the book!! Selected answers (or hints) not provided at the end the book:

- Chapter 7
  - # 2: $X \in (0, \infty)$, continuous; $Y \in \{0, 1, 2, ...\}$, discrete
  - # 10: $X_j \in [0, \infty), j = 1, ..., 100$; $Y \in [0, \infty)$; both continuous
  - # 16: Y could be 0
  - # 18: Yes, a r.v. can be both. Give an example!
- Chapter 8
  - # 2: (a) $p(x) = \binom{7}{x}(.5)^7$ for $x = 0, 1, 2, ..., 7$
  - # 9: (a) $c = \frac{1}{8}$
  - # 10:

x	2	4	6	8
$p(x)$	3/10	1/2	3/20	1/20

- Chapter 15

  - # 18 (a) Bin(21,0.65) (b) 4.78

- Chapter 16
  - # 8 (a) 14.28 (b) code below (c) 1.03×10^{-6} (d) 10 questions: 91.43 minutes

```
1-pgeom(q = 18, prob = 0.07)
```

```
[1] 0.2518698
```

```
## OR
pgeom(q = 18, prob = 0.07, lower.tail = F)
```

```
[1] 0.2518698
```

- Chapter 17
  - # 6 (a) 400, 87.18 (b) No
  - # 12 (c) 0.8000

- Chapter 18
  - # 20 (a) (b) 0.6514 (c) 0.0598
  - # 24 (c) 0.8571
  - # 26 162,754.8

- Chapter 19
  - # 6: (c) 15.625 (d) 0.0486 (f) 0.0488
  - # 18: 100

- Chapter 20
  - # 2: (a) 0.0001 (b) Discrete since X has a finite number of possible values. Uniform since each outcome is equally likely. (c) X = randomly selected 4-digit ID#; $X = 0000, 0001, \ldots, 9999$ (d) 5000.5 (e) 8,333,333.25