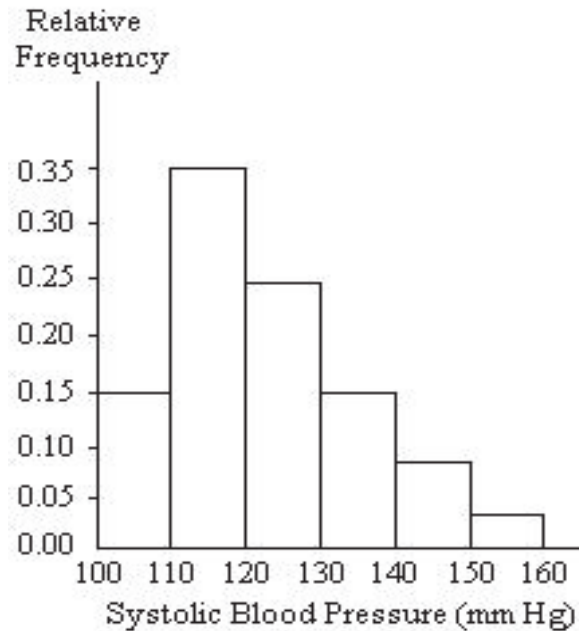


[1] (12 marks) Circle the best answer.

Use the following Histogram to answer parts (i) and (iii)

A nurse measured the blood pressure of each person who visited her clinic. Following is a relative-frequency histogram for the systolic blood pressure readings for those people aged between 25 and 40. Use the histogram to answer the question. The blood pressure readings were given to the nearest whole number.



(i) Approximately what percentage of the people aged 25-40 had a systolic blood pressure reading less than 120?

- A) 15% B) 75% C) 50% D) 35% E) 25%

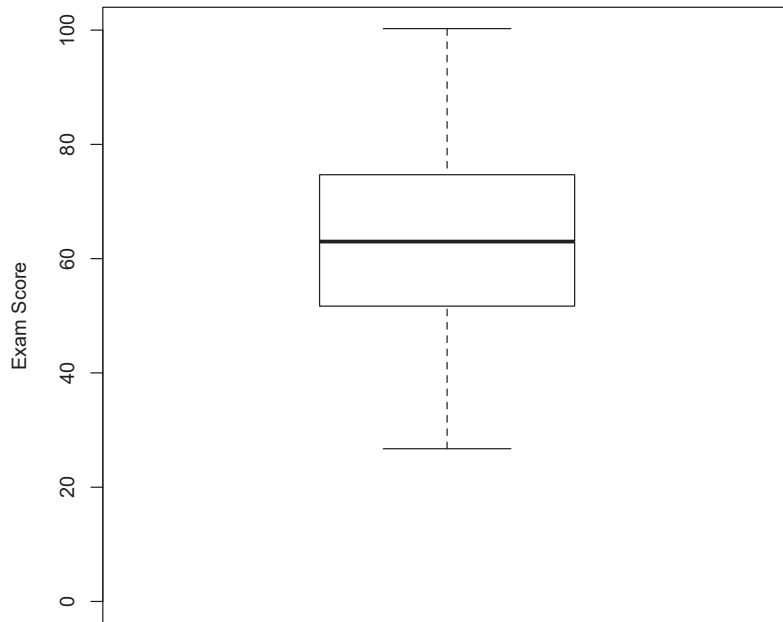
(ii) Given that 200 people were aged between 25 and 40, approximately how many had a systolic blood pressure reading less than 130?

- A) 70 B) 25 C) 100 D) 50 E) 150

(iii) Which of the following is true for systolic Blood Pressure

- A) Mean and Median are same because the histogram is symmetric
B) Mean is greater than median because histogram is left-skewed
C) Mean is greater than median because histogram is right-skewed
D) Median is greater than mean because histogram is left-skewed
E) Median is greater than mean because histogram is right-skewed

The exam scores for all students taking an introductory Statistics course are used to construct the following box plot.



(iv) Based on this box plot, the interquartile range is closest to

- A) 10 B) 25 C) 50 D) 80 E) 75

(v) If 5 points were added to each score, then

- A) the third quartile would increase by 5 points.
B) the median score would increase by 5 points.
C) the interquartile range would remain unchanged.
D) Only A) and B) are correct
E) A), B) and C) all are correct.

(vi) If 5 points were added to each score, then standard deviation of the new scores would

- A) be increased by 5.
B) be increased by 25.
C) remain unchanged.
D) be decreased by 5.
E) be decreased by 25.

[2] (7 marks)

(a) If the sample space $S = A \cup B$ and if $P(A) = 0.7$ and $P(B) = 0.6$

i. (3 marks) Find $P(A \cap B)$

ii. (2 marks) Are A and B independent? Why or why not?

(b) (2 marks) This is not related to Part (a). Draw a Venn Diagram involving sets A , B , and C where A and B are mutually exclusive, B and C are disjoint and $A \cap C \neq \emptyset$

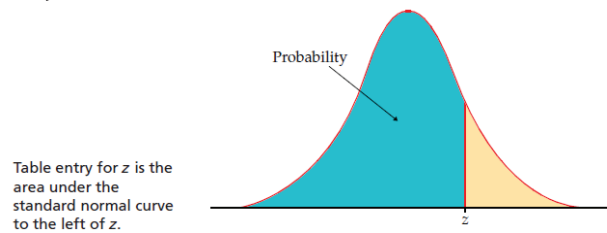
[3] (7 marks) Let X denote the distance (m) that an animal moves from its birth site to the first territorial vacancy it encounters. Suppose that banner-tailed kangaroo rats, X has an exponential distribution with parameter $\lambda=0.013$

(a) (3 marks) What is the probability that the distance is between 100m and 220m

(b) (3 marks) What is the value of the median distance?

(c) (1 mark) In language that is clear and accurate, provide an interpretation of the probability expression $P(X < 150|X > 100) = 0.478$

- [4] (6 marks) Suppose that $X \sim N(6.3, 4)$. Using the section of the standard normal table below, calculate $P(|X - 5| > 2)$.



| TABLE A | | | | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Standard normal probabilities (continued) | | | | | | | | | | |
| z | .00 | .01 | .02 | .03 | .04 | .05 | .06 | .07 | .08 | .09 |
| 0.0 | .5000 | .5040 | .5080 | .5120 | .5160 | .5199 | .5239 | .5279 | .5319 | .5359 |
| 0.1 | .5398 | .5438 | .5478 | .5517 | .5557 | .5596 | .5636 | .5675 | .5714 | .5753 |
| 0.2 | .5793 | .5832 | .5871 | .5910 | .5948 | .5987 | .6026 | .6064 | .6103 | .6141 |
| 0.3 | .6179 | .6217 | .6255 | .6293 | .6331 | .6368 | .6406 | .6443 | .6480 | .6517 |
| 0.4 | .6554 | .6591 | .6628 | .6664 | .6700 | .6736 | .6772 | .6808 | .6844 | .6879 |
| 0.5 | .6915 | .6950 | .6985 | .7019 | .7054 | .7088 | .7123 | .7157 | .7190 | .7224 |
| 0.6 | .7257 | .7291 | .7324 | .7357 | .7389 | .7422 | .7454 | .7486 | .7517 | .7549 |
| 0.7 | .7580 | .7611 | .7642 | .7673 | .7704 | .7734 | .7764 | .7794 | .7823 | .7852 |
| 0.8 | .7881 | .7910 | .7939 | .7967 | .7995 | .8023 | .8051 | .8078 | .8106 | .8133 |
| 0.9 | .8159 | .8186 | .8212 | .8238 | .8264 | .8289 | .8315 | .8340 | .8365 | .8389 |
| 1.0 | .8413 | .8438 | .8461 | .8485 | .8508 | .8531 | .8554 | .8577 | .8599 | .8621 |
| 1.1 | .8643 | .8665 | .8686 | .8708 | .8729 | .8749 | .8770 | .8790 | .8810 | .8830 |
| 1.2 | .8849 | .8869 | .8888 | .8907 | .8925 | .8944 | .8962 | .8980 | .8997 | .9015 |
| 1.3 | .9032 | .9049 | .9066 | .9082 | .9099 | .9115 | .9131 | .9147 | .9162 | .9177 |
| 1.4 | .9192 | .9207 | .9222 | .9236 | .9251 | .9265 | .9279 | .9292 | .9306 | .9319 |
| 1.5 | .9332 | .9345 | .9357 | .9370 | .9382 | .9394 | .9406 | .9418 | .9429 | .9441 |
| 1.6 | .9452 | .9463 | .9474 | .9484 | .9495 | .9505 | .9515 | .9525 | .9535 | .9545 |
| 1.7 | .9554 | .9564 | .9573 | .9582 | .9591 | .9599 | .9608 | .9616 | .9625 | .9633 |
| 1.8 | .9641 | .9649 | .9656 | .9664 | .9671 | .9678 | .9686 | .9693 | .9699 | .9706 |
| 1.9 | .9713 | .9719 | .9726 | .9732 | .9738 | .9744 | .9750 | .9756 | .9761 | .9767 |

[5] (8 marks) Suppose X_1 and X_2 are two independent random variables, where $X_1 \sim U(10, 25)$ and $X_2 \sim U(20, 30)$. Let $Y = \max(X_1, X_2)$. Showing all required steps, find the *pdf* of Y .