NAME: SOLUTIONS **SET:** _____

Quiz #2
Descriptive Statistics, Probability

1) The BCIT Student Association wishes to study student commute times. Two students are hired to find out how long it took students to get to campus today.

Length of commute (minutes)	Frequency
[0,15)	12
[15,30)	41
[30,45)	29
[45,60]	25
[60,75)	23
[75,90)	19
[90,105]	15

a) [3] Student A surveyed 164 students and obtained the data in the table on the right. Estimate the standard deviation of students' commute times based on this data.

Class marks: 7.5, 22.5, 37.5, 52.5, 67.5, 82.5, 97.5

From calculator: $s = 26.91$ min

b) [3] Student B surveyed 180 students. Unfortunately, Student B lost the file containing the data but had saved the summary statistics to the cloud. Student B's student commute times had a mean of 50 minutes and a standard deviation of 20 minutes. What can you say about the number of students in Student B's sample whose commutes were between 10 and 90 minutes?

10 & 90 are 2 standard deviations above & below $\bar{x} = 50$ min respectively

Chebyshev says at least $\frac{3}{4}$ of the data lies in this range. $\frac{3}{4} \cdot 180 = 135$. ⇒ at least 135 students

2) An online system randomly generates 8-character user passwords. Each character is one of 26 lowercase letters (a-z) and one of 10 digits (0-9).

a) [2] How many different passwords are there, if characters can be repeated?

36 characters, 8-character password

$\Rightarrow 36^8 = 2.821 \times 10^{12}$

b) [2] Suppose a password contains 8 *distinct* characters. What is the probability that this password contains only letters?

$$P(\text{only letters}) = \frac{\#\text{passwords w/ 8 distinct letters}}{\#\text{passwords w/ 8 distinct characters}}$$

$$= \frac{26P8}{36P8}$$

$$= 0.05163$$