

SOLUTION

BRONX COMMUNITY COLLEGE of the City University of New York

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MTH 23.5
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Exam 1 (FORM A)
Fall 2026

Directions: Write your answers in the provided space. To get full credit you **must** show all your work. Simplify your answers whenever possible. Be certain to indicate your final answer clearly. **No** electronic devices of any kind are allowed! (i.e. no calculators, no phones, no smart watches, etc). Using one during the exam will result in at least a zero on this test. Each question is worth 10 points.

1. Calculate and simplify.

a. $5 - 20$

a) $\boxed{-15}$

b. $7 - 5 \cdot 8$

b) $7 - 40 = \boxed{-33}$

c. $-10 \cdot 2 + 2 \cdot 5^2$

c) $-20 + 2 \cdot 25 = -20 + 50 = \boxed{30}$

2. a. Convert 1.045 to a percent. $\rightarrow \times 100 \rightarrow \boxed{104.5\%}$

b. Convert 5.16% to a decimal. $\rightarrow \div 100 \rightarrow \boxed{0.0516}$

c. Convert 15% to a fraction. $\rightarrow \frac{15}{100} = \boxed{\frac{3}{20}}$

3. Evaluate the following expressions at the given values.

a. $x + 10$ if $x = 2 \rightarrow (2) + 10 = \boxed{12}$

b. $-10 + 2x$ if $x = -10 \rightarrow -10 + 2(-10) = -10 - 20 = \boxed{-30}$

c. $2a - 3b$ if $a = 0, b = -1 \rightarrow 2(0) - 3(-1) = \boxed{3}$

d. $x^2 - y^2 - 2$ if $x = -2, y = -1$

$\rightarrow (-2)^2 - (-1)^2 - 2 = 4 - 1 - 2 = \boxed{1}$

4. Simplify the fraction

a. $\frac{3}{9} \rightarrow \begin{matrix} \div 3 \\ \div 3 \end{matrix} \rightarrow \boxed{\frac{1}{3}}$

b. $\frac{2}{3} \rightarrow \boxed{\frac{2}{3}}$

c. $\frac{24}{18} \rightarrow \begin{matrix} \div 6 \\ \div 6 \end{matrix} \rightarrow \boxed{\frac{4}{3}}$

5. A survey asked 100 BCC students two questions:

- how many hours of sleep they get in a typical day, and
- what their favorite cafeteria food item is.

So the two relevant variables for this survey are:

1) number of hours of sleep, and

2) favorite food (which we will assume can be one of the 4 options: coffee, salad, sandwich, muffin).

- ← 1) QUANT (a) and RATIO (b)
- ← 2) QUAL (a) and NOMINAL (b)
- For each of the two variables, is this variable qualitative or quantitative?
 - For each of the two variables, is it nominal, ordinal, interval, or ratio?

6. Consider the following scenario: A new drug is being tested by a drug company to determine its effectiveness in treating people with the flu. Of interest is the average (mean) length of time in days from the time the patient starts the treatment until the symptoms go away. The company selects 50 people from an NYU hospital to get the treatment. State what each of the following terms refers to in the scenario.

a. Population: People with flu

b. Sample: 50 people from NYU

c. Parameter: Average len time

d. Statistic: Average len time

e. Variable: length of time.

7. Consider the following data (already in order from smallest to biggest):

2, 3, 3, 6, 7, 10, 11

- a. Find the second quartile (i.e. median). $\rightarrow$ 6 (since position 4 is in middle of 7 items)
- b. Find the first quartile. $\rightarrow$ 3 (middle of 2, 3, 3)
- c. Find the third quartile.

- d. Find the range, and the interquartile range. $\rightarrow$

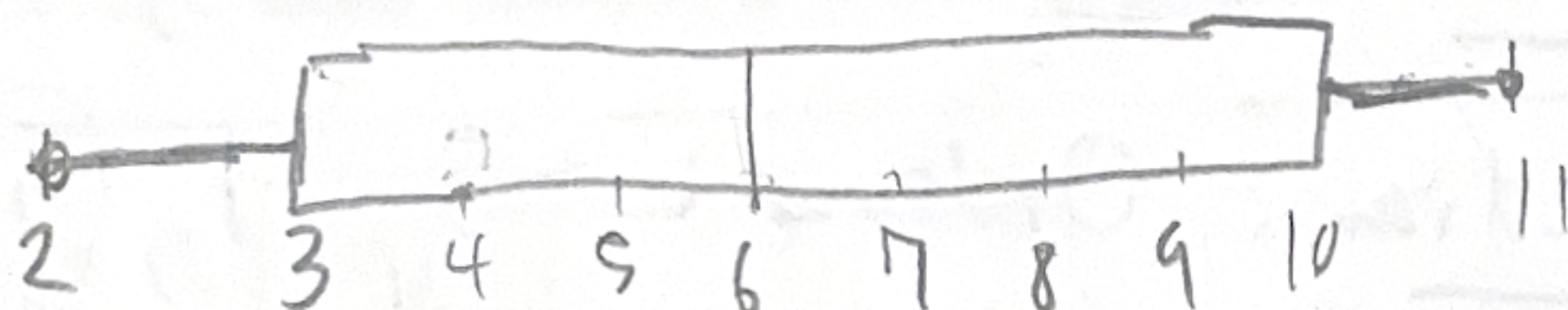
- e. Draw a box plot.

$$\text{range} = \text{Max} - \text{Min} = 11 - 2 = \boxed{9}$$

$$\text{IQR} = Q3 - Q1 = 10 - 3 = \boxed{7}$$

c) 10
Middle of
7 10 11

e)



8. Consider the following data of test scores:

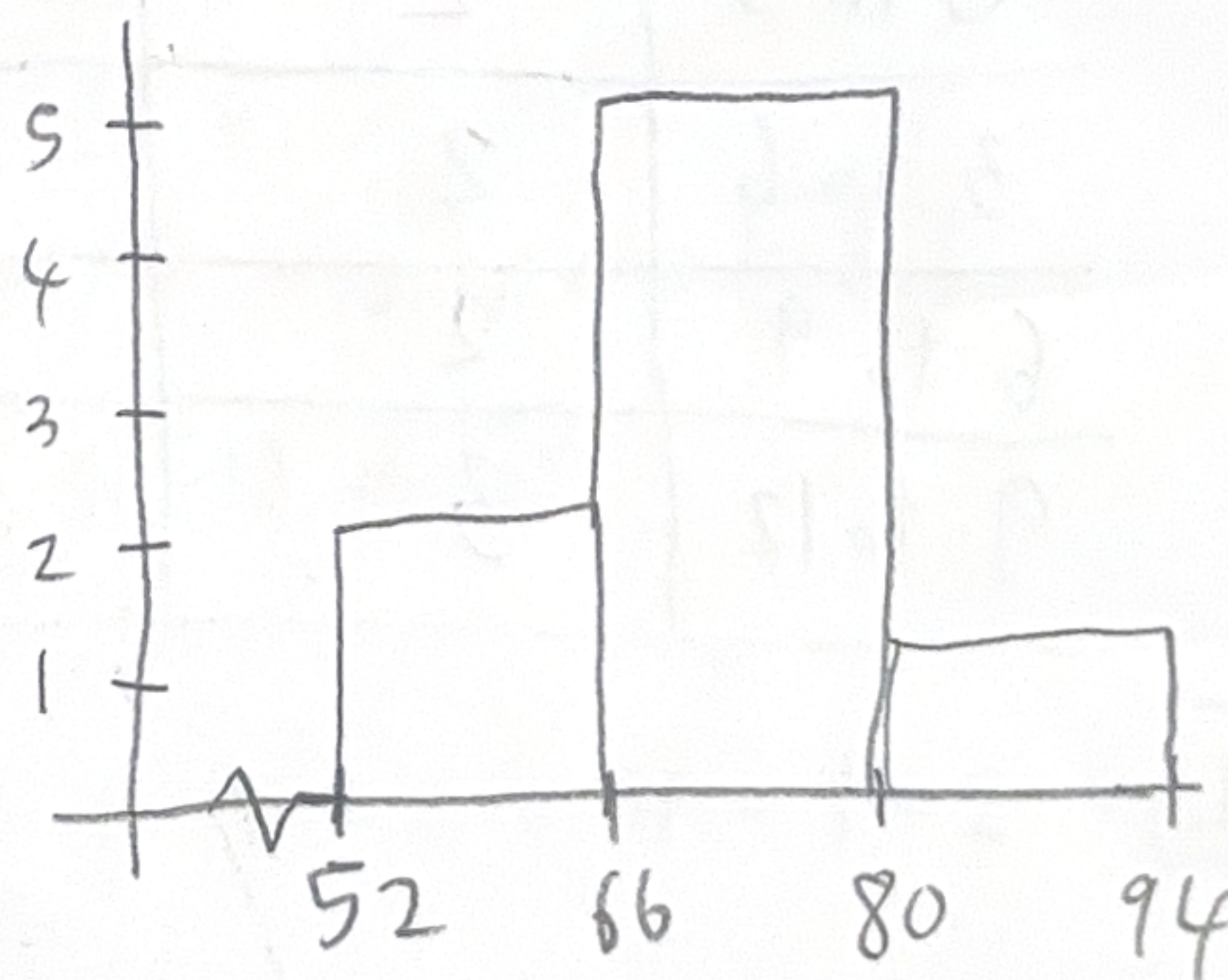
68, 77, 52, 94, 77, 60, 77, 70

Make a frequency table with 3 classes. Then make a histogram.

$$\text{width} = \frac{\text{Range}}{3} = \frac{94 - 52}{3} = \frac{42}{3} = 14$$

Class	Frequency
52 to 66	2
66 to 80	5
80 to 94	1

$\rightarrow$ Histogram:



9. Suppose we have the following data

$$X : x_1 = 8, x_2 = -5, x_3 = -1, x_4 = 8, x_5 = 5$$

Evaluate the following:

a. $\sum X \rightarrow \text{Sum} : 8 + (-5) + (-1) + 8 + 5 = \boxed{15}$

b. $\bar{X} \rightarrow \text{Mean} : \frac{\text{Sum}}{n} = \frac{15}{5} = \boxed{3}$

c. Median, Mode, and Range of X.

Range = Max - Min = $8 - (-5) = \boxed{13}$

Mode : $\boxed{8}$ (occurs twice, most often)

Median : Ordered : $-5, -1, \underset{\substack{\uparrow \\ \text{Middle}}}{5}, 8, 8 \Rightarrow \boxed{\text{Median } 5}$

10. Consider the following data, which gives the number of minutes students are late to a class:

0, 12, 10, 10, 9, 6, 7, 4, 1

Make a relative frequency table with 4 classes (do not make a histogram).

$\downarrow$
class width = $\frac{\text{range}}{4} = \frac{12-0}{4} = 3 \quad \left. \vphantom{\frac{12-0}{4}} \right\} n=9$

Class	Frequency	Relative Frequency
0 to 3	2	$\frac{2}{9}$
3 to 6	2	$\frac{2}{9}$
6 to 9	2	$\frac{2}{9}$
9 to 12	3	$\frac{3}{9} = \frac{1}{3}$