Year 9 Worksheet 9: Probability & Data Analysis

Question 1: Answer the following.

(1) A letter is randomly chosen from the word "MATHEMATICS." What is the probability that it is the letter "M"?

A. $\frac{1}{10}$ B. $\frac{2}{10}$ C. $\frac{1}{11}$ D. $\frac{2}{11}$ E. $\frac{1}{12}$

(2) What are the values of x and y in the two-way table?

A. x = 5, y = 12 B. x = 11, y = 9

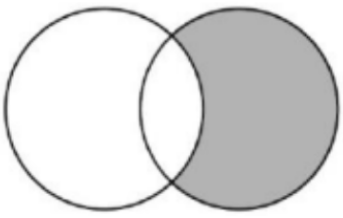
C. x = 8, y = 11 D. x = 8, y = 13

E. x = 9, y = 10

	A	Not A	Total
B		8	20
Not B	1	x	
Total	y		32

(3) Which shaded region represents A∩B?

A.



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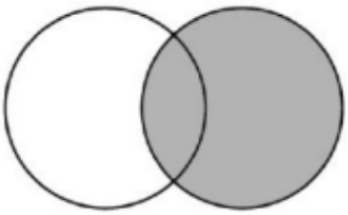

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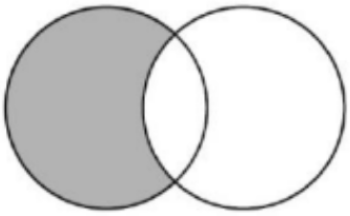

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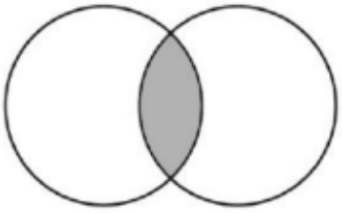

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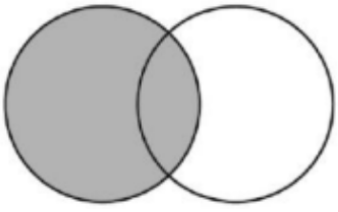
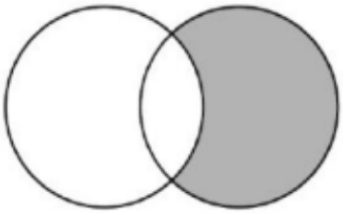


(4) Which shaded region represents AUB'?

A.



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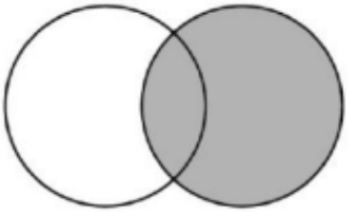

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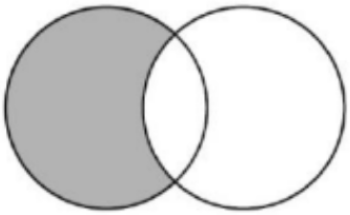

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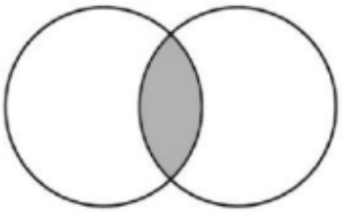

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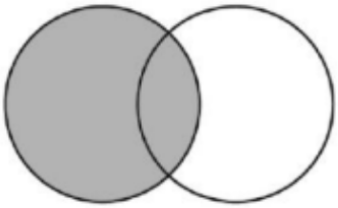


(5) A box contains 3 blue marbles and 2 yellow marbles. If two marbles are randomly selected without replacement, what is the probability of selecting one blue marble and one yellow marble?

A. $\frac{3}{10}$ B. $\frac{2}{5}$ C. $\frac{2}{10}$ D. $\frac{3}{4}$ E. $\frac{1}{20}$

(6) From rolling a standard 6-sided die, a student finds an experimental probability of 0.25 of rolling a 6. If the die is rolled 200 times, what is the expected number of 6s?

A. 40 B. 50 C. 30 D. 45 E. 25

(7) Sarah received scores of 85, 90, 98, and 92 on her last four mathematics quizzes. What score must she get on the fifth quiz to have an average (mean) score of 90?

A. 89 B. 90 C. 85 D. 92 E. 93

(8) The median of the data in this stem-and-leaf plot is:

Stem	Leaf			
5	2	3	4	
6	0	5	7	
7	1	4	4	8
8	2	5	6	

A. 74 B. 71 C. 78 D. 67 E. 65

(9) The mode of the data in this stem-and-leaf plot is:

A. 74 B. 71 C. 78 D. 67 E. 65

(10) The mean of the data in this stem-and-leaf plot is:

A. 70.5 B. 69.3 C. 71 D. 71.8 E. 68.7

Question 2: Answer the following.

1	Determine the probability of each of the following. a. What is the probability of selecting the letter 'S' from the phrase "SUCCESS TUTORING"? b. What is the probability of selecting a vowel from the phrase "SUCCESS TUTORING"? c. What is the probability of selecting a consonant other than 'S' from the phrase "Success Tutoring"?
2	In a school with 120 students, 80 students play soccer, 65 students play basketball, 40 students play both soccer and basketball, and 15 students do not play either sport. a) Construct a Venn diagram for the students who play soccer and/or basketball.

b) How many students play only basketball?

c) If one of the 120 students were randomly selected, find:

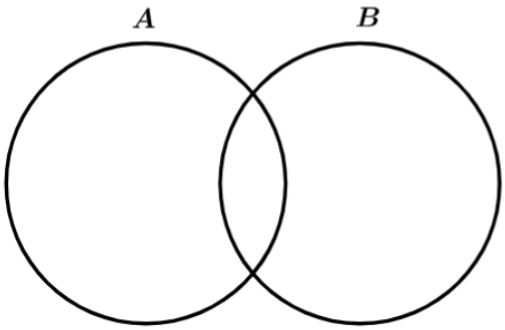
i) The probability that a student plays both soccer and basketball.

ii) The probability that a student does not play soccer.

iii) The probability that a student plays only soccer.

3 Complete the two-way table and convert it into a Venn diagram.

	A	Not A	Total
B		12	
Not B	32		42
Total	50		



Find the probabilities for the following.

a. P(not A)

b. P(A and B)

c. P(B only)

d. P(A or B)

4	Sarah is recording the temperature in her town for 15 days. The temperatures are as follows: 23, 24, 25, 25, 25, 26, 27, 28, 29, 30, 32, 32, 33, 33, 35, 38 Create a stem-and-leaf plot and find: a. Mean b. Median c. Mode d. Range

5	Emily has three coins, and she flips them at the same time. Each coin can show either heads (H) or tails (T). a. List all the possible combinations using a tree diagram b. Find the probability of getting at least two heads. c. Find the probability of getting exactly one tail in the three coin tosses. d. Find the probability of getting all tails in the three coin tosses.

6	Maria and James are competing in a video game tournament to win a prize. Their scores in each round are recorded over a 10-round period. Maria's scores: 80, 95, 87, 92, 78, 85, 88, 90, 96, 82, 81, 89, 93 James's scores: 88, 91, 79, 85, 92, 90, 94, 87, 93, 86, 90, 76, 82 a) Draw an ordered back-to-back stem-and-leaf plot for the data. b) For each player, find the: i) Median score ii) Mean score c) By comparing the two sets of data, state, with reasons, who you think should win the prize. d) Describe each player's data as approximately symmetrical or skewed.

7	A group of students is participating in a science fair, and their project completion times, in minutes, are recorded. The data for 30 students are as follows: 12,15,10,13,14,18,17,11,20,16,12,14,13,19,15,11,16,14,17,12,15, 13,18,14,10,16,19,13,15,17 a. Record the above data in a frequency table in class intervals of 3 minutes. Include a percentage frequency column. b. Construct a frequency histogram. c. Determine the: i. Number of students that completed their project in less than 16 minutes. ii. Percentage of students that completed their project between 16 and 19 minutes.

8	A group of students conducted a survey to record the time, in minutes, each student spends commuting to school. The data for 12 students are as follows: 15,20,18,12,22,25,14,19,16,23,17,21 a) List the data in order, from smallest to largest. b) Find the range. c) Find the: i) Median (Q2) ii) Lower quartile (Q1) iii) Upper quartile (Q3) iv) Interquartile range (IQR) d) Interpret the IQR.

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Answer Key

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A. $\frac{1}{10}$ B. $\frac{2}{10}$ C. $\frac{1}{11}$ D. $\frac{2}{11}$ E. $\frac{1}{12}$

Answer: D. 2/11

(2) What are the values of x and y in the two-way table?

A. x = 5, y = 12 B. x = 11, y = 9

C. x = 8, y = 11 D. x = 8, y = 13

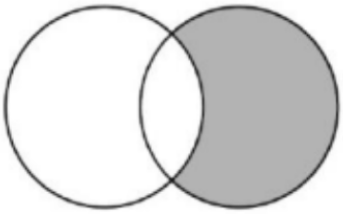
E. x = 9, y = 10

Answer: D. x = 8, y = 13

	A	Not A	Total
B		8	20
Not B	1	x	
Total	y		32

(3) Which shaded region represents A∩B?

A.



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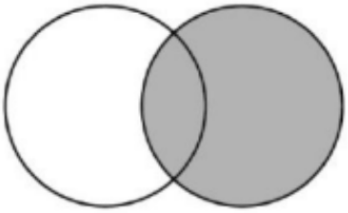

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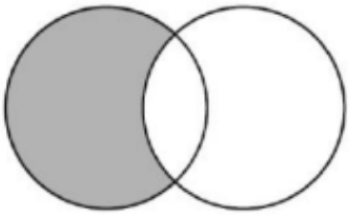

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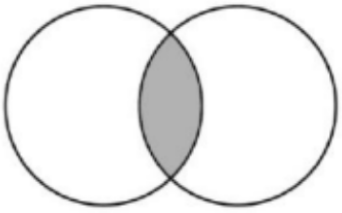

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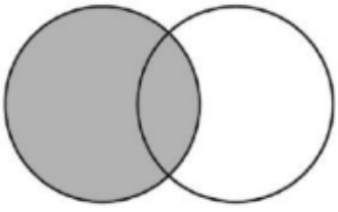
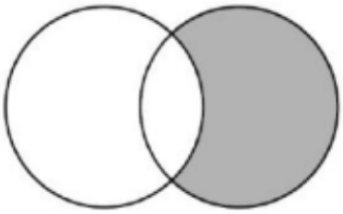


Answer: D

(4) Which shaded region represents AUB'?

A.



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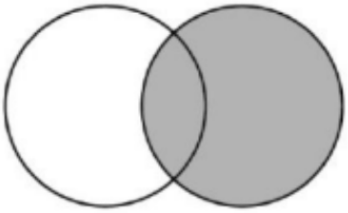

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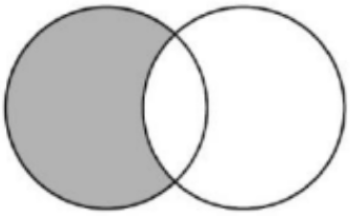

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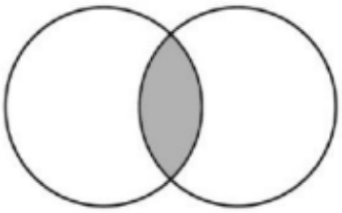
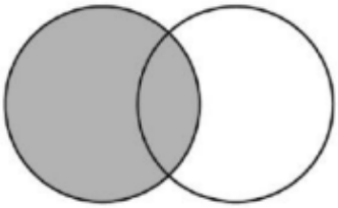


E.



Answer: E

(5) A box contains 3 blue marbles and 2 yellow marbles. If two marbles are randomly selected without replacement, what is the probability of selecting one blue marble and one yellow marble?

A. $\frac{3}{10}$ B. $\frac{2}{5}$ C. $\frac{2}{10}$ D. $\frac{3}{4}$ E. $\frac{1}{20}$

Answer: A. 3/10

(6) From rolling a standard 6-sided die, a student finds an experimental probability of 0.25 of rolling a 6. If the die is rolled 200 times, what is the expected number of 6s?

A. 40 B. 50 C. 30 D. 45 E. 25

Answer: B. 50

(7) Sarah received scores of 85, 90, 98, and 92 on her last four mathematics quizzes. What score must she get on the fifth quiz to have an average (mean) score of 90?

A. 89 B. 90 C. 85 D. 92 E. 93

Answer: C. 85

(8) The median of the data in this stem-and-leaf plot is:

Stem	Leaf			
5	2	3	4	
6	0	5	7	
7	1	4	4	8
8	2	5	6	

A. 74 B. 71 C. 78 D. 67 E. 65

Answer: B. 71

(9) The mode of the data in this stem-and-leaf plot is:

A. 74 B. 71 C. 78 D. 67 E. 65

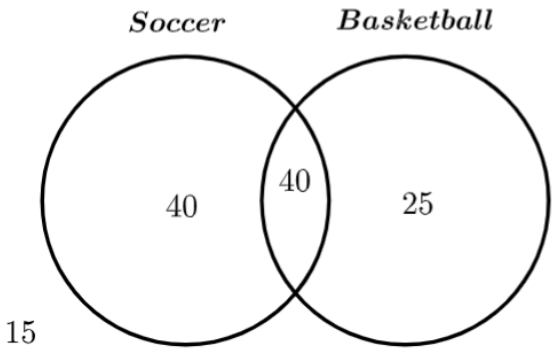
Answer: A. 74

(10) The mean of the data in this stem-and-leaf plot is:

A. 70.5 B. 69.3 C. 71 D. 71.8 E. 68.7

Answer: B. 69.3

Question 2: Answer the following.

1	Determine the probability of each of the following. a. What is the probability of selecting the letter 'S' from the phrase "SUCCESS TUTORING"? Occurrences of the letter 'U' = 3 Total letters in the phrase = 15 Probability = 3 / 15 = ⅕ b. What is the probability of selecting a vowel from the phrase "SUCCESS TUTORING"? Vowels in the phrase "Success Tutoring" are U, E, U, O, I. Total vowels = 5 Total letters in the phrase = 15 Probability = 5 / 15 = ⅓ c. What is the probability of selecting a consonant other than 'S' from the phrase "Success Tutoring"? Consonants in the phrase are C, C, T, T, R, N, G = 7 Total letters in the phrase excluding 'S' = 15 - 3 ('S's) = 12 Probability = 7 / 12
2	In a school with 120 students, 80 students play soccer, 65 students play basketball, 40 students play both soccer and basketball, and 15 students do not play either sport. a) Construct a Venn diagram for the students who play soccer and/or basketball. 

b) How many students play only basketball?

Students who play only basketball = 65 - 40
Students who play only basketball = 25

c) If one of the 120 students were randomly selected, find:

i) Probability that a student plays both soccer and basketball:

$$P(S \cap B) = \frac{\text{Students who play both sports}}{\text{Total students}} = \frac{40}{120} = \frac{1}{3}$$

ii) Probability that a student does not play soccer:

$$P(\text{Not Soccer}) = \frac{\text{Students who do not play soccer}}{\text{Total students}} = \frac{Total - Soccer}{Total} = \frac{120-80}{120} = \frac{40}{120} = \frac{1}{3}$$

iii) Probability that a student plays only soccer:

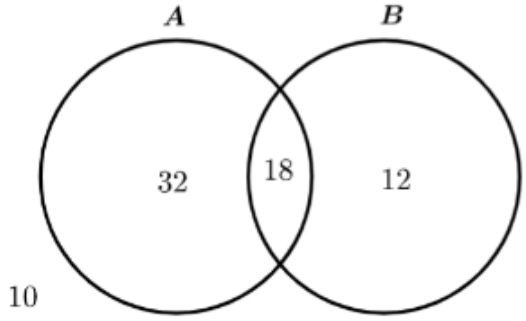
To find this, subtract the students who play both sports from the total number of soccer players:

$$P(\text{Only Soccer}) = \frac{\text{Students who play only soccer}}{\text{Total students}} = \frac{Soccer - (S \cap B)}{\text{Total students}} = \frac{80-40}{120} = \frac{40}{120} = \frac{1}{3}$$

3

Complete the two-way table and convert it into a Venn diagram.

	A	Not A	Total
B	18	12	30
Not B	32	10	42
Total	50	22	72



a. P(not A) = 22
b. P(A and B) = 18
c. P(B only) = 12
d. P(A or B) = 62

4

Sarah is recording the temperature in her town for 15 days. The temperatures are as follows:

23, 24, 25, 25, 25, 26, 27, 28, 29, 30, 32, 32, 33, 33, 35, 38

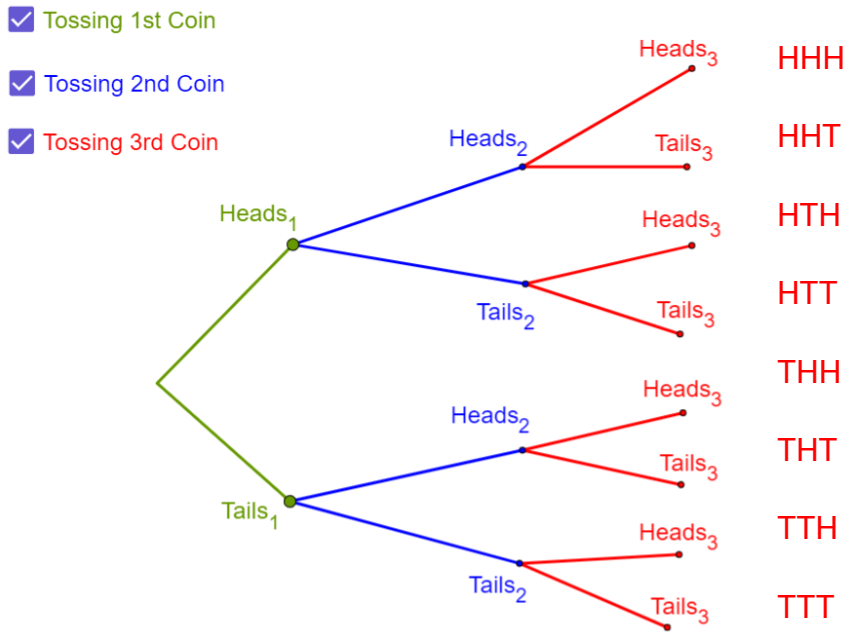
Create a stem-and-leaf plot and find:

Stem	Leaf
2	3 4 5 5 5 6 7 8 9
3	0 2 2 3 3 5 8

Range:	15
Count:	16
Sum:	465
Mean:	29.06
Median:	28.5
Mode:	25

5 Emily has three coins, and she flips them at the same time. Each coin can show either heads (H) or tails (T).

a. List all the possible combinations using a tree diagram



	b. Find the probability of getting at least two heads. Out of the eight possible outcomes, the ones with at least two heads are: • HHH • HHT • HTH • THH So, the probability is $\frac{4}{8} = \frac{1}{2}$. c. Find the probability of getting exactly one tail in the three coin tosses. Out of the eight possible outcomes, the ones with exactly one tail are: • HHT • HTH • THH So, the probability is $\frac{3}{8}$. d. Find the probability of getting all tails in the three coin tosses. There is only one outcome with all tails: TTT. So, the probability is $\frac{1}{8}$.
6	Maria and James are competing in a video game tournament to win a prize. Their scores in each round are recorded over a 10-round period. Maria's scores: 80, 95, 87, 92, 78, 85, 88, 90, 96, 82, 81, 89, 93 James's scores: 88, 91, 79, 85, 92, 90, 94, 87, 93, 86, 90, 76, 82

a) Draw an ordered back-to-back stem-and-leaf plot for the data.

James

Leaf
6 9
2 5 6 7 8
0 0 1 2 3 4

Maria

Stem	Leaf
7	8
8	0 1 2 5 7 8 9
9	0 2 3 5 6

b) For each player, find the:

Mean: 87.15
Median: 88

Mean: 87.38
Median: 88

c) By comparing the two sets of data, state, with reasons, who you think should win the prize.

Maria should win the prize since her average score is 87.38, James's score is 87.15.

d) Describe each player's data as approximately symmetrical or skewed.

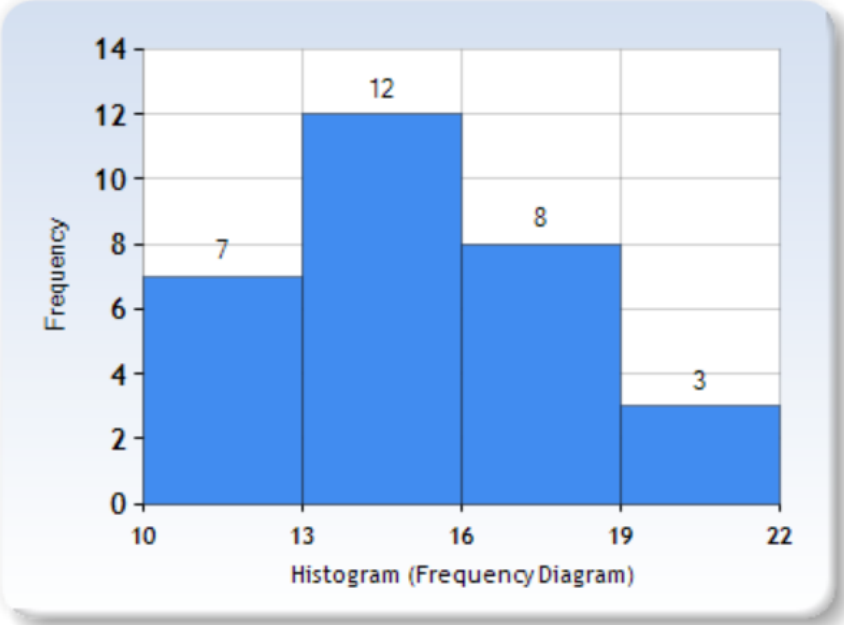
Both data are skewed.

7	A group of students is participating in a science fair, and their project completion times, in minutes, are recorded. The data for 30 students are as follows. Answer: a. Record the above data in a frequency table in class intervals of 3 minutes. Include a percentage frequency column.

Frequency Distribution Table

Class	*Count*	*Percentage*
10 - 12	7	23.3
13 - 15	12	40
16 - 18	8	26.7
19 - 21	3	10
Total	30	100

b. Construct a frequency histogram.



c. Determine the:
i. Number of students that completed their project in less than 15 minutes.

19 students

	ii. Percentage of students that completed their project between 16 and 18 minutes. Class interval 16-18 contributes to this: 8 students $\frac{8}{30} \times 100 \approx 26.67$ of students
8	A group of students conducted a survey to record the time, in minutes, each student spends commuting to school. The data for 12 students are as follows: 15,20,18,12,22,25,14,19,16,23,17,21 **a) List the data in order, from smallest to largest:** $12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25$ **b) Find the range:** $\text{Range} = 25 - 12 = 13$ c) Find the: First Quartile $Q_1 = 15.5$ Second Quartile $Q_2 = 18.5$ Third Quartile $Q_3 = 21.5$ Interquartile Range IQR = 6 d) Interpret the IQR: The IQR represents the middle 50% of the commuting times, indicating that half of the students have commuting times between 15.5 minutes and 20.5 minutes.