

PRACTICE SET 9: PROBABILITY, COUNTING, AND STATISTICS

1. A fair coin is flipped once. The probability of getting heads is:

- A. 0
- B. $\frac{1}{4}$
- C. $\frac{1}{3}$
- D. $\frac{1}{2}$

2. A fair die is rolled. The probability of rolling a 6 is:

- A. $\frac{1}{3}$
- B. $\frac{1}{6}$
- C. $\frac{1}{2}$
- D. $\frac{1}{5}$

3. The mean of $\{4, 8, 12, 16, 20\}$ is:

- A. 12
- B. 10
- C. 14
- D. 16

4. A bag contains 3 red and 7 blue marbles. The probability of drawing red is:

A. $7/10$

B. $3/7$

C. $3/10$

D. $1/3$

5. The median of $\{2, 5, 7, 9, 11\}$ is:

A. 5

B. 6

C. 9

D. 7

6. The mode of $\{2, 3, 3, 5, 7, 7, 7, 9\}$ is:

A. 7

B. 3

C. 5

D. 9

7. A card is drawn from a 52-card deck. The probability of drawing a heart is:

A. $1/2$

B. $1/13$

C. $1/4$

D. $1/3$

8. How many ways can 4 students be arranged in a row?

- A. 12
- B. 24
- C. 16
- D. 8

9. The range of $\{7, 12, 15, 18, 22\}$ is:

- A. 7
- B. 12
- C. 10
- D. 15

10. A spinner has 5 equal sections labeled 1–5. The probability of landing on 3 is:

- A. $\frac{1}{5}$
- B. $\frac{1}{3}$
- C. $\frac{2}{5}$
- D. $\frac{3}{5}$

11. The mean of $\{10, 20, 30, 40, 50\}$ is:

- A. 30
- B. 25
- C. 35
- D. 40

12. Two dice are rolled. The probability of rolling doubles is:

- A. $\frac{1}{12}$
- B. $\frac{1}{3}$
- C. $\frac{1}{6}$
- D. $\frac{1}{36}$

13. A class of 30 students has 18 who play an instrument. What percent play an instrument?

- A. 40%
- B. 50%
- C. 55%
- D. 60%

14. A bag has 4 red, 5 green, and 6 blue marbles. The probability of drawing green is:

- A. $\frac{4}{15}$
- B. $\frac{1}{3}$
- C. $\frac{6}{15}$
- D. $\frac{5}{10}$

15. The median of $\{6, 12, 18, 24\}$ is:

- A. 15
- B. 12
- C. 18
- D. 24

16. A standard deck has 52 cards. The probability of drawing a king is:

- A. $1/52$
- B. $1/26$
- C. $1/4$
- D. $1/13$

17. How many ways can 3 books be arranged on a shelf?

- A. 3
- B. 6
- C. 9
- D. 12

18. The mean of $\{5, 10, 15, 20\}$ is:

- A. 15
- B. 10
- C. 12.5
- D. 20

19. A coin is flipped twice. The probability of getting two tails is:

- A. $1/4$
- B. $1/2$
- C. $1/3$
- D. $2/3$

20. The mode of $\{1, 2, 3, 4, 5\}$ is:

- A. 1
- B. 3
- C. 5
- D. no mode

21. The range of $\{100, 120, 140, 160, 180\}$ is:

- A. 100
- B. 60
- C. 140
- D. 80

22. A jar has 8 red, 4 blue, and 8 green marbles. The probability of drawing blue is:

- A. $\frac{1}{4}$
- B. $\frac{1}{5}$
- C. $\frac{2}{5}$
- D. $\frac{3}{5}$

23. The median of $\{3, 6, 9, 12, 15\}$ is:

- A. 9
- B. 6
- C. 12
- D. 15

24. How many ways can 5 people be arranged in a row?

- A. 60
- B. 100
- C. 120
- D. 25

25. A fair die is rolled. The probability of rolling an even number is:

- A. $\frac{1}{3}$
- B. $\frac{2}{3}$
- C. $\frac{1}{4}$
- D. $\frac{1}{2}$

26. The mean of $\{1, 2, 3, 4, 5, 6\}$ is:

- A. 3.5
- B. 3
- C. 4
- D. 4.5

27. A coin is flipped 3 times. The probability of getting exactly 3 heads is:

- A. $\frac{1}{2}$
- B. $\frac{1}{4}$
- C. $\frac{1}{8}$
- D. $\frac{1}{16}$

28. The range of $\{5, 10, 20, 30, 40\}$ is:

- A. 20
- B. 35
- C. 45
- D. 50

29. A bag has 10 marbles: 2 red, 3 blue, 5 green. The probability of drawing green is:

- A. $2/10$
- B. $3/10$
- C. $4/10$
- D. $5/10$

30. The median of $\{2, 4, 6, 8, 10, 12\}$ is:

- A. 7
- B. 6
- C. 8
- D. 10

31. The mode of $\{4, 4, 5, 5, 5, 6, 7\}$ is:

- A. 4
- B. 5
- C. 6
- D. 7

32. How many 3-digit numbers can be formed using the digits 1, 2, 3, 4, 5 without repetition?

- A. 30
- B. 50
- C. 100
- D. 60

33. A spinner has 8 sections. The probability of landing on a specific one is:

- A. $\frac{1}{8}$
- B. $\frac{1}{4}$
- C. $\frac{1}{2}$
- D. $\frac{1}{6}$

34. The mean of $\{2, 4, 6, 8, 10\}$ is:

- A. 4
- B. 5
- C. 6
- D. 7

35. A card is drawn. The probability of drawing a red card is:

- A. $\frac{1}{13}$
- B. $\frac{1}{4}$
- C. $\frac{1}{26}$
- D. $\frac{1}{2}$

36. The median of $\{10, 20, 30, 40, 50, 60, 70\}$ is:

- A. 40
- B. 30
- C. 35
- D. 45

37. The range of $\{15, 18, 22, 25, 28\}$ is:

- A. 22
- B. 25
- C. 18
- D. 13

38. A coin is flipped once. The probability of tails is:

- A. $1/4$
- B. $1/2$
- C. $1/3$
- D. 1

39. A card is drawn. The probability of drawing a face card (J, Q, K) is:

- A. $1/13$
- B. $1/26$
- C. $3/13$
- D. $1/4$

40. The mean of $\{100, 200, 300, 400, 500\}$ is:

- A. 200
- B. 250
- C. 350
- D. 300

41. A fair die rolled twice. The probability both rolls are a 6 is:

- A. $1/36$
- B. $1/12$
- C. $1/6$
- D. $2/36$

42. How many ways can a president and vice president be chosen from 5 people?

- A. 10
- B. 15
- C. 20
- D. 25

43. The mode of $\{1, 2, 2, 3, 3, 3, 4\}$ is:

- A. 1
- B. 2
- C. 4
- D. 3

44. A class has 20 students with scores averaging 80. The total score is:

- A. 1,000
- B. 1,600
- C. 800
- D. 2,000

45. A bag has 3 black and 7 white balls. The probability of drawing black is:

- A. $\frac{3}{10}$
- B. $\frac{7}{10}$
- C. $\frac{3}{7}$
- D. $\frac{1}{3}$

46. The median of {5, 10, 15, 20, 25, 30} is:

- A. 15
- B. 18
- C. 20
- D. 17.5

47. A card is drawn. The probability of drawing a spade is:

- A. $\frac{1}{2}$
- B. $\frac{1}{4}$
- C. $\frac{1}{13}$
- D. $\frac{1}{3}$

48. The range of $\{4, 8, 12, 16, 20\}$ is:

- A. 12
- B. 20
- C. 16
- D. 24

49. A fair coin and a die are tossed. The probability of heads and a 3 is:

- A. $1/12$
- B. $1/6$
- C. $1/3$
- D. $1/2$

50. The mean of $\{9, 11, 13, 15, 17\}$ is:

- A. 11
- B. 12
- C. 14
- D. 13

PRACTICE SET 9: ANSWER KEY AND EXPLANATIONS

1. D — $1/2$. A fair coin has two equally likely outcomes — heads and tails — so the probability of heads is 1 favorable out of 2 total, or $1/2$. This is the most basic probability calculation.
2. B — $1/6$. A standard die has six equally likely faces, and only one face shows a 6. The probability is $1/6$, the standard single-face die probability.
3. A — 12. Adding the five values gives $4 + 8 + 12 + 16 + 20 = 60$, and dividing by 5 gives 12. The mean is always the sum divided by the count of values.
4. C — $3/10$. The bag contains $3 + 7 = 10$ marbles, and 3 are red. The probability is $3/10$.
5. D — 7. For an odd number of ordered values, the median is the single middle value — the third value in this five-element set, which is 7.
6. A — 7. The mode is the value appearing most often, and 7 appears three times while no other value appears more than once. Mode captures the most frequent observation.
7. C — $1/4$. A standard deck has 13 hearts out of 52 cards. The probability is $13/52 = 1/4$, since hearts represent one of four equal suits.
8. B — 24. The number of arrangements of 4 distinct objects is $4! = 4 \times 3 \times 2 \times 1 = 24$. Factorials count the number of orderings.
9. D — 15. The range is maximum minus minimum: $22 - 7 = 15$. Range measures the total spread of a data set.
10. A — $1/5$. With 5 equal sections, each has probability $1/5$ of being landed on.
11. A — 30. Adding the five values gives 150, and dividing by 5 gives 30. The mean captures the central tendency of evenly spaced values.
12. C — $1/6$. There are 6 doubles out of 36 total dice combinations (1,1), (2,2), ..., (6,6). The probability is $6/36 = 1/6$.
13. D — 60%. Dividing 18 by 30 gives 0.6, which converts to 60%.
14. B — $1/3$. The jar contains $4 + 5 + 6 = 15$ marbles, and 5 are green. The probability is $5/15 = 1/3$.
15. A — 15. For an even number of values, the median is the average of the two middle values: $(12 + 18)/2 = 15$.

16. D — $1/13$. A standard deck has 4 kings out of 52 cards, giving $4/52 = 1/13$.
17. B — 6. The number of arrangements of 3 books is $3! = 6$.
18. C — 12.5. Adding $5 + 10 + 15 + 20 = 50$, and dividing by 4 gives 12.5.
19. A — $1/4$. Two independent flips multiply: $(1/2)(1/2) = 1/4$.
20. D — no mode. Every value in $\{1, 2, 3, 4, 5\}$ appears exactly once, so there is no value that appears more often than others, meaning no mode exists.
21. D — 80. The range is $180 - 100 = 80$.
22. B — $1/5$. The jar contains $8 + 4 + 8 = 20$ marbles, and 4 are blue. The probability is $4/20 = 1/5$.
23. A — 9. The middle value of the five ordered values is 9.
24. C — 120. The number of arrangements of 5 distinct people is $5! = 120$.
25. D — $1/2$. Even numbers on a die are 2, 4, and 6 — three of the six outcomes. The probability is $3/6 = 1/2$.
26. A — 3.5. Adding $1 + 2 + 3 + 4 + 5 + 6 = 21$, and dividing by 6 gives 3.5.
27. C — $1/8$. Three independent flips each with probability $1/2$ multiply: $(1/2)^3 = 1/8$.
28. B — 35. The range is $40 - 5 = 35$.
29. D — $5/10$. The bag has 10 marbles and 5 are green, giving a probability of $5/10$ (which equals $1/2$ in simplest form, but the answer matches the unreduced form here).
30. A — 7. For an even number of values, the median is the average of the two middle values: $(6 + 8)/2 = 7$.
31. B — 5. The value 5 appears three times — more than any other value — so it is the mode.
32. D — 60. With 5 choices for the first digit, 4 for the second, and 3 for the third, the total is $5 \times 4 \times 3 = 60$. This uses the multiplication principle for arrangements without repetition.
33. A — $1/8$. With 8 equal sections, each has probability $1/8$ of being landed on.
34. C — 6. Adding $2 + 4 + 6 + 8 + 10 = 30$, and dividing by 5 gives 6.
35. D — $1/2$. A standard deck has 26 red cards out of 52, giving $26/52 = 1/2$.
36. A — 40. The middle value of the seven ordered values is the fourth value, which is 40.
37. D — 13. The range is $28 - 15 = 13$.
38. B — $1/2$. A fair coin has two equally likely outcomes, so the probability of tails is $1/2$.

39. C — $3/13$. A standard deck has 12 face cards (4 jacks, 4 queens, 4 kings) out of 52, giving $12/52 = 3/13$.
40. D — 300. Adding $100 + 200 + 300 + 400 + 500 = 1,500$, and dividing by 5 gives 300.
41. A — $1/36$. The two rolls are independent, so multiplying the individual probabilities gives $(1/6)(1/6) = 1/36$.
42. C — 20. The number of ways to choose and arrange 2 positions from 5 people is $5 \times 4 = 20$. The two positions are distinct, so order matters.
43. D — 3. The value 3 appears three times, more than any other value in the set.
44. B — 1,600. The total score is $\text{mean} \times \text{count} = 80 \times 20 = 1,600$.
45. A — $3/10$. The bag has $3 + 7 = 10$ balls, and 3 are black, giving $3/10$.
46. D — 17.5. For an even number of values, the median is the average of the two middle values: $(15 + 20)/2 = 17.5$.
47. B — $1/4$. A standard deck has 13 spades out of 52, giving $13/52 = 1/4$.
48. C — 16. The range is $20 - 4 = 16$.
49. A — $1/12$. The two events are independent, so multiplying individual probabilities gives $(1/2)(1/6) = 1/12$.
50. D — 13. Adding $9 + 11 + 13 + 15 + 17 = 65$, and dividing by 5 gives 13. The mean of a symmetric arithmetic sequence is always the middle value.