

Mensuration, Statistics and Probability

Mathematics · Class 10 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ___ / 24
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- Take $\pi = 22/7$ wherever it is needed. There is no negative marking.
- Figures are not drawn to scale unless stated. Rough work may be done at the side of each page.

Section A — Mathematical Reasoning

Q1–Q8 · 1 mark each

- The area of a circle of radius r is _____.
 (A) πr^2 (B) $2\pi r$
 (C) πd (D) $\frac{4}{3}\pi r^3$
- The circumference of a circle of radius r is _____.
 (A) πr^2 (B) $2\pi r$
 (C) πr (D) $4\pi r^2$
- The area of a sector of angle θ in a circle of radius r is _____.
 (A) $\theta\pi r^2$ (B) $\frac{\theta}{360} \times 2\pi r$
 (C) $\frac{\theta}{180} \times \pi r^2$ (D) $\frac{\theta}{360} \times \pi r^2$
- The length of an arc that subtends an angle θ at the centre of a circle of radius r is _____.
 (A) $\frac{\theta}{360} \times 2\pi r$ (B) $\frac{\theta}{360} \times \pi r^2$
 (C) $\frac{360}{\theta} \times 2\pi r$ (D) $2\pi r\theta$
- The volume of a sphere of radius r is _____.
 (A) $4\pi r^2$ (B) $\frac{4}{3}\pi r^3$
 (C) $\frac{2}{3}\pi r^3$ (D) $\frac{1}{3}\pi r^2h$
- The total surface area of a solid cylinder of radius r and height h is _____.
 (A) $2\pi rh$ (B) πr^2h
 (C) $2\pi r(r + h)$ (D) $\pi r(r + h)$

7. For grouped data, the mean is calculated as _____.

(A) $\frac{\sum x}{n^2}$

(C) $\sum fx$

(B) $\frac{\sum f}{\sum x}$

(D) $\frac{\sum fx}{\sum f}$

8. The probability of an event E always satisfies _____.

(A) $0 \leq P(E) \leq 1$

(C) $P(E) > 1$

(B) $-1 \leq P(E) \leq 1$

(D) $P(E) = 1$ always

Section B — Everyday Mathematics and Reasoning

Q9–Q15 · 1 mark each

9. The area of a circle of radius 7 cm is _____.

(A) 44 cm^2

(C) 308 cm^2

(B) 154 cm^2

(D) 49 cm^2

10. The area of a quadrant of a circle of radius 14 cm is _____.

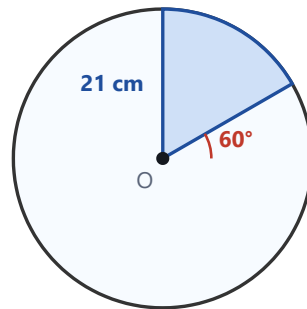
(A) 77 cm^2

(C) 154 cm^2

(B) 308 cm^2

(D) 616 cm^2

11. In the figure, a sector of angle 60° is shaded in a circle of radius 21 cm. The area of the shaded sector is _____.



A 60° sector of a circle of radius 21 cm

(A) 22 cm^2

(C) 462 cm^2

(B) 154 cm^2

(D) 231 cm^2

12. A solid metal sphere of radius 3 cm is melted and recast into a solid cylinder of radius 3 cm. The height of the cylinder is _____.

(A) 4 cm

(C) 2 cm

(B) 3 cm

(D) 6 cm

13. The table shows the daily wages of 40 workers. The mean daily wage is _____.

Wage (₹)	0–10	10–20	20–30	30–40	40–50
Number of workers	5	8	12	10	5

Table 6.1 — Daily wages of 40 workers (in hundreds of rupees)

(A) ₹24.5

(C) ₹26.5

(B) ₹25.5

(D) ₹30.0

14. One card is drawn at random from a well-shuffled pack of 52 cards. The probability that it is a king is _____.

(A) $\frac{1}{52}$

(B) $\frac{1}{4}$

(C) $\frac{1}{13}$

(D) $\frac{4}{13}$

15. Two fair coins are tossed together. The probability of getting **at least one** head is _____.

(A) $\frac{1}{4}$

(B) $\frac{1}{2}$

(C) 1

(D) $\frac{3}{4}$

Achievers Section

Q16–Q18 · 3 marks each

16. A solid metal sphere of radius 6 cm is melted and drawn into a cylindrical wire of radius 0.2 cm. The length of the wire is _____.

(A) 72 m

(B) 36 m

(C) 144 m

(D) 720 m

17. The mean of the five observations x , $x + 2$, $x + 4$, $x + 6$ and $x + 8$ is 11. The value of x is _____.

(A) 5

(B) 6

(C) 7

(D) 9

18. A bag contains 5 red, 8 white and 7 black balls. One ball is drawn at random. The probability that it is **neither** white **nor** black is _____.

(A) $\frac{3}{4}$

(B) $\frac{1}{4}$

(C) $\frac{2}{5}$

(D) $\frac{7}{20}$

Answer Key

1	A	2	B	3	D	4	A	5	B
6	C	7	D	8	A	9	B	10	C
11	D	12	A	13	B	14	C	15	D
16	A	17	C	18	B				

Solutions

1. Answer: (A) πr^2

The area enclosed by a circle is πr^2 . The expression $2\pi r$ is its circumference, a length rather than an area.

2. Answer: (B) $2\pi r$

The distance once around a circle is $2\pi r$, which can also be written as πd where d is the diameter.

3. Answer: (D) $\frac{\theta}{360} \times \pi r^2$

A sector is the fraction $\frac{\theta}{360}$ of the whole circle, so its area is $\frac{\theta}{360} \times \pi r^2$. The same fraction of the circumference gives the arc length.

4. Answer: (A) $\frac{\theta}{360} \times 2\pi r$

The arc is the fraction $\frac{\theta}{360}$ of the full circumference, so its length is $\frac{\theta}{360} \times 2\pi r$.

5. Answer: (B) $\frac{4}{3} \pi r^3$

A sphere encloses $\frac{4}{3} \pi r^3$. The expression $4\pi r^2$ is its surface area, and $\frac{2}{3} \pi r^3$ the volume of a hemisphere.

6. Answer: (C) $2\pi r(r + h)$

Adding the curved surface $2\pi rh$ to the two circular ends $2\pi r^2$ gives $2\pi r(r + h)$. Leaving out the ends would give only the curved surface area.

7. Answer: (D) $\frac{\sum fx}{\sum f}$

Each class is represented by its mid-value x , weighted by its frequency f , so the mean is $\frac{\sum fx}{\sum f}$ — the total of all the values divided by the number of observations.

8. Answer: (A) $0 \leq P(E) \leq 1$

A probability is a fraction of the possible outcomes, so it can never be negative or exceed 1: $0 \leq P(E) \leq 1$, with 0 for an impossible event and 1 for a certain one.

9. Answer: (B) 154 cm^2

Area = $\pi r^2 = \frac{22}{7} \times 7 \times 7 = 22 \times 7 = 154 \text{ cm}^2$. (44 cm would be its circumference.)

10. Answer: (C) 154 cm^2

A quadrant is a quarter of the circle, so its area is $\frac{1}{4} \times \frac{22}{7} \times 14 \times 14 = \frac{1}{4} \times 616 = 154 \text{ cm}^2$.

11. Answer: (D) 231 cm^2

The sector is $\frac{60}{360} = \frac{1}{6}$ of the circle, so its area is $\frac{1}{6} \times \frac{22}{7} \times 21 \times 21 = \frac{1}{6} \times 1386 = 231 \text{ cm}^2$.

12. Answer: (A) 4 cm

Melting conserves volume: $\frac{4}{3} \pi (3)^3 = \pi (3)^2 h$, so $36\pi = 9\pi h$ and $h = 4 \text{ cm}$.

13. Answer: (B) ₹25.5

The class mid-values are 5, 15, 25, 35 and 45. Then $\sum fx = 5(5) + 8(15) + 12(25) + 10(35) + 5(45) = 25 + 120 + 300 + 350 + 225 = 1020$, and $\sum f = 40$. So the mean is $\frac{1020}{40} = ₹25.5$.

14. Answer: (C) $\frac{1}{13}$

A pack has 4 kings out of 52 cards, so the probability is $\frac{4}{52} = \frac{1}{13}$.

15. Answer: (D) $\frac{3}{4}$

The four equally likely outcomes are HH, HT, TH and TT. Three of them contain at least one head, so the probability is $\frac{3}{4}$. Equivalently, $1 - P(\text{no head}) = 1 - \frac{1}{4}$.

16. Answer: (A) 72 m

The sphere's volume is $\frac{4}{3}\pi(6)^3 = 288\pi \text{ cm}^3$, and the wire is a cylinder of volume $\pi(0.2)^2L = 0.04\pi L$. Equating, $L = \frac{288}{0.04} =$

7200 cm = **72 m**.

17. Answer: (C) 7

The five observations add to $5x + 20$, so the mean is $\frac{5x + 20}{5} = x + 4$. Setting $x + 4 = 11$ gives $x = 7$, and the observations are 7, 9, 11, 13 and 15.

18. Answer: (B) $\frac{1}{4}$

The bag holds $5 + 8 + 7 = 20$ balls. A ball that is neither white nor black must be red, and there are 5 of those, so the probability is $\frac{5}{20} = \frac{1}{4}$.