

Mensuration, Statistics and Probability

Mathematics · Class 9 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ____ / 24
--------------------	-----------------	-------------------	-------------------------

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

1. By Heron's formula, the area of a triangle with sides a , b , c and semi-perimeter s is _____.

- (A) $\sqrt{s(s-a)(s-b)(s-c)}$ (B) $s(s-a)(s-b)(s-c)$
 (C) $\sqrt{s(a+b+c)}$ (D) $\frac{1}{2}(a+b+c)$

2. The curved surface area of a cylinder of radius r and height h is _____.

- (A) $\pi r^2 h$ (B) $\pi r(r+h)$
 (C) $2\pi r(r+h)$ (D) $2\pi rh$

3. The volume of a cone of base radius r and height h is _____.

- (A) $\frac{1}{3}\pi r^2 h$ (B) $\pi r^2 h$
 (C) $\frac{2}{3}\pi r^3$ (D) $\frac{4}{3}\pi r^3$

4. The surface area of a sphere of radius r is _____.

- (A) $2\pi r^2$ (B) $3\pi r^2$
 (C) $4\pi r^2$ (D) $\frac{4}{3}\pi r^3$

5. The mean of the observations 2, 4, 6, 8 and 10 is _____.

- (A) 5 (B) 6
 (C) 7 (D) 30

6. The median of the data 5, 9, 3, 11, 7 is _____.

- (A) 5 (B) 7
 (C) 9 (D) 11

7. The probability of an impossible event is _____.

- (A) -1 (B) $\frac{1}{2}$
 (C) 1 (D) 0

8. The area of a triangle whose sides measure 3 cm, 4 cm and 5 cm is _____.

(A) 6 cm^2

(B) 10 cm^2

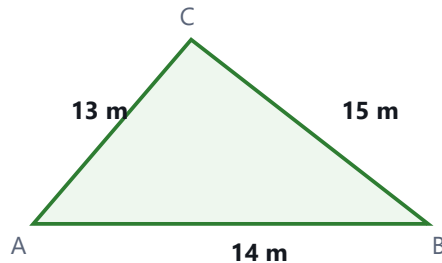
(C) 12 cm^2

(D) 7.5 cm^2

Section B — Everyday Mathematics and Reasoning

Q9–Q15 · 1 mark each

9. A triangular park has sides of 13 m, 14 m and 15 m, as shown. The area of the park is _____.



A triangular park with sides 13 m, 14 m and 15 m

(A) 42 m^2

(B) 91 m^2

(C) 84 m^2

(D) 168 m^2

10. A cylindrical water drum has base radius 7 cm and height 10 cm. Its volume is _____.

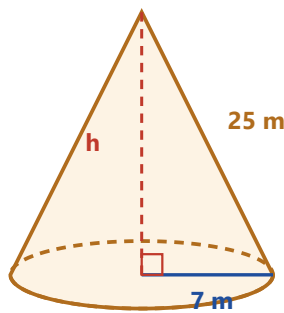
(A) 440 cm^3

(B) 2200 cm^3

(C) 770 cm^3

(D) 1540 cm^3

11. The conical tent shown has base radius 7 m and slant height 25 m. The volume of air inside it is _____.



A conical tent of base radius 7 m and slant height 25 m

(A) 1232 m^3

(B) 550 m^3

(C) 3696 m^3

(D) 616 m^3

12. A spherical ball has radius 7 cm. The area of leather needed to cover it exactly is _____.

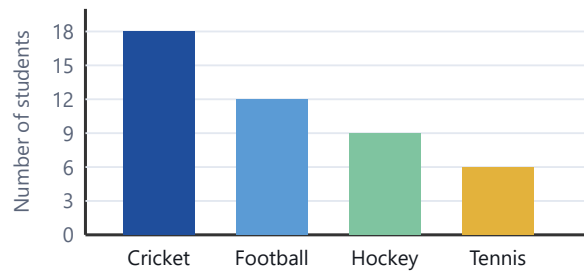
(A) 154 cm^2

(B) 616 cm^2

(C) 308 cm^2

(D) 1436 cm^2

13. The bar graph shows the favourite sport of the students of a class. If one student is chosen at random from this class, what is the probability that hockey is that student's favourite sport?



Favourite sport of the students of a class

- (A) $\frac{9}{50}$ (B) $\frac{1}{4}$
 (C) $\frac{1}{5}$ (D) $\frac{2}{5}$
14. The mean of 10 observations is 15. If every observation is increased by 3, the new mean is _____.
 (A) 15 (B) 18
 (C) 30 (D) 45
15. A die was thrown 60 times and the outcomes recorded below. What is the empirical probability of getting a number **greater than 4**?

Outcome	1	2	3	4	5	6
Frequency	10	8	12	9	11	10

Table 6.1 — Outcomes of 60 throws of a die

- (A) $\frac{1}{2}$ (B) $\frac{1}{3}$
 (C) $\frac{11}{60}$ (D) $\frac{7}{20}$

Achievers Section

Q16–Q18 · 3 marks each

16. An isosceles triangle has a perimeter of 32 cm and each of its two equal sides measures 10 cm. Its area is _____.
 (A) 48 cm² (B) 36 cm²
 (C) 60 cm² (D) 96 cm²
17. A cone and a cylinder have the same base radius and the same height. The ratio of the volume of the cone to that of the cylinder is _____.
 (A) 1 : 2 (B) 1 : 3
 (C) 2 : 3 (D) 3 : 1
18. The mean of 20 observations was found to be 30. Later it was discovered that one observation, which was actually 45, had been recorded as 25. The corrected mean is _____.
 (A) 29 (B) 30
 (C) 31 (D) 32

Answer Key

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

Solutions

1. Answer: (A) $\sqrt{s(s-a)(s-b)(s-c)}$

Heron's formula gives the area purely from the three sides as $\sqrt{s(s-a)(s-b)(s-c)}$, where $s = \frac{a+b+c}{2}$. The last option is the semi-perimeter itself, not an area.

2. Answer: (D) $2\pi rh$

Unrolling the curved surface gives a rectangle whose width is the circumference $2\pi r$ and whose height is h , so the curved surface area is $2\pi rh$. Adding the two circular ends would give the total surface area $2\pi r(r+h)$.

3. Answer: (A) $\frac{1}{3}\pi r^2 h$

A cone holds exactly one third of the cylinder that has the same base and height, so its volume is $\frac{1}{3}\pi r^2 h$. The expression $\frac{4}{3}\pi r^3$ is the volume of a sphere.

4. Answer: (C) $4\pi r^2$

The surface area of a sphere is $4\pi r^2$ — four times the area of its great circle. ($2\pi r^2$ is the curved surface of a hemisphere, and $\frac{4}{3}\pi r^3$ is a volume, not an area.)

5. Answer: (B) 6

Mean = sum $\div$ number of observations = $(2 + 4 + 6 + 8 + 10) \div 5 = 30 \div 5 = 6$.

6. Answer: (B) 7

First arrange in order: 3, 5, 7, 9, 11. With five observations the median is the third one, which is 7. Forgetting to sort the data is the usual slip here.

7. Answer: (D) 0

An event that can never happen occurs in none of the trials, so its probability is 0. Probability always lies between 0 and 1, with 1 for an event that is certain, and it can never be negative.

8. Answer: (A) 6 cm²

Here $s = (3 + 4 + 5) \div 2 = 6$, so the area is $\sqrt{6 \times 3 \times 2 \times 1} = \sqrt{36} = 6 \text{ cm}^2$. Since $3^2 + 4^2 = 5^2$, the triangle is right-angled, and $\frac{1}{2} \times 3 \times 4 = 6 \text{ cm}^2$ confirms it.

9. Answer: (C) 84 m²

The semi-perimeter is $s = (13 + 14 + 15) \div 2 = 21$ m. By Heron's formula the area is $\sqrt{(21 \times (21 - 13) \times (21 - 14) \times (21 - 15))} = \sqrt{(21 \times 8 \times 7 \times 6)} = \sqrt{7056} = 84 \text{ m}^2$.

10. Answer: (D) 1540 cm³

Volume = $\pi r^2 h = \frac{22}{7} \times 7 \times 7 \times 10$. One 7 cancels the denominator, leaving $22 \times 7 \times 10 = 1540 \text{ cm}^3$.

11. Answer: (A) 1232 m³

First find the height: $h = \sqrt{l^2 - r^2} = \sqrt{625 - 49} = \sqrt{576} = 24$ m. Then volume = $\frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 49 \times 24 = \frac{1}{3} \times 22 \times 7 \times 24 = 1232 \text{ m}^3$.

12. Answer: (B) 616 cm²

The covering must match the surface area of the sphere: $4\pi r^2 = 4 \times \frac{22}{7} \times 7 \times 7 = 4 \times 22 \times 7 = 616 \text{ cm}^2$.

13. Answer: (C) $\frac{1}{5}$

Reading the bars against the scale: Cricket 18, Football 12, Hockey 9 and Tennis 6, so the class has $18 + 12 + 9 + 6 = 45$ students. The probability of picking one of the 9 hockey students is $\frac{9}{45} = \frac{1}{5}$.

14. Answer: (B) 18

Adding 3 to each of the 10 observations raises the total by $10 \times 3 = 30$, so the mean rises by $30 \div 10 = 3$. The new mean is $15 + 3 = 18$. In general, adding a constant to every observation shifts the mean by that same constant.

15. Answer: (D) $\frac{7}{20}$

Numbers greater than 4 are 5 and 6, which occurred $11 + 10 = 21$ times out of 60 throws. So the empirical probability is $\frac{21}{60} = \frac{7}{20}$. Note the frequencies do add to 60, as they must.

16. Answer: (A) 48 cm^2

The base is $32 - (10 + 10) = 12 \text{ cm}$, so $s = 32 \div 2 = 16 \text{ cm}$. By Heron's formula the area is $\sqrt{(16 \times 6 \times 6 \times 4)} = \sqrt{2304} = 48 \text{ cm}^2$. Checking with the altitude: half the base is 6 cm, so the height is $\sqrt{(100 - 36)} = 8 \text{ cm}$ and $\frac{1}{2} \times 12 \times 8 = 48 \text{ cm}^2$.

17. Answer: (B) 1 : 3

The cone has volume $\frac{1}{3} \pi r^2 h$ and the cylinder $\pi r^2 h$. Dividing, the common factor $\pi r^2 h$ cancels and the ratio is **1 : 3** — three coneloads of water fill the cylinder exactly.

18. Answer: (C) 31

The recorded total was $20 \times 30 = 600$. Replacing 25 by 45 raises the total by 20, giving a corrected total of 620. So the corrected mean is $620 \div 20 = 31$ — an error of 20 spread over 20 observations shifts the mean by exactly 1.