# Prime CAT 10 2022 QA

**Q 1.** If the vertices of a triangle are (0, 4), (3, 0) and (1, 19/4), then what is the area of the circle passing through these three points?

**1)** $\frac{201\pi}{8}$

**2)** $\frac{213\pi}{32}$

**3)** $\frac{53\pi}{8}$

**4)** $\frac{425\pi}{64}$

---

**Q 2.** In a round-robin T20 cricket tournament, every team played every other team exactly once. Every team won 6 matches and lost 6 matches; there were no ties. Find the number of sets of three teams {P, Q, R} such that P beats Q, Q beats R and R beats P.

**1)** 91

**2)** 195

**3)** 81

**4)** 286

---

**Q 3.** Two runners Amit and Ravi start running simultaneously from point A and point B of a track and run towards B and A at a constant speed respectively. They meet at a point between two points and then reach their destination in 32 sec and 18 sec respectively. The time taken (in seconds) by Ravi to cover the entire distance between point B and point A is

---

**Q 4.** If $(a^b)^c$ = bac25, where a, b and c are all one-digit natural numbers, find the value of a + b + c.

**1)** 10

**2)** 11

**3)** 12

**4)** 13

---

**Q 5.** Two vessels contain two mixtures A and B. Mixture A contains ingredients X, Y and Z in the ratio of 2 : 7 : 3 respectively and mixture B contains ingredients X and Y in the ratio of 3 : 4 respectively. We have to make 189 liters of a new mixture by adding the mixtures A and B in the ratio of 4 : 5. What will be the quantity (in liters) of ingredient X in the final mixture?

**1)** 61

**2)** 93

**3)** 77

**4)** 59

---

**Q 6.** When Mr. John looked at the rosters for this term's classes, he saw that the roster for his Algebra class (A) had x names, the roster for his Calculus class (C) had x + 2, and the roster for his Statistics class (S) had x – 8. When he compared the rosters, he saw that A and C had 9 names in common, A and S had 7, and C and S had 10. He also saw that 4 names were on all 3 rosters. If the rosters for Mr. John's 3 classes are combined with no student's name listed more than once, then how many names in the following options can be on the combined roster?

**1)** 32

**2)** 42

**3)** 50

**4)** 60

---

**Q 7.** What is the number of integers that satisfy the equation $(x^2 - 7x + 11)^{x-1} = 1$?

---

**Q 8.** From a class of 50 students with roll numbers 1, 2, 3, …, 50, some students were selected for an event but the condition was that their roll numbers should be either a multiple of 3 or a multiple of 4. The average weight of all the students who were not selected was 48 kg and the average weight of all the students who were selected was 44 kg. What was the average weight (in kg) of the class?

**1)** 44.8

**2)** 47.2

**3)** 46.08

**4)** 45.6

---

**Q 9.** On a circle of diameter 8 cm and center O, an ant starts from a point A on the circumference and moves along a chord AB of length 4 cm. Then it moves along another chord BC whose length also is 4 cm and reaches point C. If the point B lies on the minor arc AC, then what is the area (in sq. cm) of the quadrilateral OABC?

**1)** $4\sqrt{3}$

**2)** 12

**3)** $8\sqrt{3}$

**4)** 15

---

**Q 10.** Let $a_n$ be a sequence such that $a_n = 2a_{n-1} - x$ for $n \geq 2$ and a certain number x. If $a_1 = 9$ and $a_5 = 99$, then how many factors does $x + a_2 + a_3$ have?

**1)** 4

**2)** 6

**3)** 8

**4)** More than 8

---

**Q 11.** A shopkeeper can make a profit of 17% on the cost price by selling a washing machine for Rs. 7,020. If the cost of storage for a month is 10% of the cost price and the shopkeeper wants to earn the same initial amount as profit by selling the washing machine after a month, then what will be the new percentage profit (approximately)?

**1)** 14.55%

**2)** 15.45%

**3)** 13.65%

**4)** 17.45%

---

**Q 12.** Let $f(x + y) = f(x)f(y)$, for all x, y. If $f(6) = 5$, then $f(-6) + f(-12)$ is

**1)** 6/5

**2)** 25

**3)** 6/25

**4)** 24

---

**Q 13.** Piya and Riya start from two points A and B towards B and A respectively at 8:20 AM. The speeds of Piya and Riya are in the ratio of 4:5. They meet at point C, somewhere between A and B and then both started towards their destination at 9:27 AM. If Piya reaches B at 10:32 AM, then how much time (in minutes) did they spend together?

---

**Q 14.** Raghu does 60% of a piece of work in 18 days. Later, with Shambhu's help, he completes the remaining work in 6 days. In how many days can Shambhu complete 70% of the work?

---

**Q 15.** In triangle ABC, $\angle B = 90°$, AB = 6 cm and BC = 8 cm. If the bisector of $\angle A$ meets BC at D, then the length (in cm) of AD is

**1)** $5\sqrt{3}$

**2)** $3\sqrt{5}$

**3)** $4\sqrt{3}$

**4)** $6\sqrt{5}$

---

**Q 16.**

What is the sum of all integral solutions of the equation $x^{\log_3 x^2 + (\log_3 x)^2 - 10} = \frac{1}{x^2}$?

---

**Q 17.** In a to-and-fro journey, the speed of the car is 25 km/h and 40 km/h respectively. If it takes 2.6 hours to complete the whole ride, what will be the total distance (in km) traveled by the car?

---

**Q 18.** If the equation $2x^2 + (k + 6)x + 4kx + 8 = 0$ has equal roots, then the sum of all values of k is

**1)** 0

**2)** −1.2

**3)** −2.4

**4)** 3.2

---

**Q 19.** The marks scored by Bob in three subjects is equal to x, y and z such that they are in the ratio 3 : 4 : 5 and x + y + z = 192. If marks obtained by Ben in these three subjects are a, b and c respectively such that x = 2a − c, y = 2x − a, and z = 2b − y, then find the value of 2b − 3a + c.

---

**Q 20.** If the interest compounded annually on a certain sum at a certain rate of interest for 2 years is equal to 44% of the simple interest on the same amount at the same interest rate for five years, then find the rate percentage.

**1)** 12%

**2)** 20%

**3)** 24%

**4)** 18%

---

**Q 21.** A truncated cone has horizontal bases with radii 25 cm and 4 cm. If a sphere is tangent to the top, bottom, and lateral surface of the truncated cone, then the surface area (in sq. cm) of the sphere is

1) $100\pi$
2) $400\pi$
3) $800\pi$
4) $1600\pi$

---

**Q 22.** In a chemical reaction, two compounds A and B are formed at different rates every second. When the time was T = 0 seconds, the ratio of molecules of compounds A and B was 2 : 3 but when T = 1 second, the ratio became 5 : 9. The rate of formation of compound B is what percentage above the rate of formation of compound A?

---