PART-I
DELHI REGION

SECTION - A

Question numbers 1 to 10 carry one mark each.

1.   If $\dfrac{p}{q}$ is a rational number ($q \neq 0$), what is condition on q so that the decimal

representation of $\dfrac{p}{q}$ is terminating?

Ans. q is of the form $2^m \, 5^n$ 1 m

Performance

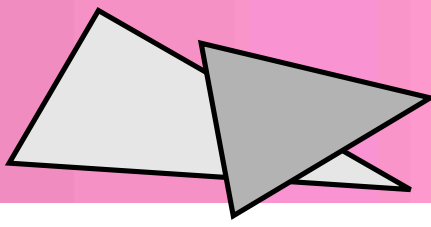| Marks	N.A.	0	1	Mean Score
Percentage	34	32	34	0.5

Quantitative Analysis

- Only 34% of the students could give the correct answer.

- 34% did not attempt the question at all while 32% did try but gave wrong answers.

Common Errors

- It was a question on recall. Only those students who could recall the condition, answered the question correctly. As such no error was noticeable.

Suggested Remedial Measures

- Students should not waste time in thinking or trying out such questions. If one can recall the condition correctly, then he should answer the question else leave it as there is no partial marking.

2. Write the zeroes of the polynomial $x^2 + 2x + 1$.

Ans. -1   1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	8	27	65	0.7

Quantitative Analysis

- Response was good. 92% attempted the question and out of them 65% gave correct answer.
- Only 8% failed to attempt the question.

Common Errors

- Only a negligible number of students identified the polynomial as a perfect square. Most of them wasted time in splitting the middle term; even some making mistakes in factorizing such a simple expression.

Suggested Remedial Measures

- As no solution is required, a student should observe the polynomial as a perfect square and write the answer to save time.

3. Find the value of K so that the following system of equations has no solution:
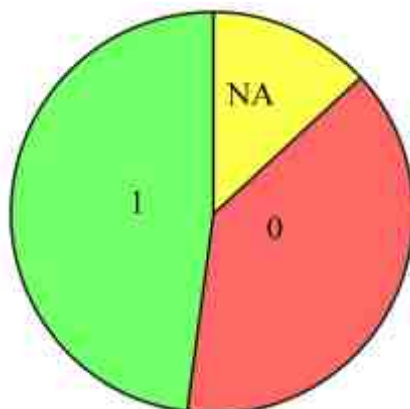 $3x - y - 5 = 0$; $6x - 2y - K = 0$

Ans. K ≠ 10   1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	13	39	48	0.6

Quantitative Analysis

- Many students got confused so a good member of students (39%) failed to give correct answer.

- 48% applied the condition properly and got full marks.

- Only 13% did not attempt the question.

Common Errors

- Students appeared confused about the condition, specialy using the symbol $\neq$ and also with the signs of the constant terms -5 and $-k$

- Computational error was also frequent.

Suggested Remedial Measures

- Student should understand the given condition and desired answer very cautiously in such questions. As such quite a few students wrote the answer as k = 10 which implies infinite solutions while the desired condition is no solution.
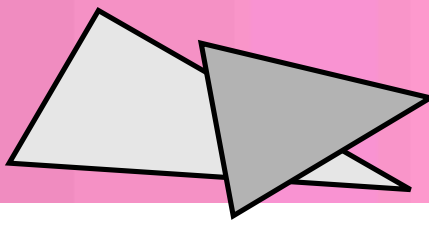
4. The nth term of an A.P. is $7 - 4n$. Find its common difference.
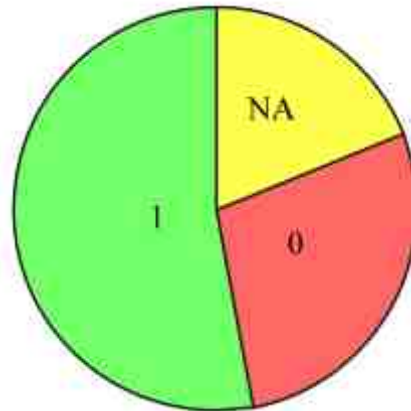
Ans. $d = -4$ 1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	19	28	53	0.7

Quantitative Analysis

● A well attempted question answered by 81% students out of which 53% getting full marks.

● 19% of the students did not attempt the question.

Common Errors

● As the terms of the A.P. were in decreasing order and common diffrence was a negative number so a quite a good number of students committed mistake involving negative sign.

Suggested Remedial Measures

● Student should be more careful while handling negative sign or negative numbers.

5. In Fig. 1, AD = 4 cm, BD = 3 cm and CB = 12 cm, find cot θ.

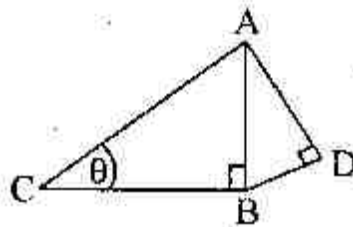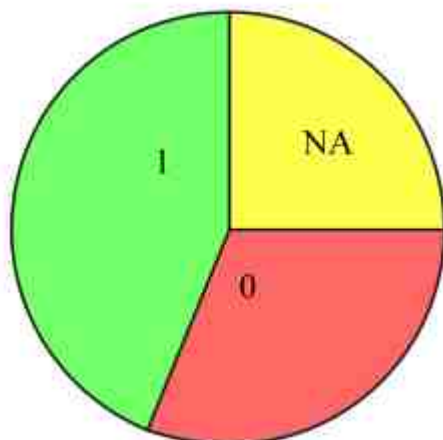**Fig. 1**

Ans. $\dfrac{12}{5}$ 1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	25	31	44	0.6

Quantitative Analysis

- Only 44% of the students could answer the question correctly. Rest 56% either did not attempt or gave wrong answer.

Common Errors

- Students applied wrong definition of $\cot\theta$ and answered as $\dfrac{5}{12}$ instead of $\dfrac{12}{5}$.

- Many students did not visualize first to find AB and then to find the value of $\cot\theta$.

Suggested Remedial Measures

- Students got confused in distinguishing between perpendicular and base for the given angle in a right triangle. They must observe and use the terms opposite side to the angle and base to look for the values of trigonometric ratios.

- Remembering a few commonly used Pythogorean triplets (3, 4, 5) (5, 12, 13), etc. and their multiples can help in saving time in such situations of right triangles.

6. In Fig. 2, P and Q are points on the sides AB and AC respectively of $\triangle$ ABC such that AP = 3.5 cm, PB = 7 cm, AQ = 3 cm and QC = 6 cm. If PQ = 4.5 cm, find BC.
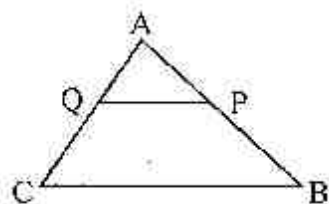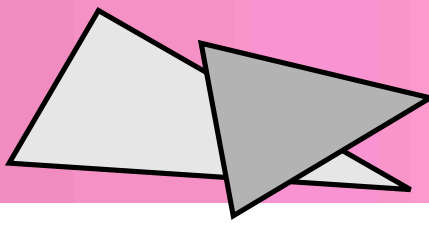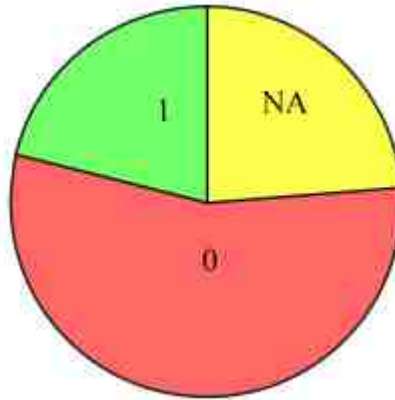

Fig. 2

Ans. 13.5 cm   1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	24	55	21	0.3

Quantitative Analysis

- Only a very low percentage (21%) answered the question correctly.

- 55% did try to answer but committed errors.

Common Errors

- Majority of students identified the similar triangles, but committed mistakes in taking proportional sides, e.g.

$\Delta AQP \sim \Delta ACB$

$$\therefore \quad \frac{AQ}{QC} = \frac{AP}{PB} = \frac{QP}{CB} \qquad \left[\begin{array}{c} \text{Correct is} \\ \frac{AQ}{AC} = \frac{AP}{AB} = \frac{QP}{CB} \end{array}\right]$$

thus getting wrong answer $\left(\dfrac{3}{6} = \dfrac{4.5}{CB}\right)$ or $CB = 9cm$

Suggested Remedial Measures

- More emphasis to be laid on recognizing overlapping similar triangles and their corresponding sides to express the proportion.

- Even by observation and using common sense that the ratio between the corresponding sides is 1:3, such questions can be answered very quickly. They should not waste time in formal calculations.

7. In Fig. 3, PQ = 24 cm, QR = 26 cm, $\angle$PAR = 90°, PA = 6 cm and AR = 8 cm. Find $\angle$QPR.

Fig. 3

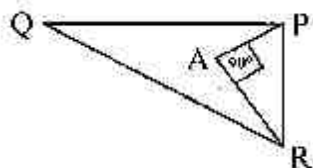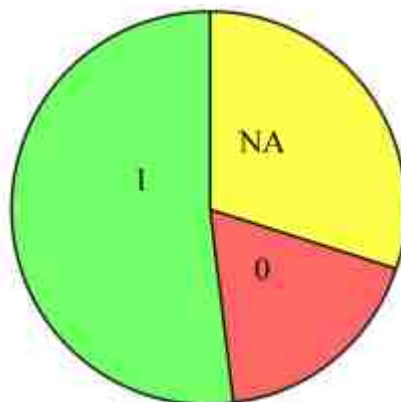**Ans.** $\angle$QPR = 90°   1 m

Performance

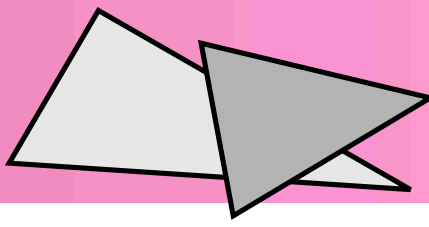| Marks	N.A.	0	1	Mean Score
Percentage	30	18	52	0.7

Quantitative Analysis

● 52% students answered the question correctly which is nearly half the sample.

● 48% were unable to answer the question.

Common Errors

● Many students failed to find the side PR and majority of those who could find failed to use the converse of the Pythogoras theorem to get the $\angle$QPR.

Suggested Remedial Measures

● Equal emphasis should be given to the converse of Pythogoras theorem.

● Sufficient practice and knowledge of Pythogorean triplets such as (10, 24, 26) (6, 8, 10) can help to save time in such type of questions.

8. In Fig. 4, O is the centre of a circle. The area of sector OAPB is $\frac{5}{18}$ of the area of the circle. Find x.
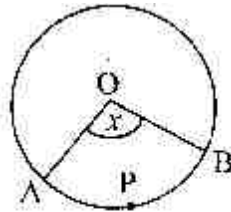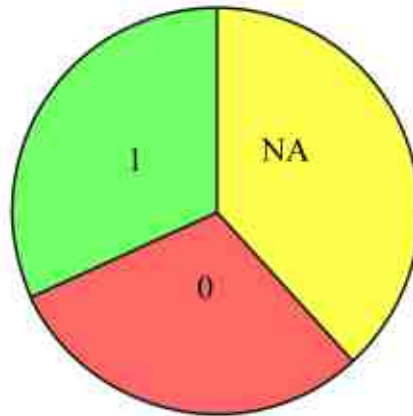

Fig. 4

Ans. 100°

1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	38	30	32	0.5

Quantitative Analysis

● Poor response as only 32% students could answer the question correctly.

● 68% of the students were unable to answer the question.

Common Errors

● Most of the students (68%) failed to answer the question as they applied the wrong formula or property and made computational mistakes.

Suggested Remedial Measures

● Simple logic that the area of the sector is $\frac{5}{18}$ th of the whole circle, so the angle must also be

$\dfrac{5}{18}$ th of the whole central angle, can save precious time in answering such questions.
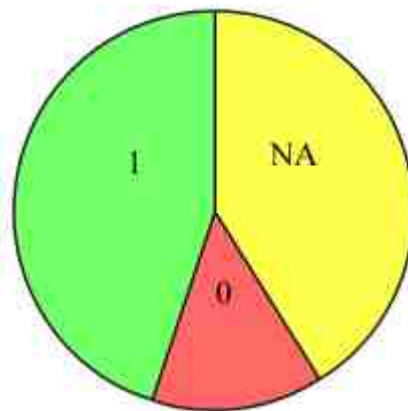
- More practice needed to answer such questions, without wasting much time on formal calculations.

9. Which measure of central tendency is given by the x-coordinate of the point of intersection of the "more than ogive" and "less than ogive" ?

Ans. Median   1 m

Performance

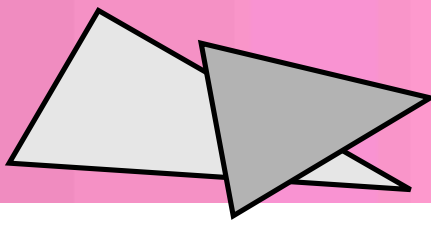| Marks	N.A.	0	1	Mean Score
Percentage	41	14	45	0.7

Quantitative Analysis

- Only 45% could recall the necassary property and answer the question while 55% were unable to answer the question.

Common Errors

- No common error could be observed. Some students gave the answer by trial as mean or mode.

Suggested Remedial Measures

- More emphasis to be given to such properties during teaching /learning, with illustrations as in this case.
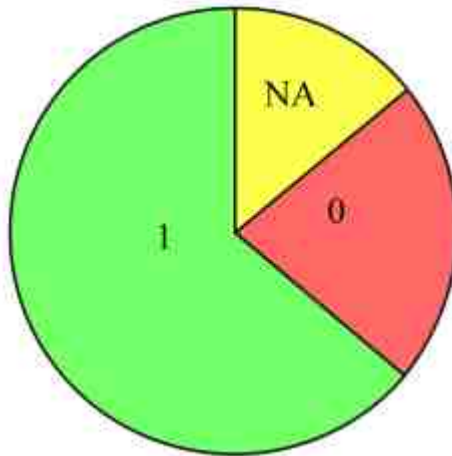
10. From a well shuffled pack of cards, a card is drawn at random. Find the probability of getting a black queen.

Ans. $\dfrac{1}{26}$ 1 m

Performance

Marks	N.A.	0	1	Mean Score
Percentage	14	22	64	0.7

Quantitative Analysis

● Response was good as the question was quite simple and needed hardly any computation. As such 64% candidates were able to answer while 36% failed to answer.

Common Errors

● Many students took the number of black queens as 4. It appeared that they were not familiar with the pack of playing cards.

● Quite a few students used the wrong definition as $P(E) = \dfrac{\text{Number of total outcomes}}{\text{Number of favourable outcomes}}$ and got the answer P (E)>1

Suggested Remedial Measures

● In some families, playing cards or just keeping a pack of cards is regarded as out of bounds. As such, students are not fully familiar with the types, colours and their numbers in a pack of cards. Being a topic in syllabus, to answer such questions on probability, the knowledge of a pack cards is essential. Since the question on it are very easy and time saving, teachers should familiarize the students with the contents of a pack of playing cards.