

THE MOTHER'S INTERNATIONAL SCHOOL
SUMMATIVE ASSESSMENT-I (2015-2016)
CLASS - X
SUBJECT: MATHEMATICS
15th Sept. 2015

TIME: 3 HOURS

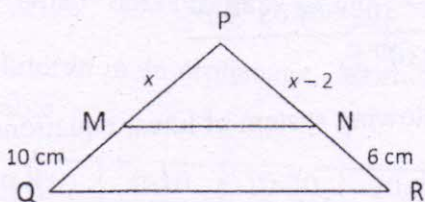
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General Instructions:-

1. All Questions are Compulsory
2. The Question Paper consists of 31 questions, divided into 4 sections A, B, C & D.
Section A Comprises of 4 questions of 1 mark each.
Section B Comprises of 6 questions of 2 mark each.
Section C Comprises of 10 questions of 3 mark each.
Section D Comprises of 11 questions of 4 mark each.

Section – A (1 Mark each)

- Q1. Find the median of the data if the mode is 18 and the mean is 24.
- Q2. If $\sec 4A = \operatorname{cosec} (A - 20^\circ)$ where $4A$ is acute, then find the value of A .
- Q3. If $MN \parallel QR$, $PM = x$ cm, $MQ = 10$ cm, $PN = (x - 2)$ cm, $NR = 6$ cm, then find x .



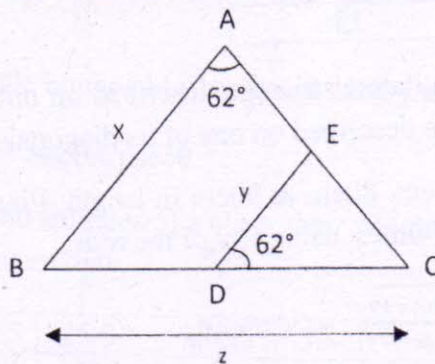
- Q4. If $\operatorname{cosec} \theta = 2x$ and $\cot \theta = \frac{2}{y}$, find the value of $4(x^2 - \frac{1}{y^2})$

Section – B (2 Mark each)

- Q5. What type of decimal representation will the following numbers represent

(a) $\frac{180}{84}$ (b) $\frac{663}{1200}$

- Q6. Express EC in terms of x , y and z where $AB = x$, $DE = y$ and $BC = z$.



- Q7. The annual Profit earned by 30 shops of a shopping Complex in a locality give rise to the following distribution.

| Profit (in lakh Rs.) | No. of Shops |
|--------------------------|--------------|
| More than or equal to 5 | 30 |
| More than or equal to 10 | 28 |
| More than or equal to 15 | 16 |
| More than or equal to 20 | 14 |
| More than or equal to 25 | 10 |
| More than or equal to 30 | 7 |
| More than or equal to 35 | 3 |

Convert this data into a frequency distribution table.

- Q8. If one zero of the polynomial $2x^2 - 8x - m$ is $\frac{5}{2}$, find the other zero and also, the value of m .
- Q9. Taking $A = 30^\circ$, verify $\text{Cos}A = \frac{1}{\sqrt{1+\tan^2A}}$.
- Q10. Find the HCF of 405 and 2520 using Euclid's division lemma.

Section - C (3 Marks each)

- Q11. If α and β are zeros of $2x^2 - 3x + 2$, then form a quadratic polynomial whose zeroes are $\frac{\alpha^2}{\beta}$ and

- Q12. Evaluate : $\frac{\frac{\beta^2}{\alpha} \cdot \tan^2 60^\circ + 4\text{Sin}^2 45^\circ + 3\text{Sec}^2 30^\circ + 5\text{Cos}^2 90^\circ}{\text{Sin} 60^\circ + \text{Cos} 30^\circ}$.

- Q13. Determine the value of 'k' so that the following system of linear equations has no solution :

$$(3k + 1)x + 3y - 2 = 0$$

$$(k^2 + 1)x + (k - 2)y - 5 = 0$$

What will be the graphical representation of that system of equations?

- Q14. Compute the modal age of the students appearing for an entrance test from the following data :

| Age (in years) | No. of students |
|----------------|-----------------|
| 16-18 | 50 |
| 18-20 | 78 |
| 20-22 | 46 |
| 22-24 | 28 |
| 24-26 | 23 |

- Q15. Prove that the area of an equilateral triangle described on one side of a square is equal to half the area of the equilateral triangle described on one of its diagonals.

- Q16. Three measuring rods are 64cm, 80cm & 90cm in length. Find the least length of cloth that can be measured an exact number of times, using any of the rods.

- Q17. Prove that : $\sqrt{\frac{\text{Sec}\theta-1}{\text{Sec}\theta+1}} + \sqrt{\frac{\text{Sec}\theta+1}{\text{Sec}\theta-1}} = 2\text{Cosec}\theta$.

- Q18. Solve for x and y :

$$\frac{ax}{b} - \frac{by}{a} = a + b$$

$$ax - by = 2ab$$

Calculate the mean from the following data, using step-deviation method

| Classes | Frequency |
|---------|-----------|
| 20-24 | 10 |
| 25-29 | 12 |
| 30-34 | 8 |
| 35-39 | 20 |
| 40-44 | 11 |
| 45-49 | 4 |
| 50-54 | 5 |

Q20. A girl of height 90cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6m above the ground, find the length of her shadow after 4 seconds.

Section - D (4 Mark each)

Q21. Obtain all the zeros of the polynomial $f(x) = 3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of the zeroes are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$.

Q22. A man travels 370 km partly by train and partly by car. If he covers 250km by train and rest by car, it takes him 4 hours. But if he travels 130km by train and rest by car, he takes 18 minutes longer. Find the speed of the train and of the car.

Q23. Evaluate : $\frac{\sin 15^\circ \cos 75^\circ + \cos 15^\circ \sin 75^\circ}{\tan 5^\circ \tan 30^\circ \tan 35^\circ \tan 55^\circ \tan 85^\circ} + \frac{4}{3} (\sec^2 59^\circ - \cot^2 31^\circ)$

Q24. For helping the children in an orphanage, ^{some} ~~40~~ students of a class saved their pocket money as given in the following table :

| | | | | | | | |
|----------------------|------|-------|-------|-------|-------|-------|-------|
| Money saved (in Rs.) | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 |
| No. of students | 3 | f_1 | 9 | 12 | 5 | 3 | 2 |

Find f_1 if the median of this data is 32.5. Also, mention the value depicted by the students.

Q25. State and Prove the converse of Pythagoras theorem.

Q26. Prove that $\sqrt{7}$ is an irrational number. Hence prove that $3 - 5\sqrt{7}$ is irrational.

Q27. Solve the following system of linear equation graphically :

$$3x + y + 1 = 0$$

$$2x - 3y + 8 = 0$$

Also, find the area of the triangle bounded by these lines and y axis.

Q28. Prove : $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \cdot \operatorname{cosec} \theta$.

Q29. During a medical check-up of 60 students of a class, their weights were recorded as follows : Draw less than ogive for the given data.

| | | | | | | | | |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Weight (in kg.) | 20-25 | 25-30 | 30-35 | 35-40 | 40-45 | 45-50 | 50-55 | 55-60 |
| No. of Students | 4 | 6 | 12 | 8 | 10 | 14 | 2 | 4 |

Also, find median from the graph.

Q30. If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$

Show that $m^2 - n^2 = 4\sqrt{mn}$.

Q31. In an equilateral triangle ABC, D is a point on BC such that $BD = \frac{1}{3} BC$. Prove that $9AD^2 = 7AB^2$.

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