THE MOTHER'S INTERNATIONAL SCHOOL
SUMMATIVE ASSESSMENT-1(2013-2014)
CLASS X
SUBJECT: MATHEMATICS

TIME: 3 HOURS   M.M.:90

General Instructions:
(i) All questions are compulsory.
(ii) The question paper consists of 34 questions divided into four sections A, B, C and D. Section A comprises of 8 questions of 1 mark each, section B comprises of 6 questions of 2 marks each, section C comprises of 10 questions of 3 marks each and section D comprises of 10 questions of 4 marks each.
(iii) Question numbers 1 to 8 in section A are multiple choice questions where you are required to select one correct option out of the given four.
(iv) There is no overall choice.
(v) Use of calculators is not permitted.

SECTION A

Question numbers 1 to 8 are of one mark each.

Q1. Which of the following rational numbers is expressible as a non-terminating repeating decimal?

(a) $\dfrac{1351}{1250}$ (b) $\dfrac{2017}{250}$ (c) $\dfrac{3219}{1800}$ (d) $\dfrac{1723}{625}$

Q2. The larger of two supplementary angles exceeds the smaller by 24^0. Then the angles are

(a) $122^\circ,\ 98^\circ$ (b) $112^\circ,\ 88^\circ$ (c) $102^\circ,\ 78^\circ$ (d) $92^0,\ 62^0$

Q3. A quadratic polynomial whose one zero is 5 and product of zeroes is 0, is

(a) $x^2 - 5$ (b) $5x^2 + 1$ (c) $x^2 + 5x$ (d) $x^2 - 5x$

Q4. If in Δ DEF and Δ PQR, $\angle D = \angle Q$ and $\angle R = \angle E$. Then which of the following is not true?

(a) $\dfrac{EF}{PR} = \dfrac{DF}{PQ}$ (b) $\dfrac{DE}{PQ} = \dfrac{EF}{RP}$ (C) $\dfrac{DE}{QR} = \dfrac{DF}{PQ}$ (d) $\dfrac{EF}{RP} = \dfrac{DE}{QR}$

Q5. If A, B, and C are interior angles of Δ ABC, then $\tan\left(\dfrac{A+B}{2}\right) = $

(a) $Sin\dfrac{C}{2}$ (b) $Cot\dfrac{C}{2}$ (c) $Tan\dfrac{C}{2}$ (d) $Cos\dfrac{C}{2}$

Q6. Which of the following is possible?

(a) $Cos\theta = \dfrac{7}{5}$ (b) $Sin\theta = \dfrac{13}{12}$ (c) $Sec\theta = \dfrac{4}{5}$ (d) $Tan\theta = 41$

Q7. If the curves for more than ogive and and less than ogive of a given grouped data meet at a point (30, 45), then the median of the data is

(a) 30   (b) 45   (c) 75   (d)15

Q8. Two alarm clocks ring their alarms at regular intervals of 50 seconds and 48 seconds. If they first beep together at 12 noon, at what time will they beep again for the first time?

(a) 12.20 pm   (b) 12.12 pm   (c) 12.11 pm   (d) 12.21 pm

Q9. If α, β are zeroes of quadratic polynomial $2x^2 + 5x + k$, find the value of k such that $(\alpha + \beta)^2 - \alpha\beta = 24$

Q10. For what value of 'p', the following system of equations will be inconsistent

$4x + 6y = 11$, $2x + py = 7$

Q11. If $7\,Sin^2\theta + 3\,Cos^2\theta = 4$, find the value of $Tan\theta$

Q12. Check whether 8^n can end with the digit 0 for any value of natural number n.

Q13. AC=BC in Δ ABC. If $AB^2 = 2AC^2$, prove that ABC is a right triangle.

Q14. Convert the given frequency distribution to a 'less than type' cumulative frequency distribution.

| Marks obtained	Number of students
More than or equal to 0	40
More than or equal to 20	35
More than or equal to 40	26
More than or equal to 60	14
More than or equal to 80	6

SECTION-C

Question numbers 15 to 24 carry 3 marks each.

Q15. BL and CM are medians of Δ ABC, right angled at A. Prove that $4(BL^2 + CM^2) = 5BC^2$
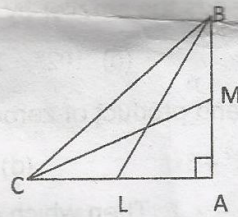
Q16. ABC and AMP are two right triangles, right angled at B and M respectively. Prove that

(i) Δ ABC ~ Δ AMP

(ii) $\dfrac{CA}{PA} = \dfrac{BC}{MP}$
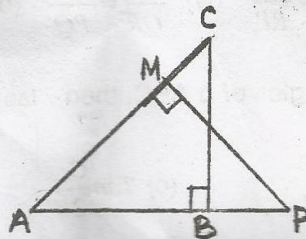
Q17. Find the zeroes of $4x^2 - 7$ and verify the relationship between the zeroes and its coefficients.

Q18. Use Euclid's Division Lemma to show that the square of any positive integer is either of the form 3m or 3m+1 for some integer m.

Q19. Evaluate

$$\frac{\tan^2 60^0 + 4\cos^2 45^0 + 3\cos ec^2 60^0 + 2\cos^2 90^0}{2\cos ec30^0 + 3\sec 60^0 - \dfrac{7}{3}\cot^2 30^0}$$

Q20. If $SecA = x + \dfrac{1}{4x}$, then prove that

$SecA + TanA = 2x$ or $\dfrac{1}{}$

Q21. Solve $px + qy = p - q$ and

$qx - py = p + q$

Q22. Find the modal age of employees in a factory. Also, interpret the value of mode obtained.

Age of employees (in years)	20-30	30-40	40-50	50-60	60-70
Number of employees	5	26	78	104	98

Q23. The median of the following data is 525. Find the values of x and y, if the total frequency is 100.

Class Interval	Frequency
0 – 100	2
100 – 200	5
200 – 300	x
300 – 400	12
400 - 500	17
500 - 600	20
600 - 700	y
700 - 800	9
800 - 900	7
900 - 1000	4

Q24. Draw the graphs of the equations $2x - y = 2$ and $4x - y = 8$. Shade the triangle formed by these lines and y-axis. Also, find the area of this triangle.

Q25. Prove that $\sqrt{3}$ is an irrational number and then prove that $5 - 2\sqrt{3}$ is also irrational.

Q26. Obtain other zeroes of $2x^4 - 6x^3 + 3x^2 + 3x - 2$, if two of its zeroes are $\frac{1}{\sqrt{2}}$ and $\frac{-1}{\sqrt{2}}$

Q27. State and prove the Basic Proportionality Theorem.

Q28. In $\triangle ABC$, P divides the side AB such that AP:PB=1:2. Q is a point on AC such that PQ II BC. Find the ratio of the areas of $\triangle APQ$ and trapezium BPQC.

Q29. Evaluate

$$\frac{\sec 31°}{\text{Cosec}59^0} + \frac{\text{Sin}(90^0 - \theta)\text{Cosec}(90^0 - \theta)\text{Cot}\theta}{\text{Sec}(90^0 - \theta)\text{Cos}(90^0 - \theta)\text{Tan}(90^0 - \theta)} + \frac{\tan 1° \tan 40° \tan 50° \tan 89° \tan 60°}{4(\text{Cos}^2 29° + \text{Cos}^2 61°)}$$

Q30. Prove that $\frac{Sin\theta - Cos\theta + 1}{Sin\theta + Cos\theta - 1} = \frac{1}{Sec\theta - Tan\theta}$ using the identity $Sec^2\theta = 1 + Tan^2\theta$

Q31. Prove that $\frac{Cot\theta}{1 + Tan\theta} = \frac{Cot\theta - 1}{2 - Sec^2\theta}$

Q32. In a factory, 4 men and 6 boys can finish a piece of work in 20 days while 3 men and 4 boys can finish it in 28 days. Find the time taken by one man alone and by one boy alone to finish the work.

Is it correct for the factory owner to make young boys work in his factory? Give a suggestion to improve the condition of the young boys working in this factory.

Q33. The table gives the frequency distribution of the number of teachers in Higher Secondary Schools in 1978 in India. Find mean number of teachers in Higher Secondary Schools in 1978 in India.(Use Step Deviation Mehod)

Number of	Number of Higher Secondary Schools
6 – 10	955
11 – 15	1067
16 – 20	1663
21 – 25	1492
26 – 30	1220
31 – 35	1129
36 – 40	745
41 - 45	637
46-50	442
	9350

Q34.

Marks	Number of students
0 – 5	5
5 – 10	7
10 – 15	11
15 – 20	13
20 – 25	25
25 – 30	22
30 – 35	12
35 - 40	5

The data gives the frequency distribution of the marks obtained by students in a test. Change the distribution to a more than type distribution and draw its ogive. Hence, obtain median marks from the graph.