DELHI PUBLIC SCHOOL NEWTOWN
SESSION 2020– 21
HALF YEARLY EXAMINATION(ONLINE)

CLASS: IX **FULL MARKS: 40**
SUBJECT: MATHEMATICS **TIME: 1 HOUR 15 MINUTES**

Instructions:

- **All questions are compulsory.**
- **This paper consists of 1 printed page.**
- **All working including rough work must be clearly shown on the same sheet as the rest of the answers.**

Question 1:

(a) If $x = 7 + 4\sqrt{3}$ then find the value of $x^2 - \frac{1}{x^2}$ **[3]**

(b) Factorise : $12mn^2 + 8mn - 20m$ **[3]**

(c) A sum of money amounts to ₹11,520 at the end of two years and ₹13824 at the end of three years. Find the sum and the rate of compound interest? **[4]**

Question 2:

(a) In what time will ₹2400 amount to ₹2646 at 10% p.a. compounded semi-annually? **[3]**

(b) The co-ordinates of points on the x-axis which are at a distance of 5 units from the point (6, -3). Find the points. **[3]**

(c) If p and q are rational numbers and $p - q\sqrt{15} = \frac{2\sqrt{3}-\sqrt{5}}{4\sqrt{3}-3\sqrt{5}}$ find the values of p and q. **[4]**

Question 3:

(a) Prove that $\sqrt{11}$ is irrational number by the method of contradiction. **[3]**

(b) Evaluate:

$$2sin^2 30° tan 60° - \frac{3cos^2 60°}{cos^2 30°} + cos^3 90° tan^2 0° + tan^2 45°$$ **[3]**

(c) In a parallelogram ABCD, E and F are the midpoints of AB and CD respectively. Show that the line segments AF and EC trisect the diagonal BD. **[4]**

Question 4:

(a) Evaluate:

$$cot 25° cot 40° cot 45° cot 50° cot 60° cot 65°$$ **[3]**

(b) Show that the vertices (2,-1), (3,4), (-2,3) and (-3,-2), taken in order, are the vertices of a rhombus. Also find its area. **[3]**

(c)if $sin\theta = \frac{4}{5}$ find the value of $\frac{4tan\theta - 5cos\theta}{sec\theta + cot\theta}$ **[4]**