

Entrance Exam to IB Diploma Program

Subject: **Mathematics**

Duration: 90 min

Date:

Group D

Name: _____

1. Find coordinates of a point on the y -axis, whose distance from a midpoint of a line segment joining $A(2, -2)$ and $B(4, -6)$ is $3\sqrt{2}$. [3]
2. Determine the real parameter m so that the function $f(x) = (m+1)x^2 - mx + 2$ has a minimum value of 1. [3]
3. Solve exponential equation: $72 \cdot 7^{x-2} + 7^x = 11^x$. [3]
4. Simplify the expression: $\left(\left(\frac{3x^{-3}}{5y^{-2}} \right)^{-3} \div \left(\frac{9x^{-1}}{5y^{-3}} \right)^{-2} \right) \cdot \frac{x^{-6}y}{15}$. [3]
5. Evaluate $\frac{2 \sin x - \sin 2x}{2 \sin x + \sin 2x}$ for $x = \frac{2\pi}{3}$. [4]
6. Find the domain of the function $y = \frac{x^2 - 1}{x + 5} \log(x^2 - 4)$. [4]

Good luck!