

Entrance Exam to IB Diploma Program

Subject: **Mathematics**

Duration: 90 min

Date:

Group C

Name: _____

1. For the function $y = (2a - 4)x + (a - 3)$ determine the values of parameter a so that the function has negative y -intercept **and** is an increasing function. [3]
2. Find in the form $f(x) = ax^2 + bx + c$ the equation of the quadratic whose graph cuts the x -axis at 4, has minimum value of 9 and $f(0) = -8$. [3]
3. Solve exponential equation: $16 \cdot 9^x + 23 \cdot 12^x = 18 \cdot 16^x$. [3]
4. If $a = -\frac{1}{5}$, $b = 0.1$ find the value of expression: $\frac{a^{-2}b^{-1} + a^{-1}b^{-2}}{a^{-2} - b^{-2}}$. [3]
5. Determine the value of expression $\sin^4 \alpha + \cos^4 \alpha$ if $\sin \alpha - \cos \alpha = \frac{1}{2}$. [4]
6. Find the domain of the function $y = \sqrt{\frac{x-1}{x}} \log(2x-1)$. [4]

Good luck!