

Entrance Exam to IB Diploma Program

Subject: **Mathematics**

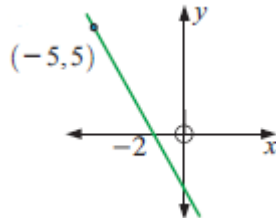
Duration: 90 min

Date: 19th June, 2017

Group B

Name: _____

1. Determine the equation of the illustrated line, its sign and increase/decrease.



[3]

2. It is given parabola $f(x) = ax^2 + bx + c$. Determine the coefficients a , b and c so that the function has x -intercept $x = 3$, extreme value for $x = 1$ and $f(2) = -3$. Hence, sketch the graph of the function by showing all important features (axes intercepts, turning point, axis of symmetry). Also, determine sign of the function and intervals of increase/decrease.

[3]

3. Solve exponential equation: $21 \cdot 3^x - 5^{x+1} = 3^{x+1} + 5^{x+2}$.

[3]

4. If $a = \frac{\sqrt{2}}{2}$, $b = \frac{1}{\sqrt[3]{2}}$ find the value of expression: $\left[a^{-\frac{3}{2}} \cdot b \cdot (ab^{-2})^{-\frac{1}{2}} (a^{-3})^{\frac{2}{3}} \right]^3$.

[3]

5. If α is acute angle, and $\sin \alpha = \frac{4}{5}$ find the value of expression $\cos \alpha + \sin \alpha \cdot \tan \alpha$.

[4]

6. Find the domain of the function $y = \sqrt{\log_{\frac{1}{7}} \frac{x-1}{x+5}}$.

[4]

Good luck!