

## Entrance Exam to IB Diploma Program

Subject: **Mathematics**

Duration: 90 min

Date: 25<sup>th</sup> June, 2018

Name: \_\_\_\_\_

1. Find  $P\left(\frac{1}{2}\right)$  if  $P\left(\frac{x-2}{2}\right) = x^2 + 4x - 1$ . [3]
2. Find the equation of the quadratic function whose graph has vertex  $(-4, 1)$  and passes through  $(1, 11)$ . 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 the inequality:  $2^{x+3} - 5^x < 7 \cdot 2^{x-2} - 3 \cdot 5^{x-1}$ . [4]
4. Solve the equation:  $\log_4(x+12) \cdot \log_x 2 = 1$ . [5]
5. Find the value of the expression:  $\frac{\sin(-328^\circ)\sin 958^\circ}{\cot 572^\circ} - \frac{\cos(-508^\circ)\cos(-1022^\circ)}{\tan(-212^\circ)}$ . [5]

Good luck!