

## Entrance Exam to IB Diploma Program

Subject: **Mathematics**

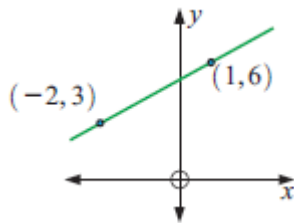
Duration: 90 min

Date: 19<sup>th</sup> June, 2017

Group A

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

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



[3]

2. It is given parabola  $f(x) = ax^2 + 2x + c$ . Determine the coefficients  $a$  and  $c$  so that the function has  $x$ -intercept  $x = -2$  and passes through the point  $M(3, 5)$ . 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:  $3 \cdot 4^x + \frac{1}{3} \cdot 9^{x+2} = 6 \cdot 4^{x+1} - \frac{1}{2} \cdot 9^{x+1}$ .

[3]

4. If  $x = 0,1$ ,  $y = 10^{-2}$  find the value of expression:  $\left(\frac{3x^{-2}y^3}{2xy^{-2}}\right)^{-2} \div \frac{4}{3}\left(\frac{y^{-3}}{x^{-1}}\right)^3$ .

[3]

5. Determine the value of expression  $\tan^2 \alpha + \frac{1}{\sin \alpha \cos \alpha} + \cot^2 \alpha$  if  $\tan \alpha + \cot \alpha = 3$ .

[4]

6. Find the domain of the function  $y = \sqrt{\log_{\frac{1}{2}} \frac{2x+3}{x}}$ .

[4]

Good luck!