**Instructions for the mathematics reports (Form 4 attachment 1)**

Form 4 attachment 1

Applicants must submit evidence of their work in the following sections:

Section 1. Mathematics problem solving

 Section 2. Mathematics inquiry-based report

This evidence can be in the form of photographs or digital scans of work from your school assignments or independent work conducted over the last year, or you may create a new piece of work for this application. The evidence can be pasted in the boxes provided in this document or uploaded as separate A4 PDF files.

Form 4 attachments include:

* Formula Booklet (see attachment 2)
* Mathematical Inquiry and Modelling (see attachment 3)

**Formula Booklet (Form 4 attachment 2)**

Form 4 attachment 2

Please use at least one of mathematics formulae in section 1 and section 2 of this form.

|  |  |
| --- | --- |
| Name of formulae | Formulae |
| 1. Equation of a straight line
2. Gradient/slope formula between two points $(x\_{1}, y\_{1})$ and $(x\_{2}, y\_{2})$
3. Distance between two points $(x\_{1}, y\_{1})$ and $(x\_{2}, y\_{2})$
4. Solutions of a quadratic equation

⑤ Equation of a quadratic function⑥ Equation of the axis of symmetry of a quadratic function⑦ Volume of a sphere⑧ Volume of a cone and pyramid⑨ Pythagorean Theorem⑩ Area and volume ratio of similar triangles⑪ Probability of an event A⑫ Complementary events⑬ Combined events ⑭ Independent events ⑮ Conditional probability⑯ Mean of a set of data⑰ Interquartile range (IQR) | 1. $y=mx+c ; ax+by+d=0$

② $m=\frac{y\_{2}-y\_{1}}{x\_{2}-x\_{1}}$③ $d=\sqrt{(x\_{1}-x\_{2})^{2}+(y\_{1}-y\_{2})^{2}}$④ $\left(x-α\right)\left(x-β\right)=0$ ⇒ $x=α, x=β$$$ ax^{2}+bx+c=0$$ ⇒ $x=\frac{-b\pm \sqrt{b^{2}-4ac}}{2a} , a\ne 0$1. $f\left(x\right)=ax^{2}+bx+c , a\ne 0$
2. $f\left(x\right)=ax^{2}+bx+c , a\ne 0 ⇒ x=-\frac{b}{2a}$
3. $V=\frac{4}{3}πr^{3}$, where $r$ is the radius
4. $V=\frac{1}{3}πr^{2}h$, where $r$ is the radius and $h$ is the height
5. $c^{2}=a^{2}+b^{2}$, where $c$ is the hypotenuse of a right triangle

⑩ With a similarity ratio of $\frac{m}{n}$,  ⇒ the ratio of areas is $\left(\frac{m}{n}\right)^{2}$　　　 ⇒ the ratio of volumes is $\left(\frac{m}{n}\right)^{3}$　⑪ $P\left(A\right)=\frac{number of outcomes in A}{total number of outcomes}$⑫ $P\left(A^{'}\right)=1-P(A)$⑬ $P\left(A⋃B\right)=P\left(A\right)+P\left(B\right)-P(A∩B)$⑭ $P\left(A∩B\right)=P\left(A\right)×P\left(B\right)$⑮ $P\left(B\right)=\frac{P(A∩B)}{P(B)}$⑯ Mean $=\frac{sum of the values}{total number of values}$⑰ IQR $=upper quartile-lower quartile$ $=Q\_{3}-Q\_{1}$ |

 **Descriptors for mathematical inquiry (Form 4 attachment 3)**

Form 4 attachment 3

Please use one of the following descriptors when you write a mathematics report.

<Descriptors for mathematical inquiry>

|  |  |  |
| --- | --- | --- |
|  | Descriptors | Prompt questions |
| Setting the goal | Research a topic to be studied, state the problem being explored and the desired end result. | * What is your topic and why?
* What is your research question?
* What do you expect in your result?
 |
| Planning | Propose one or more mathematical processes to find the solution to the problem. | * What formulas/ graphs/ problem-solving techniques will you use and why?
 |
| Mathematical working | Show, with working, the processes chosen. Define all variables and units being used if appropriate. Clearly show the final solution.  | * What was the most important steps in your mathematics?
* How did you find the results?
 |
| Justification | Determine if the answer found is correct or incorrect, with relevant working or explanations shown. Describe what it means in the context of the topic.  | * Is your answer mathematically correct?
* Is your answer appropriate in your context?
 |
| Conclusion | Extend the results to further applications, reflect on the reliability of the work done, or explain any problems and complications faced.  | * What was the result?
* What was the strength and weakness of your report and how would you improve it?
* How would you expand the idea in the next?
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