

Middle Years Programme

**MYP Honors Advanced Algebra**

**Formula Booklet**

For use during the course and examinations



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**Command terms with definitions**

**Calculate** - Obtain a numerical answer showing the relevant stages in the working.

**Comment** – Give a judgment based on a given statement or result of a calculation.

**Compare** - Give an account of the similarities between two (or more) items or situations, referring to both (all) of them throughout.

**Contrast** - Give an account of the differences between two (or more) items or situations, referring to both (all) of them throughout.

**Construct** – Display information in a diagrammatic or logical form.

**Deduce** - Reach a conclusion from the information given.

**Describe** – Give a detailed account.

**Determine** - Obtain the only possible answer.

**Draw** – Represent by means of a labelled, accurate diagram or graph drawn to scale. A straight edge should be used.

**Estimate** - obtain an approximate value.

**Explain** - give a detailed account, including reasons or causes.

**Find** - obtain an answer, showing relevant stages in the working.

**Hence** - use the preceding work to obtain the required result.

**Hence or otherwise** - it is suggested that the preceding work is used, but other methods could also receive credit.

**Identify** - provide an answer from a number of possibilities.

**Interpret** - use knowledge and understanding to recognize trends and draw conclusions from given information.

**Justify** - give valid reasons or evidence to support an answer or conclusion.

**List** - give a sequence of brief answers with no explanation.

**Plot** - mark the position of points on a diagram.

**Predict** - give an expected result.

**Show** - give the steps in a calculation or derivation.

**Show that** - obtain the required result (possibly using information given) without the formality of proof. “Show that” questions do not generally require the use of a calculator.

**Sketch** - represent by means of a diagram or graph (labelled as appropriate). The sketch should give a general idea of the required shape or relationship, and should include relevant features.

**Solve** - obtain the answer(s) using algebraic and/or numerical and/or graphical methods.

**State** - give a specific name, value or other brief answer without explanation or calculation.

**Suggest** - propose a solution, hypothesis or other possible answer.

**Verify** - provide evidence that validates the result.

**Write down** - obtain the answer(s), usually by extracting information. Little or no calculation is required. Working does not need to be shown.

**Number and Algebra**

|  |  |
| --- | --- |
| Arithmetic sequences | Recursive Formula (start at 0) |
| Recursive Formula (start at 1) |
| Explicit Formula (start at 0) |
| Explicit Formula (start at 1) |
| Geometric sequences | Recursive Formula (start at 0) |
| Recursive Formula (start at 1) |
| Explicit Formula (start at 0) |
| Explicit Formula (start at 1) |
| Geometric series |  |
| Percent Change | Given an original value, *OV*, and a new value, *NV* |
| Continuous exponential growth formula |  |
| Compound Interest Formula | , where *r* is expressed as a decimal, *n* is the compounding periods per year, and *t* is the number of years. OR  , where *r* is expressed as a percent, *n* is the compounding periods per year, and *t* is the number of years. |
| Imaginary number |  |

**Mathematical Models**

|  |  |
| --- | --- |
| Slope-intercept form of a line. |  |
| Point slope form of a line. |  |
| Slope of a line between two points |  |
| Standard Form of a line | , where *A, B, C* are integers and *A* > 0 |
| Axis of symmetry of a graph of a quadratic function | axis of symmetry |
| Solutions of a quadratic equation |  |
| Discriminant |  |
| Standard form of a circle |  |
| The equation of a vertical parabola at vertex (*h*, *k*) |  |
| The equation of a horizontal parabola at vertex (*h*, *k*) |  |

**Logarithms**

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| --- | --- |
| Exponential equation and logarithms |  |
| Natural Logarithms |  |
| Inverse Property |  |
| Product Property |  |
| Quotient Property |  |
| Power Property |  |
| Change of base |  |

**Statistics and Probability**

|  |  |
| --- | --- |
| The probability of *A* and *B* | P(*A* and *B*) = P(*A*) P(*B*) |
| The probability of *A* or *B* | P(*A* or *B*) = P(*A*) + P(*B*) – P(*A* and *B*) |
| Conditional Probability:  The probability of *A* given *B* |  |
| The number of permutations of *n* objects chosen *r* at a time | *n*P*r* = |
| The number of combinations of *n* objects chosen *r* at a time | *n*C*r* = |
| Counting Principle | If there are *m* ways to do one thing and *n* ways to do another, then there are ways of doing both. |
| Confidence interval information | For a 90% confidence interval, the *z*-score is 1.645  For a 95% confidence interval, the *z*-score is 2  For a 99% confidence interval, the *z*-score is 2.576 |
| Standardized Normal variable (*z*-score) |  |
| Margin of Error |  |
| Confidence Interval |  |
| Range | Max – Min |
| Interquartile Range |  |

**Trigonometry**

|  |  |  |
| --- | --- | --- |
| Right Triangle Trig | sine | In any right triangle with acute angle θ |
| cosine | In any right triangle with acute angle θ |
| tangent | In any right triangle with acute angle θ |
| Cosine Rule | | , |
| Sine Rule | |  |
| Area of a triangle | |  |

**Geometry**

|  |  |  |
| --- | --- | --- |
| Area Formulas | Triangle | For any triangle with base length, *b*, and height, *h* |
| Square | For any square with a side length, *s* |
| Rectangle | For any rectangle with length, *l*, and height, *w* |
| Parallelogram | For any parallelogram with base length, *b*, and height, *h* |
| Trapezoid | For any trapezoid with bases, *b*1 and *b*2, and height, *h* |
| Circle | For any circle with radius, *r* |
| Perimeter | Any Polygon | The perimeter of any polygon is the sum of the sides |
| Circle  (2 formulas) | For any circle with radius, *r*, and diameter, *d* |
| Surface Area | Sphere | Surface area of a sphere with radius, *r*. |
| Cone | Area of the curved surface of a cone with radius, *r*, and slant height, *l*. |
| Cylinder | Area of the curved surface of a cylinder with radius, *r*, and height, *h*. |
| Interior Angles of a polygon | | For any polygon with *n* sides, the sum of the interior angles is |
| Volume | Cube | For any cube with side length, *s* |
| Solid Rectangular Prism (Box) | For any solid rectangular prism with length, *l*, width, *w*, and height, *h* |
| Sphere | Volume of a sphere with radius, *r*. |
| Right Cone | Volume of a right cone with radius, *r*, and height, *h*. |
| Cylinder | Volume of a cylinder with radius, *r* and height, *h* |
| Right Pyramid | Volume of a right pyramid where *A* is the area of the base, *h* is the height |
| The Pythagorean Theorem | | Given a right triangle with legs *a* and *b,* and hypotenuse *c,* then |
| Distance Formula | | Given the points and , the distance between them is |
| Midpoint Formula | | The midpoint of a segment connecting the points and is |
| Special Right Triangles | |  |