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The solution page of this book

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Formula List of Applications and Interpretation Standard Level for IBDP Mathematics

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20 Binomial Distribution

✓ Properties of a random variable $X \sim \mathrm{B}(n, p)$ following binomial distribution:

1. Only two outcomes from every independent trial (Success and failure)
2. n : Number of trials
3. p : Probability of success
4. X : Number of successes in n trials

✓ Formulae for binomial distribution:

1. $\mathrm{P}(X = r) = \binom{n}{r} p^r (1-p)^{n-r}$ for $0 \le r \le n,\ r \in \mathbb{Z}$
2. $\mathrm{E}(X) = np$: Expected value of X
3. $\mathrm{Var}(X) = np(1-p)$: Variance of X
4. $\sqrt{np(1-p)}$: Standard deviation of X
5. $\mathrm{P}(X \le r) = \mathrm{P}(X < r+1) = 1 - \mathrm{P}(X \ge r+1)$

21 Normal Distribution

✓ Properties of a random variable $X \sim \mathrm{N}(\mu, \sigma^2)$ following normal distribution:

1. μ : Mean
2. σ : Standard deviation
3. The mean, the median and the mode are the same
4. The normal curve representing the distribution is a bell-shaped curve which is symmetric about the middle vertical line
5. $\mathrm{P}(X < \mu) = \mathrm{P}(X > \mu) = 0.5$
6. The total area under the curve is 1

Applications and Interpretation Standard Level for IBDP Mathematics
Practice Paper Set 2 – Paper 1 (90 Minutes)

Question – Answer Book

Instructions

1. Attempt **ALL** questions. Write your answers in the spaces provided in this Question - Answer Book.

2. A graphic display calculator is needed.

3. You are suggested to prepare a formula booklet of Applications and Interpretation for IBDP Mathematics when attempting the questions.

4. Supplementary answer sheets and graph papers will be supplied on request.

5. Unless otherwise specified, **ALL** working must be clearly shown.

6. Unless otherwise specified, numerical answers should be either **EXACT** or correct to **3 SIGNIFICANT FIGURES**.

7. The diagrams in this paper are **NOT** necessarily drawn to scale.

8. Information to be read before you start the exam:

	Marker's Use Only	Examiner's Use Only	
Question Number	**Marks**	**Marks**	**Maximum Mark**
1			**6**
2			**4**
3			**5**
4			**5**
5			**6**
6			**6**
7			**6**
8			**6**
9			**5**
10			**6**
11			**7**
12			**6**
13			**6**
14			**6**
Overall			
Paper 1 Total			**80**

5. The table shows the first four terms of three sequences x_n, y_n and z_n.

n	1	2	3	4
x_n	100	300	500	700
y_n	100	300	400	450
z_n	100	300	900	2700

(a) State which sequence is

(i) arithmetic;

(ii) geometric.

[2]

(b) Find the 10th term of the arithmetic sequence.

[2]

(c) Find the sum of the first 10 terms of the geometric sequence.

[2]

8. Pavel is a famous football player who frequently uses a social media platform to share his life. The number of followers N for his account can be modelled by the function $N(t) = 16500(1.07)^t$, where t is the number of months after 1 January, 2019.

(a) Write down the number of followers of the account on 1 January, 2019.

[1]

(b) Find the number of followers of the account on 1 June, 2020, giving the answer correct to the nearest integer.

[2]

(c) Find the year when the number of followers first reaches 500000.

[3]

13. The derivative of f is given by $f'(x) = \frac{1000}{x^2} + 500x$, where $x \neq 0$. The graph of f passes through the point $\mathrm{P}(2, 600)$.

(a) Find an expression for $f(x)$.

[5]

The point Q is a point on the positive x-axis with x-coordinate q. The area of the triangle OPQ is 1500, where O is the origin.

(b) Write down the value of q.

[1]

AI SL Practice Set 2 Paper 1 Solution

1. (a) (i) 40 A1 N1

(ii) 1 A1 N1

(iii) 0 A1 N1

[3]

(b) The mean number of watermelons

$= \frac{(0)(12)+(1)(10)+(2)(6)+(3)(5)+(4)(5)+(5)(2)}{12+10+6+5+5+2}$ (A1) for correct formula

$= 1.675$ A1 N2

[2]

(c) Discrete A1 N1

[1]

2. (a) The required perimeter

$= 120+350+370$ (M1) for valid approach

$= 840 \text{ cm}$

$= 8.4\times10^2 \text{ cm}$ A1 N2

[2]

(b) The required area

$= \frac{(120)(350)}{2}$ (M1) for valid approach

$= 21000 \text{ cm}^2$

$= 2.1\times10^4 \text{ cm}^2$ A1 N2

[2]