Instructions:

1. There are 51 questions in this test.
2. Answer ALL questions.
3. The time allowed is 65 minutes.
4. Use of HKEAA approved calculators is allowed.
5. Write your answers in this question booklet.
   Section A: Mark your answers by putting a “✓” in the “ ”, e.g.:
   \[ 2 + 3 = \]
   \[ \bigcirc \text{ A. 4} \quad \bigcirc \text{ B. 5} \quad \bigcirc \text{ C. 6} \quad \bigcirc \text{ D. 7} \]
   Section B: Write your answers in the spaces provided.
   Section C: Write your mathematical expressions, answers and statements/conclusions in the spaces provided.
   There is NO need to show your rough work.
6. Do your rough work on the rough work sheet provided.
7. Write your School Code, Class and Class Number in the spaces below.

School Code [ ] [ ] [ ] [ ] [ ]
Class [ ] [ 3 ] Class No. [ ] [ ]

Write one capital letter in this box.
# Formulas for Reference

<table>
<thead>
<tr>
<th>Objec <strong>Sector</strong></th>
<th>Arc length</th>
<th>(= 2\pi r \times \frac{\theta}{360^\circ})</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area</td>
<td>(= \pi r^2 \times \frac{\theta}{360^\circ})</td>
</tr>
<tr>
<td><strong>Sphere</strong></td>
<td>Surface area</td>
<td>(= 4\pi r^2)</td>
</tr>
<tr>
<td></td>
<td>Volume</td>
<td>(= \frac{4}{3}\pi r^3)</td>
</tr>
<tr>
<td><strong>Cylinder</strong></td>
<td>Curved surface area</td>
<td>(= 2\pi rh)</td>
</tr>
<tr>
<td></td>
<td>Volume</td>
<td>(= \pi r^2 h)</td>
</tr>
<tr>
<td><strong>Right circular cone</strong></td>
<td>Curved surface area</td>
<td>(= \pi rl)</td>
</tr>
<tr>
<td><strong>Circular cone</strong></td>
<td>Volume</td>
<td>(= \frac{1}{3}\pi r^2 h)</td>
</tr>
<tr>
<td><strong>Pyramid</strong></td>
<td>Volume</td>
<td>(= \frac{1}{3} \times \text{base area} \times \text{height})</td>
</tr>
</tbody>
</table>
The diagrams in this paper are not necessarily drawn to scale.

SECTION A: Mark your answers by putting a “✓” in the “○”.

1. \(-9 - 2(-5) = \)
   ○ A. \(-19\)  ○ B. \(-16\)  ○ C. 1  ○ D. 55

2. Which of the following is correct?
   ○ A. \(\sqrt{47} > 7\)  ○ B. \(\sqrt{48} > 7\)
   ○ C. \(\sqrt{49} > 7\)  ○ D. \(\sqrt{50} > 7\)

3. Sam is \(x\) years old. Ada is 3 times as old as Sam. 4 years later, Ada will be
   ○ A. \((3x - 4)\) years old .  ○ B. \((3x + 4)\) years old .
   ○ C. \((3x + 8)\) years old .  ○ D. \(3(x + 4)\) years old .

4. Determine whether each of the following is factorization or expansion.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| (i) | \((x + 1)(x + 2)\)  
\= \(x^2 + 3x + 2\) |
| (ii) | \(x^2 + 5x + 4\)  
\= \((x + 1)(x + 4)\) |

○ A. (i) Factorization  
    (ii) Factorization

○ B. (i) Factorization  
    (ii) Expansion

○ C. (i) Expansion  
    (ii) Factorization

○ D. (i) Expansion  
    (ii) Expansion
5. Solve graphically \[ \begin{cases} x + 4 = 2y \\ 3x + y = 9 \end{cases} \]

- A. (0, 2)  
- B. (2, 3)  
- C. (3, 0)  
- D. (3, 2)  

(16)

6. If \( x \geq y \), which of the following is correct?

- A. \( x + 2 \leq y + 2 \)  
- B. \( x - 2 \leq y - 2 \)  
- C. \( -2x \leq -2y \)  
- D. \( \frac{x}{2} \leq \frac{y}{2} \)  

(17)

7. The weight of Mary is measured to be 28 kg correct to the nearest kg. Which of the following could be the actual weight of Mary?

- A. 27.2 kg  
- B. 27.3 kg  
- C. 28.4 kg  
- D. 28.5 kg  

(18)
8. Alex wants to measure the length of a key. Which of the following rulers gives the length with the smallest error?

- A. 
- B. 
- C. 
- D. 

9. Which of the following is an equilateral polygon?

- A. 
- B. 
- C. 
- D. 

10. Figure 1 is changed to Figure 2 after a single transformation. The transformation is

- A. rotation.
- B. reflection.
- C. translation.
- D. enlargement.
11. Find the image of the above figure after reflecting in the dotted line.

- A.  
- B.  
- C.  
- D.  

12. Which of the following triangles is similar to $\triangle PQR$ as shown in the above figure?

- A.  
- B.  
- C.  
- D.  

13. In the figure, $AB$ and $CD$ are straight lines intersecting at $O$. $a$ and $b$ are

- A. alternate angles .  
- B. angles at a point .  
- C. vertically opposite angles .  
- D. adjacent angles .  

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14. Which of the following nets can be folded into a cube?

- [ ] A.

- [ ] B.

- [ ] C.

- [ ] D.

15. Which of the following rectangular coordinate planes shows the position of the point $P(-2, 3)$?

- [ ] A.

- [ ] B.

- [ ] C.

- [ ] D.
16. If the point $M(3, 2)$ is reflected in the $x$-axis to $M'$, then the coordinates of $M'$ are

- A. $(2, 3)$.
- B. $(3, -2)$.
- C. $(-3, 2)$.
- D. $(-3, -2)$.

17. In the figure, the mid-point of $PQ$ is

- A. $(-4, -4)$.
- B. $(-2, 4)$.
- C. $(-1, 2)$.
- D. $(0, 2)$.

18. Refer to the figure. Find $BC$ correct to 3 significant figures.

- A. $6.69$ cm
- B. $7.43$ cm
- C. $9.00$ cm
- D. $11.1$ cm
19. The manager of a restaurant wants to know the opinions of customers on the hygiene, service, food quality and location of the restaurant. Which of the following methods of collecting data is most appropriate?

- A. Doing experiments with the customers
- B. Observing the behaviour of the customers
- C. Handing out questionnaires to the customers
- D. Reviewing the past sales records of the restaurant

20. The following charts show the annual profits of a watch factory in 2004 and 2005. Which chart is most correct in showing the ratio of the profits in 2004 and 2005?

- A.

```
Profit ($ million)  
8 6
4 2

2004 2005
```

- B.

```
Profit ($ million)  
8 6
4 2

2004 2005
```

- C.

```
Profit ($ million)  
8 6
4 2

2004 2005
```

- D.

```
```

21. Find the median of the following numbers:

4, 5, 5, 7, 10, 17

- A. 5
- B. 6
- C. 7
- D. 8
SECTION B : Write down your answers in the spaces provided.

22. Janet deposits $20 000 in a bank at an interest rate of 3% p.a. Simple interest is paid by the bank. What is the simple interest that she will receive after 2 years?

Answer : The simple interest is $__________________ .

23. In a mathematics test, Ada got 80 marks and Bill got 48 marks. Find the ratio of Ada’s marks to Bill’s marks in the form $a : b$.

Answer : The ratio is __________ : __________ .

24. Find the $n^{th}$ term of the following sequence:

4, 8, 12, 16, 20, ...

Answer : The $n^{th}$ term is ________________ .

25. Consider the polynomial $5x^4 - x^2 + 7x - 2$. Find its constant term.

Answer : The constant term is ________________ .

26. Expand $-3x(2 - x + 4x^3)$.

Answer : $-3x(2 - x + 4x^3) = $______________

27. Factorize $x^2 - 6x + 9$.

Answer : $x^2 - 6x + 9 = $______________

28. In the figure, the area of the rectangle is 90 cm$^2$. Write an equation to find $x$.
(You are not required to solve the equation.)

Equation : ________________

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29.

The above figure has rotational symmetry. The order of rotational symmetry is _____.

30.

In the figure, \( \triangle ABC \sim \triangle PQR \). Find the values of \( x \) and \( y \).

Answers: \( x = \) _____, \( y = \) _____

31. Refer to the figure. Find the value of \( x \).

Answer: \( x = \) _____

32. In the figure, \( \triangle ABC \) is equilateral. \( BCD \) is a straight line. Find the value of \( x \).

Answer: \( x = \) _____
33. Which of the lines are axes of rotational symmetry of the above cubes? (There may be more than one answer.)

Answer: ________________

34. If the point $M(-4, 2)$ is translated 5 units to the right, then the new coordinates of $M$ are __________.

35. Refer to the figure. Find $\theta$ correct to 1 decimal place.

Answer: $\theta = \underline{\text{__________}}$
36. In the figure, \(AB, CD\) and \(EF\) are parallel lines. Find the value of \(x\).

Answer: \(x = \underline{\text{ }}\)

37. The figure shows a regular hexagon \(ABCDEF\) and a right-angled triangle \(EFH\). \(AFH\) is a straight line. Find the value of \(x\).

Answer: \(x = \underline{\text{ }}\)

38. The figure shows a triangular prism, where \(ABCD\) and \(BCEF\) are rectangles. \(ABCD\) is a horizontal plane and \(BCEF\) is a vertical plane. Name the angle between the line \(AF\) and the plane \(ABCD\).

Answer: \(\underline{\text{ }}\)

39. Which of the following triangles is/are right-angled? (There may be more than one answer.)

Answer: \(\underline{\text{ }}\)
40. In the polar coordinate plane, the polar coordinates of $A$ are (_____, _____).

41. A teacher wants to find out the most popular kind of books among the students. Put the following stages in order. Example: (1) $\rightarrow$ (2) $\rightarrow$ (3) $\rightarrow$ (4)

(1) Present the data using a pie chart.
(2) Collect the records of borrowed books from the school library.
(3) Read from the pie chart the most popular kind of books among the students.
(4) Organize and tabulate the records of borrowed books by their kinds.

Answer: ______________________________________

42. The pie chart below shows the grades of 198 students in a science project.

**Grades of 198 students in a science project**

(a) Which grade do the most students get?

Answer: The most students get Grade ________.

(b) How many students get Grade D?

Answer: ________ students get Grade D.

(c) There are 30 students getting Grade B in the project. Find the number of students getting Grade A.

Answer: ________ students get Grade A.
SECTION C: Write your mathematical expressions, answers and statements/conclusions in the spaces provided. There is NO need to show your rough work.

43. The following table shows the number of visitors to the Art Gallery from January to May this year.

<table>
<thead>
<tr>
<th>Month</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of visitors</td>
<td>19 857</td>
<td>20 784</td>
<td>21 049</td>
<td>18 798</td>
<td>20 065</td>
</tr>
</tbody>
</table>

Estimate the total number of visitors to the Art Gallery from January to May this year. Explain your method of estimation.

44. Solve the simultaneous equations \( \begin{cases} x + y = 1 \\ x = 2y + 4 \end{cases} \).

(Show your working)
45. David deposits $2000 in a bank for 3 years. The interest rate offered by the bank is 10% p.a. compounded yearly. Find the amount that David will receive.

(Show your working)

46. The examination fee ($E$) of a public examination is given by the formula $E = 250 + 120n$, where $n$ is the number of papers taken by a student ($n \geq 1$).

(a) Make $n$ the subject of the formula.

(Show your working)

(b) James pays $1090 to sit for $n$ papers in the public examination. Find $n$.

(Show your working)
47. The radius and the circumference of a circular flower-bed are \( r \) m and \( 10\pi \) m respectively.

(a) Find the value of \( r \).

(Show your working)

(b) Find the area of the circular flower-bed in terms of \( \pi \).

(Show your working)

48. Tin Tin Restaurant fixes a rectangular signboard on a vertical wall with a straight rod \( AB \) (as shown in the figure). Given \( AB = 1.7 \) m and \( AC = 0.8 \) m, find the length \( BC \) of the signboard.

(Show your working)
49. In the figure, $\angle ABC = 90^\circ$, $\angle ADC = 90^\circ$ and $AB = AD$. Prove that $\triangle ABC \cong \triangle ADC$.

(Proof)

50. The heights of five players in a basketball team are 170 cm, 179 cm, 184 cm, 185 cm and 197 cm. Find their mean height.

(Show your working)
51. The following advertisement is cut from a newspaper.

(a) What are the weekly sales of magazines A, B and C?

Answer: The weekly sales of magazine A are ________ copies.
The weekly sales of magazine B are ________ copies.
The weekly sales of magazine C are ________ copies.

(b) Explain why the bar chart is misleading.

END OF PAPER