## 9 ME 1 ( $\mathbf{Q}$ )



## INSTRUCTIONS

1. There are 47 questions in this paper.
2. Time allowed is 65 minutes.
3. Answer ALL questions in the separate ANSWER BOOKLET.
4. The use of HKEAA approved calculators is permitted.
5. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
6. Rough work should be done on the rough work sheet provided.
7. The diagrams in this paper are not necessarily drawn to scale.

## FORMULAS FOR REFERENCE

| Sector | Arc length | $=2 \pi r \times \frac{\theta}{360^{\circ}}$ |
| :---: | :---: | :---: |
|  | Area | $=\pi r^{2} \times \frac{\theta}{360^{\circ}}$ |
| Sphere | Surface area | $=4 \pi r^{2}$ |
|  | Volume | $=\frac{4}{3} \pi r^{3}$ |
| Cylinder | Curved surfa | $=2 \pi r h$ |
|  | Volume | $=\pi r^{2} h$ |
| Cone | Curved surface area $=\pi r l$ |  |
|  | Volume | $=\frac{1}{3} \pi r^{2} h$ |
| Prism | Volume | $=$ base area $\times$ height |
| Pyramid | Volume | $=\frac{1}{3} \times \text { base area } \times \mathrm{hc}$ |

SECTION A: Choose the best answer for each question. You should mark all your answers in the ANSWER BOOKLET.

1. Below shows a multiplication of fractions, where $N$ is a 2-digit even number. Which of the following CAN be the product?

$$
\frac{1}{2} \times \frac{1}{N}
$$

A. $\frac{1}{2}$
B. $\frac{1}{20}$
C. $\frac{1}{22}$
D. $\frac{1}{200}$
2. An orchestra has 12 female members. The ratio of the number of male members to the number of female members is $3: 2$. Find the number of male members.
A. 6
B. 8
C. 18
D. 30
3. Which of the following is NOT a polynomial ?
A. $m^{3}-\frac{1}{6}$
B. $m^{3}-6 m$
C. $m^{3}-\frac{m}{6}$
D. $m^{3}-\frac{6}{m}$
4. Simplify $\frac{y^{-7}}{y^{-3}}$.
A. $\frac{1}{y^{10}}$
B. $\frac{1}{y^{4}}$
C. $y^{4}$
D. $y^{10}$
5. Determine whether each of the following is factorization or expansion.

| (i) | $\begin{array}{c}(x-1)(x+3)(x-5) \\ =x^{3}-3 x^{2}-13 x+15\end{array}$ |
| :--- | :--- |

(ii) $\begin{array}{r}x^{3}-3 x^{2}-13 x+15 \\ =(x-1)(x+3)(x-5)\end{array}$
A. (i) Expansion
(ii) Factorization
B. (i) Expansion
(ii) Expansion
C. (i) Factorization
(ii) Factorization
D. (i) Factorization
(ii) Expansion
6. Wincy buys 5 mice and 4 sets of headphones for $\$ 1860$. The price of a set of headphones is higher than that of a mouse by $\$ 60$. It is given that the prices of a mouse and a set of headphones are $\$ x$ and $\$ y$ respectively. Which of the following pairs of simultaneous equations shows the relation between $x$ and $y$ ?
A. $\left\{\begin{array}{l}4 x+5 y=1860 \\ x-y=60\end{array}\right.$
B. $\left\{\begin{array}{l}4 x+5 y=1860 \\ y-x=60\end{array}\right.$
C. $\left\{\begin{array}{l}5 x+4 y=1860 \\ x-y=60\end{array}\right.$
D. $\left\{\begin{array}{l}5 x+4 y=1860 \\ y-x=60\end{array}\right.$
7. Which of the following is an identity?
A. $x^{2}-25=(x-5)(x-5)$
B. $-5(x-1)=-5 x-1$
C. $\frac{5 x+2}{2}=5 x+1$
D. $2(5-x)=10-2 x$
8. Carmen spent $x$ hours practising piano last week. Her practising time on the piano this week was 3 times that of last week. If her total practising time on the piano in these two weeks was less than 50 hours, which of the following inequalities can be used to find the range of values of $x$ ?
A. $x+3 x<50$
B. $x+3 x \leq 50$
C. $x+\frac{x}{3}<50$
D. $x+\frac{x}{3} \leq 50$
9. Which of the following information shows the height of a building with the most suitable unit and degree of accuracy?
A.

C.

B.

## Information of Building

Name: Assessment Centre
Height: 0.025123456 km
D.

## Information of Building

Name: Assessment Centre
Height: 25.123456 m
10.


The figure shows a solid cube. Its total surface area is $486 \mathrm{~cm}^{2}$. Find the side length of the cube.
A. 81 cm
B. $\quad 11.0 \mathrm{~cm}$
C. 9 cm
D. $\quad 7.86 \mathrm{~cm}$
11. The figure shows a sphere of diameter 18 cm . Find the surface area of the sphere.

A. $324 \pi \mathrm{~cm}^{2}$
B. $972 \pi \mathrm{~cm}^{2}$
C. $1296 \pi \mathrm{~cm}^{2}$
D. $7776 \pi \mathrm{~cm}^{2}$
12. Which of the following represents the marked angle in the figure?
A. $S$
B. $P S$
C. $\angle P S R$
D. $R S P$

13.


Which of the following 3-D figures can be made by the net above?
A.

B.

C.

D.

14. Figure $X$ is changed to Figure $Y$ after a single transformation. What is the corresponding transformation?

A. Enlargement
B. Translation
C. Reflection
D. Rotation
15. In the following figures, which thick line is an axis of rotational symmetry of cube PQRSTUVW ?
A.

B.

C.

D.

16. The figures below show the 2-D representations of a solid from various views.


Which of the following could be the solid?
A.
B.
C.
D.


front


front


front


front
17. $P(-6,3)$ and $Q(4,-5)$ are two points on a straight line $L$ in the rectangular coordinate plane. The slope of $L=$
A. $\frac{(-5)+3}{4+(-6)}$.
B. $\frac{4+(-6)}{(-5)+3}$.
C. $\frac{(-5)-3}{4-(-6)}$.
D. $\frac{4-(-6)}{(-5)-3}$.
18. Referring to the figure, find $\theta$. (Correct to 3 significant figures)
A. $32.6^{\circ}$
B. $40.1^{\circ}$
C. $49.9^{\circ}$
D. $57.4^{\circ}$

19. The frequency polygon below shows the total studying time of 14 students last week.

Total studying time of $\mathbf{1 4}$ students last week


If the same set of data are presented by a cumulative frequency polygon, which of the following diagrams could be obtained?
A.

Total studying time of 14 students last week

C.

Total studying time of 14 students last week

B.

Total studying time of 14 students last week

D.

Total studying time of 14 students last week

20. The diagram below shows the sales of Wonderful Toothpaste and Twin Toothpaste in 2020.

## Sales of Wonderful Toothpaste and Twin Toothpaste in 2020



Based on the diagram above, Mrs Cheung believes that the sales of Wonderful Toothpaste are 3 times that of Twin Toothpaste in 2020.
Which of the following statements is the best reason that Mrs Cheung is misled by the above diagrams?
A. The prices of the two brands of toothpaste are not shown.
B. The scale of vertical axis in the diagram does not start from 0 .
C. There is no comparison of the sales of other brands of toothpaste.
D. The scale of the horizontal axis in the diagram does not show in values.

SECTION B: Write ALL the answers in the ANSWER BOOKLET. Working need not be shown.
21. Write down the numbers represented by $A, B$ and $C$ on the number line below.

22. Round off 60300 to 2 significant figures.
23. A scientific formula is given as follows:

$$
I=\frac{V}{r+R}
$$

If $I=4, V=20$ and $R=3$, find the value of $r$.
24. The $n^{\text {th }}$ term of a sequence is $2 n(n+1)$. Find the value of the $6^{\text {th }}$ term of the sequence.
25. Simplify $(6 x+4)-7 x$.
26. Factorize $9-x^{2}$.
27. Solve the equation $\frac{8-x}{3}=x$.
28.


The above figure shows the graphs of $3 x+y-8=0$ and $x-2 y+4=0$.
According to the given graphs, $(2,3)$ is the $\quad *$ exact solution approximate solution of the simultaneous equations $\left\{\begin{array}{l}3 x+y-8=0 \\ x-2 y+4=0\end{array}\right.$.
(*Circle the correct answer in the ANSWER BOOKLET)
29. Make $m$ the subject of the formula $a=\frac{m-1}{5}$.
30. Solve the inequality $3-2 x \geq 11$.
31. The figure below has rotational symmetry. Find its order of rotational symmetry.

32. In the figure, $\triangle A B C \sim \triangle E D C$. Find
(a) the value of $x$,
(b) the value of $y$.

33. In the figure, $A B / / D C . \angle A D C=65^{\circ}$ and $\angle C A D=70^{\circ}$. Find $x$.

34. The figure shows a right triangular prism $A B C D E F$. $E F D$ is a horizontal plane and $A E D C$ is a vertical plane. Name the projection of $A D$ on the plane $E F D$.

35. Which of the following must be right-angled triangle(s)? (May be more than one answer)

Triangle $X$


Triangle $Y$

36. In the figure, $\boldsymbol{S}(-4,2)$ is reflected about $y$-axis to $\boldsymbol{S}^{\prime}$. Find the coordinates of $\boldsymbol{S}^{\prime}$.

37. Determine whether each of the following data is discrete or continuous.
(i) The volume of each apple in an apple garden
(ii) The number of apples in an apple garden
38. The following pie chart shows the vehicles used by Secondary 3 students to go to school.

Vehicles used by Secondary 3 students to go to school


According to the above chart, answer the following questions.
(a) Find the value of $x$.
(b) If there are 22 Secondary 3 students going to school by tram, find the total number of students of that level.
(c) What percentage of Secondary 3 students are going to school by bus or minibus?
39. The following data show the number of sit-ups done by 5 students in one minute.

$$
21, \quad 28, \quad 30, \quad 24, \quad 27
$$

Find the mean and the median of the above data.

SECTION C: All working must be clearly shown.
Write the mathematical expressions, answers and statements/conclusions in the spaces provided in the ANSWER BOOKLET.
40. Jimmy deposits $\$ 20000$ in a bank. The interest rate is $3 \%$ p.a. compounded yearly. Find the amount he will receive after 2 years.
41. There are 6400 customers of a restaurant in March. If the number of customers of the restaurant decreases by $25 \%$ per month, find the number of customers of the restaurant in May of that year.
42. Complete the table for the equation $y=\frac{x}{4}-1$ in the ANSWER BOOKLET.

| $x$ | -4 | 0 | 4 |
| :---: | :---: | :---: | :---: |
| $y$ |  | -1 |  |

According to the table, draw the graph of this equation on the rectangular coordinate plane given in the ANSWER BOOKLET.
43. Solve the simultaneous equations $\left\{\begin{array}{l}y=7 x+10 \\ y=5 x+8\end{array}\right.$.
44. In the figure, $A D B$ and $A E C$ are straight lines. $A D=2 \mathrm{~cm}, A E=3 \mathrm{~cm}, D B=4 \mathrm{~cm}$ and $E C=6 \mathrm{~cm}$. Prove that $\triangle A B C \sim \triangle A D E$.

45. In the figure, $B C D$ is a straight line. $\angle A C B=35^{\circ}$ and $\angle A D C=15^{\circ}$. Find $x$.

46. In the figure, the radius of sector $O A B$ is 5 cm and reflex $\angle A O B=225^{\circ}$. Let $x$ be the arc length of the sector, find $x$. Give the answer correct to 3 significant figures.

47. The following shows the check-in duration (minute) of 10 passengers of an airline.

$$
3, \quad 5, \quad 6, \quad 7, \quad 16, \quad 16, \quad 19, \quad 24, \quad 26,28
$$

It is given that the mean check-in duration of the 10 passengers is 15 minutes. Hence the airline claimed, 'Among the 10 passengers, more than half can finish their check-in in 15 minutes.'
Do you agree with the airline's claim? Explain your answer.

## END OF PAPER

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