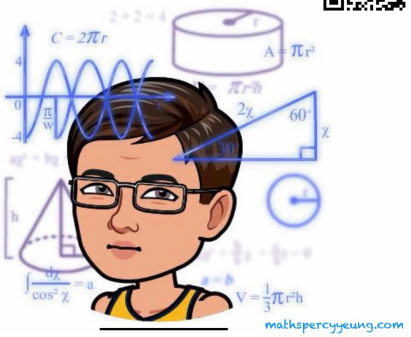

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S3 Mathematics (Paper II)

S3 ( ) Full Mark: 32 marks

Name: _____( ) Time Allowed: 45 min

Instructions:

1. Write your name, class and class number in the spaces provided on both the question paper and the Multiple Choice Answer Sheet.
2. This paper consists of 32 multiple choice questions.
3. All questions carry equal marks.
4. **ANSWER ALL QUESTIONS**. You are advised to use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly, otherwise you will lose marks if the answers cannot be captured.
5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.
6. No marks will be deducted for wrong answers.
7. The diagrams in this paper are not necessarily drawn to scale.
8. Only calculators with the "**H.K.E.A. APPROVED**" or "**H.K.E.A.A. APPROVED**" label are allowed in the examination.

1. Factorize $9x^2 - 64$.

   A. $(3x - 6)^2$ B. $(3x - 8)^2$

   C. $(3x + 6)(3x - 6)$ D. $(3x + 8)(3x - 8)$

2. Simplify $(-2ab^2)^4$.

   A. $16a^4b^8$ B. $-16a^4b^8$

   C. $8a^4b^6$ D. $-8a^4b^6$

3. Given that the speed of light is 3×10^5 km/s and the speed of sound is 300 m/s. How many times the speed of light is the speed of sound?

   A. 10^4 B. 10^5

   C. 10^6 D. 10^7

4. If $m < 0$ and $n > 0$, which of the following are correct?

   I. $2m < 2n$

   II. $mn < 0$

   III. $\frac{1}{m} > \frac{1}{n}$

   A. I and II only B. I and III only

   C. II and III only D. I, II and III

5. If the sum of two consecutive even integers is not less than 27, find the smallest possible value of the smaller integer.

   A. 13 B. 14

   C. 15 D. 16

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6. The value of a car is now \$500 000. Its value depreciates at a rate of 10% per year. Find the depreciation of the car after 4 years.

   A. \$171 950 B. \$200 000

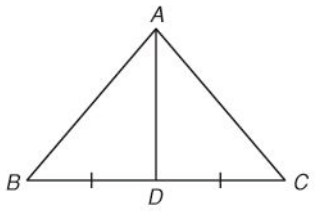
   C. \$328 050 D. \$340 000

7. Elise deposits \$100 000 in a bank at a simple interest rate of 5% p.a. How long will it take for Elise to receive an amount of \$200 000?

   A. 5 years B. 10 years

   C. 15 years D. 20 years

8. Refer to the figure. Which of the following is true?



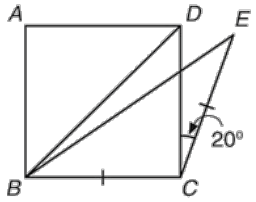
   A. AD is a perpendicular bisector of $\triangle ABC$.

   B. AD is an angle bisector of $\triangle ABC$.

   C. AD is an altitude of $\triangle ABC$.

   D. AD is a median of $\triangle ABC$.

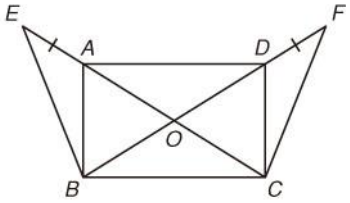
9. In the figure, $ABCD$ is a square and $CB = CE$. Find $\angle DBE$.



A. 5° B. 10°

C. 15° D. 20°

10. In the figure, $ABCD$ is a rectangle. $COAE$ and $BODF$ are straight lines. Which of the following are correct?



I. $\triangle AEB \cong \triangle DFC$

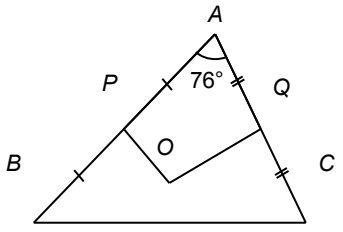
II. $\triangle AOB \cong \triangle COD$

III. $\triangle BCE \cong \triangle CBF$

A. I and II only B. I and III only

C. II and III only D. I, II and III

11. In the figure, O is the circumcentre of $\triangle ABC$. Find $\angle POQ$.



A. 104° B. 120°

C. 142° D. 152°

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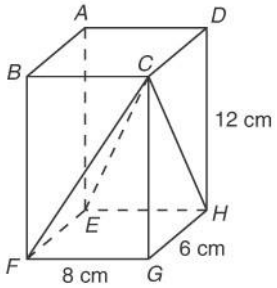
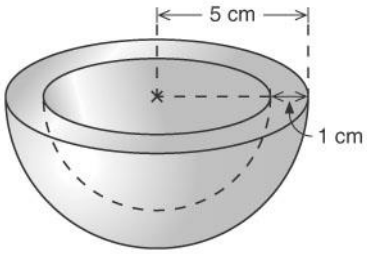
12. The figure shows a cuboid *ABCDHEFG*. Find the volume of pyramid *CEFGH*.



A. $160\ cm^3$ B. $192\ cm^3$

C. $288\ cm^3$ D. $576\ cm^3$

13. The figure shows a hemispherical vessel with uniform thickness 1 cm and external radius 5 cm. Find the total surface area of the vessel.



A. $91\pi\ cm^2$ B. $141\pi\ cm^2$

C. $164\pi\ cm^2$ D. $200\pi\ cm^2$

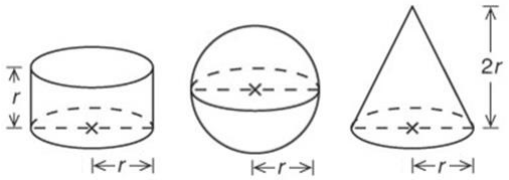
14. The ratio of the volumes of two hemispheres is 27 : 64. Find the ratio of their curved surface areas.

A. 3 : 4 B. 9 : 16

C. 37 : 64 D. 81 : 256

15. The figure shows a cylinder, a sphere and a right circular cone. Find

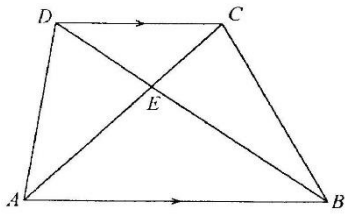
volume of cylinder : volume of sphere : volume of cone.



A. $3:4:2$ B. $4:3:2$

C. $4:3:6$ D. $3:4:6$

16. In the figure, if $\dfrac{\text{Area of triangle } CDE}{\text{Area of triangle } BCE} = \dfrac{1}{2}$, find $\dfrac{\text{Area of triangle } CDE}{\text{Area of trapezium } ABCD}$.



A. $\dfrac{1}{7}$ B. $\dfrac{1}{8}$

C. $\dfrac{1}{9}$ D. $\dfrac{1}{10}$

17. Which of the following points is collinear with $A(5, 2)$ and $B(4, 1)$?

A. $P(0, 1)$ B. $Q(5, 0)$

C. $R(-4, -1)$ D. $S(1, -2)$

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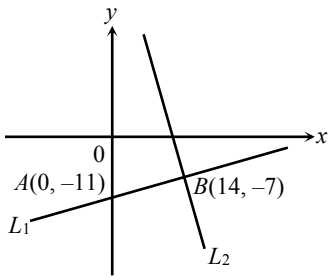
18. In the figure, L_1 and L_2 are two straight lines. L_1 cuts the y-axis at $A(0, -11)$ and intersects L_2 at $B(14, -7)$. If $L_1 \perp L_2$ and L_2 cuts the y-axis at C, then the coordinates of C are



A. $(0,\ 12)$ B. $(0,\ 35)$

C. $(0,\ 42)$ D. $(0,\ 49)$

19. $2\sin^2 60° - \tan 60° \cos 30° =$

A. $\sqrt{3} - \frac{3}{2}$ B. $\frac{1}{2} - \frac{\sqrt{3}}{2}$

C. 0 D. $\frac{3}{2}$

20. Find the acute angle θ if $\cos\theta = \sin(2\theta - 30°)$.

A. $30°$ B. $40°$

C. $50°$ D. $60°$

21. Simplify $\cos^2\theta[\tan\theta + \tan(90° - \theta)]$.

A. $\frac{1}{\tan\theta}$ B. $\tan\theta$

C. $\sin\theta$ D. 1

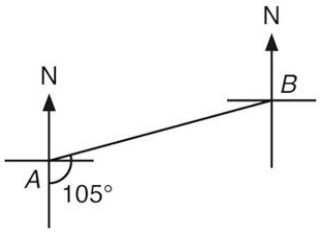
22. The inclination of a straight road is 26°. Express the gradient of the road in the form 1 : n.

(Give n correct to the nearest integer.)

A. 1 : 2 B. 1 : 4

C. 1 : 10 D. 1 : 20

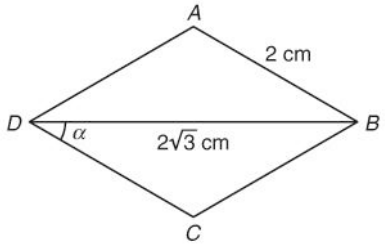
23. Refer to the figure. Find the compass bearing of A from B.



A. S15ºE B. S75ºW

C. N15ºE D. N75ºW

24. The figure shows a rhombus $ABCD$. Find α.



A. 15° B. 30°

C. 45° D. 60°

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25. Given a set of data $x - 1$, x, $x + 1$, $x - 2$ and $x + 7$, which of the following is/are correct?

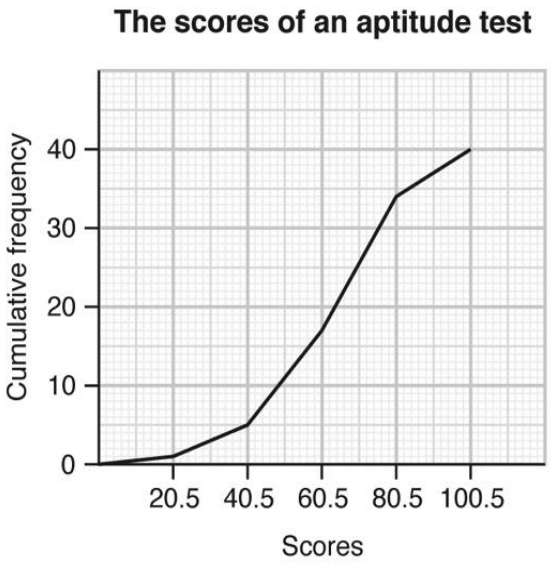
I. The arithmetic mean is $x + 1$.

II. The median is $x + 1$.

III. The data set has no modes.

A. I only
B. I and II only
C. I and III only
D. II and III only

26. The following cumulative frequency polygon shows the scores of an aptitude test of 40 candidates. The first class interval is 1 – 20.



Find the modal class of the score distribution.

A. 21 – 40
B. 41 – 60
C. 61 – 80
D. 81 – 100

27. Which of the following is an impossible event?

A. All the 10 children in Mr Tang's family are boys.

B. Toss 8 coins. 8 'tail's show up.

C. Draw a card randomly from a pack of 52 playing cards. It is the King of clubs.

D. Throw 2 dice. The product of the numbers is 7.

28. There are 2 multiple choice questions. Each question has four options, A, B, C and D, of which only one is correct. Mabel selects the answers at random, find the probability that she answers at least one question correctly.

A. $\frac{1}{4}$ B. $\frac{3}{8}$

C. $\frac{7}{16}$ D. $\frac{1}{2}$

29. A company sold out 10 000 lottery tickets for \$5 each. If there is only one prize, which is worth \$30 000, find the expected value of the prize obtained for each ticket.

A. \$2 B. S3

C. \$5 D. \$30 000

30. If the length of a rectangle is increased by 10%, and its width is decreased by 10%, then the area of the rectangle will

A. remain unchanged. B. be increased by 1%.

C. be decreased by 1%. D. be increased by 2%.

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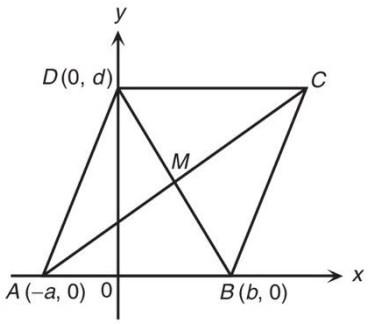
31. Simplify $\dfrac{3^{n+2}-3^{n-1}}{3^n+3^{n+1}}$, where n is an integer.

A. $\dfrac{11}{3}$ B. $\dfrac{9}{4}$

C. $\dfrac{14}{5}$ D. $\dfrac{13}{6}$

32. Referring to the figure, $ABCD$ is a rhombus and its diagonals intersect at M. Which of the following must be true?



I. Coordinates of $C = (a + b, d)$

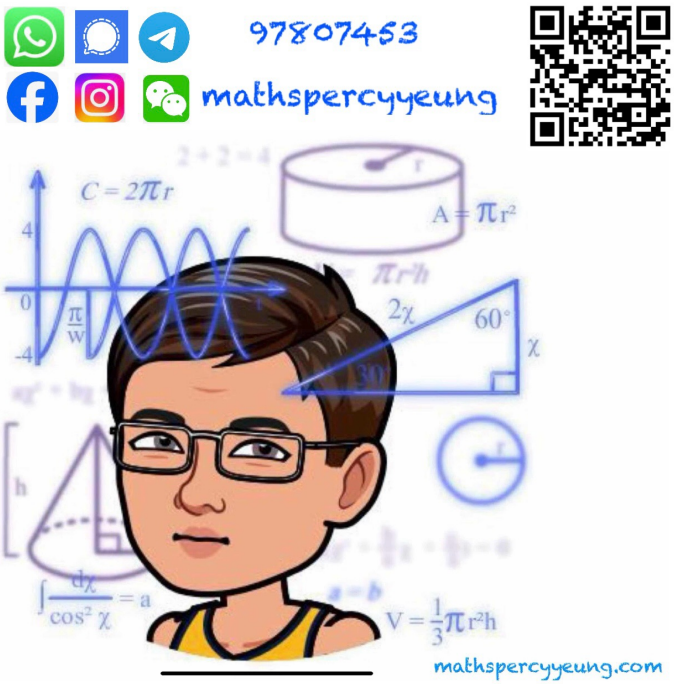
II. Coordinates of $M = \left(\dfrac{b}{2}, \dfrac{d}{2}\right)$

III. $a = \dfrac{d^2 - b^2}{2b}$

A. I and II only B. I and III only

C. II and III only D. I, II and III

~ End of paper ~


97807453
mathspercyyeung
C = 2πr
A = πr²
πrh
2χ
60°
χ
30°
h
$\int \frac{d\chi}{\cos^2 \chi} = a$
$V = \frac{1}{3}\pi r^2 h$
mathspercyyeung.com