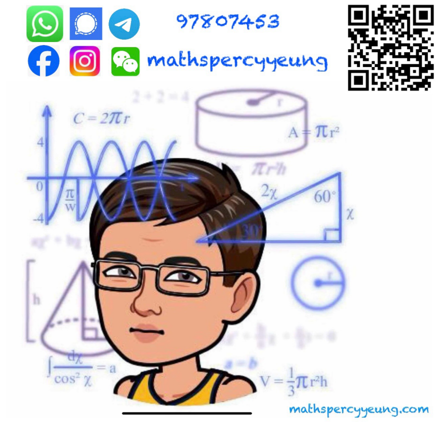
2017-2018 F.5 1st TERM EXAM-MATH-CP 2

17-18 F.5
1st TERM EXAM
MATH CP
PAPER 2

MC



2017 – 2018
Form 5 First Term Examination

MATHEMATICS Compulsory Part

PAPER 2

4th January, 2018.
10:30 am – 11:30 am (1 hour)

INSTRUCTIONS

1. Read carefully the instructions on the Answer Sheet. After the announcement of the start of the examination, you should insert the information required in the spaces provided.

2. When told to open this book, you should check that all the questions are there. Look for the words ‘**END OF PAPER**’ after the last question.

3. All questions carry equal marks.

4. **ANSWER ALL QUESTIONS**. You should use an HB pencil to mark all your 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.

There are 21 questions in Section A and 15 questions in Section B.
The diagrams in this paper are not necessarily drawn to scale.
Choose the best answer for each question.

Section A

1. $\dfrac{x^{-3}}{(2x^{-2})^3} =$

A. $\dfrac{x^3}{8}$.

B. $\dfrac{1}{8x^3}$.

C. $\dfrac{x^3}{6}$.

D. $\dfrac{1}{6x^3}$.

2. If $p+q=\dfrac{q}{p}+2$, then $q=$

A. $\dfrac{p(p-2)}{p-1}$.

B. $\dfrac{p(p-2)}{1-p}$.

C. $\dfrac{p^2-2}{p-1}$.

D. $\dfrac{p^2-2}{1-p}$.

3. $2x^2-2y^2-x-y=$

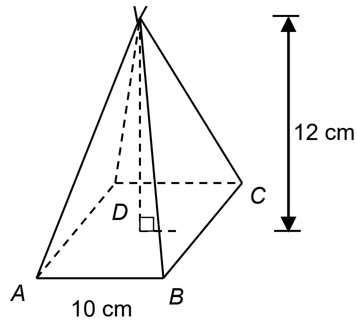
A. $(x-y)(2x+2y-1)$

B. $(x-y)(2x+2y+1)$

C. $(x+y)(2x-2y-1)$

D. $(x+y)(2x-2y+1)$

4. The figure shows a right solid pyramid *VABCD* with a square base *ABCD* of side 10 cm. The height of the pyramid is 12 cm. Find the total surface area of the pyramid.



A. 260 cm^2

B. 340 cm^2

C. 360 cm^2

D. 400 cm^2

5. Three solid metallic spheres of radius 5 cm are melted and recast into a new solid sphere. Find the radius of the new solid sphere correct to 3 significant figures.

A. 7.21 cm

B. 7.43 cm

C. 8.66 cm

D. 8.78 cm

6. Which of the following may be a domain of the function $y=-\dfrac{1}{\sqrt{x}}$?

A. All real numbers except 0

B. All negative real numbers

C. All positive real numbers

D. All non-negative real numbers

7. It is given that p is a real constant. The roots of the quadratic equation $2x^2 - x + \frac{p}{4} = 0$ are

A. $x = \frac{1 \pm \sqrt{1-2p}}{2}$.

B. $x = \frac{1 \pm \sqrt{1-2p}}{4}$.

C. $x = \frac{1 \pm \sqrt{1-p}}{2}$.

D. $x = \frac{-1 \pm \sqrt{1-p}}{4}$.

8. It is given that $x - k$ is a factor of $f(x) = x^3 - kx^2 + 2x - 4$, where k is a constant. When $f(x)$ is divided by $x + k$, the remainder is

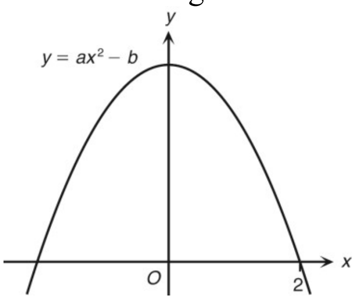
A. –24.

B. –8.

C. –2.

D. 0.

9. The figure shows the graph of $y = ax^2 - b$, where a and b are constants. It is given that the graph passes through (2, 0). Which of the following are true?



I. $a < 0$

II. $b < 0$

III. The solutions of the inequality $y > 0$ are $-2 < x < 2$.

A. **I** and **II** only

B. **I** and **III** only

C. **II** and **III** only

D. **I**, **II** and **III**

10. If an angle θ lies in quadrant III, which of the following is true?

A. $\cos\theta \sin\theta < 0$

B. $\tan\theta \sin\theta < 0$

C. $\cos\theta \tan\theta > 0$

D. $\cos\theta \sin\theta \tan\theta < 0$

11. $\frac{\sin\theta\tan\theta}{(1-\cos\theta)(1+\cos\theta)} =$

A. $\tan^2\theta$.

B. $-\tan^2\theta$.

C. $\frac{1}{\cos\theta}$.

D. $-\frac{1}{\cos\theta}$.

12. For $0° \le \theta \le 180°$, the greatest value of $\frac{2}{3 - \cos\theta - 3\cos(180° - \theta)}$ is

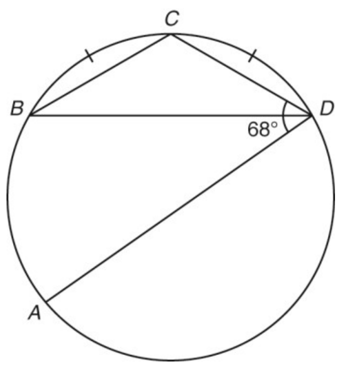
A. -2.

B. $\frac{2}{5}$.

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

D. 2.

13. In the figure, AD is a diameter of the circle $ABCD$, where $\overset{\frown}{BC} = \overset{\frown}{CD}$. If $\angle ADC = 68°$, then $\angle ADB =$



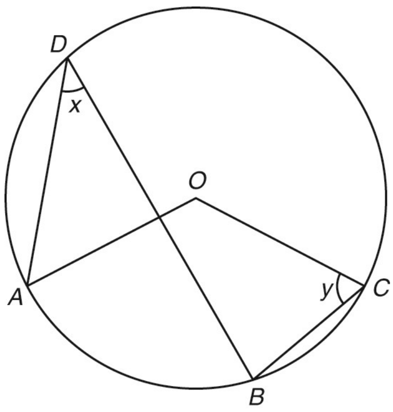
A. $22°$.

B. $34°$.

C. $46°$.

D. $52°$.

14. In the figure, O is the centre of the circle $ABCD$. Let $\angle ADB = x$ and $\angle OCB = y$, then $\angle AOC =$



A. $2x + y$.

B. $90° + x - y$.

C. $180° + 2x - 2y$.

D. $360° - 2x - 2y$.

15. Solve the compound inequality $2(x+5) \geq -6$ and $4(x+6) > x - 6$.

A. $x > -10$

B. $x \geq -8$

C. $-10 < x \leq -8$

D. no solutions

16. Which of the following compound inequalities has 'all real numbers' as its solutions?

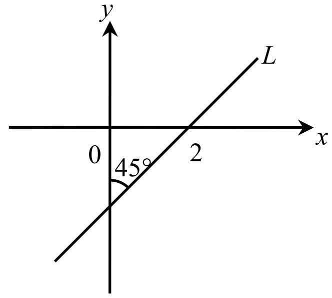
A. $x > 2$ or $x < 0$

B. $x > 0$ or $x < 2$

C. $x > 2$ and $x < 0$

D. $x < 2$ and $x < 0$

17. In the figure, the straight line L cuts the x-axis at (2, 0) and the angle between L and the y-axis is 45°. Find the equation of L.



A. $x - y - 2 = 0$

B. $x - y + 2 = 0$

C. $x + y - 2 = 0$

D. $x + y + 2 = 0$

18. L is a line parallel to the x-axis. P is a moving point in the rectangular coordinate plane such that P is equidistant from L and the y-axis. The locus of P is a

A. parabola.

B. circle.

C. triangle.

D. pair of straight lines.

19. It is given that moving point P is equidistant from the two parallel lines L_1: $y = 2x - 1$ and L_2: $y = 2x + 4$. Which of the following is the equation of the locus of P?

A. $2y = 4x + 3$

B. $2y = 4x - 3$

C. $y = 2x + 3$

D. $2y = 2x + 3$

20. Which of the following equations represents a circle?

A. $x^2 - y^2 - 4x + 9y + 10 = 0$
B. $x^2 + y^2 - 4x + 9y + 10 = 0$
C. $x^2 + y^2 - 4xy + 10 = 0$
D. $2x^2 + y^2 - 4x + 9y + 10 = 0$

21. A circle C passes through the points $A(-6, -2)$ and $B(0, 6)$. If AB is a diameter of the circle, find the equation of C.

A. $x^2 + y^2 + 6x - 4y - 12 = 0$
B. $x^2 + y^2 - 6x + 4y - 12 = 0$
C. $x^2 + y^2 + 6x - 4y + 38 = 0$
D. $x^2 + y^2 - 6x + 4y + 38 = 0$

Section B

22. $(3+4i)(4-3i)+(2-i)^2 =$

A. $3+3i$.
B. $5+11i$.
C. $27+3i$.
D. $29+3i$.

23. If α and β are the roots of the quadratic equation $x^2 - 8x + 1 = 0$, which of the following has the roots 3α and 3β?

A. $x^2 - 24x + 9 = 0$
B. $x^2 - 24x + 1 = 0$
C. $x^2 + 24x + 9 = 0$
D. $x^2 + 24x + 1 = 0$

24. Consider the graph of $y = 3^x$. Which of the following is/are true?

I. The y-intercept of the graph is 3.
II. The axis of symmetry of the graph is $x = 0$.
III. The value of y increases as x increases.

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

25. If log 3 = x and log 2 = y, then log 15 =

A. $x - y + 1$.
B. $10x - y$.
C. $2x + y$.
D. $\frac{10x}{y}$.

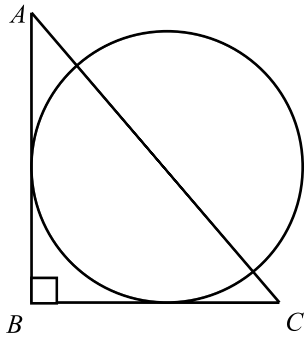
26. If $\log x^2 = \log 3x + 1$, then $x =$

A. 5.
B. 30.
C. –2 or 5.
D. 0 or 30.

27. Solve $2\cos^2\theta + 3\sin\theta - 3 = 0$, where $0° \le \theta \le 360°$.

A. $\theta = 0°$ or $\theta = 30°$
B. $\theta = 30°$ or $\theta = 90°$
C. $\theta = 0°$ or $\theta = 30°$ or $\theta = 150°$
D. $\theta = 30°$ or $\theta = 90°$ or $\theta = 150°$

28. In the figure, AB and BC are tangents to the circle such that AB = 12 cm and BC = 9 cm. If AC passes through the centre of the circle, find the radius of the circle.



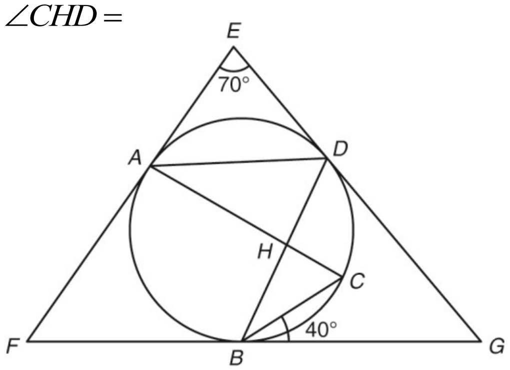
A. 4.5 cm

B. $\frac{36}{7}$ cm

C. 6 cm

D. 7.5 cm

29. In the figure, EF, FG and GE are the tangents to the circle $ABCD$ at A, B and D respectively. AC and BD intersect at H. If $\angle AED = 70°$ and $\angle CBG = 40°$, then $\angle CHD =$



A. 80°

B. 85°

C. 95°

D. 110°

30. Solve $(x-4)(2x+1) \le (x-4)x$.

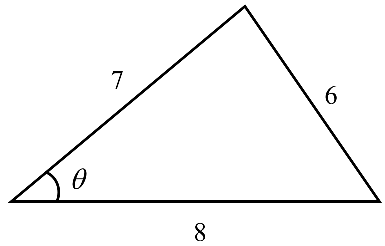
A. $-1 \le x \le 4$

B. $x \le -1$

C. $x \le 4$

D. $x \ge -1$

31. In the figure, $\cos\theta =$



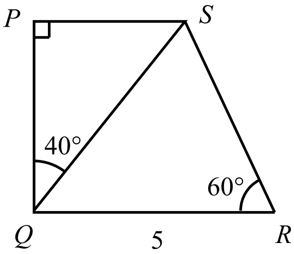
A. $\frac{1}{4}$.

B. $\frac{149}{336}$.

C. $\frac{17}{32}$.

D. $\frac{11}{16}$.

32. The figure shows a trapezium $PQRS$, where PS // QR and $\angle QPS$ = 90°. If QR = 5, $\angle PQS$ = 40° and $\angle QRS$ = 60°, find RS.



A. $\frac{5\sin 50°}{\sin 70°}$

B. $\frac{5\sin 50°}{\sin 60°}$

C. $\frac{5\sin 70°}{\sin 50°}$

D. $\frac{5\sin 70°}{\sin 60°}$

33. If the whole graph of $y = -4x^2 - 4kx + k - 12$ lies below the x-axis, find the range of the values of k.

A. $k < 2$ or $k > 6$

B. $k < -4$ or $k > 3$

C. $2 < k < 6$.

D. $-4 < k < 3$.

34. The equation of a circle is $x^2 + y^2 = 16$. L is a tangent to the circle and passes through (4, 8). If L is not a vertical line, find the equation of L.

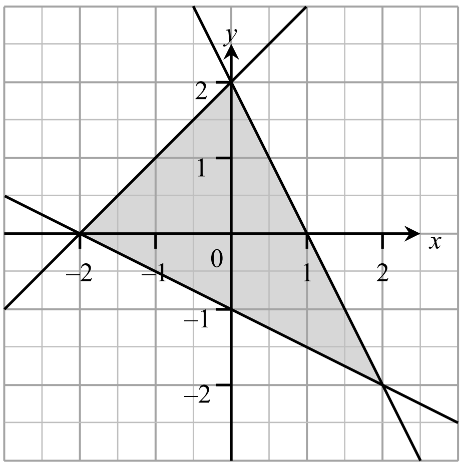
A. $x - y + 4 = 0$

B. $3x - 4y + 20 = 0$

C. $x - y - 4 = 0$

D. $4x - 3y + 20 = 0$

35. The figure shows a shaded region (including the boundary). If (h, k) is a point lying in the shaded region, where h and k are integers, which of the following must be true?



I. $y - x \geq 2$

II. $y + 2x \leq 2$

III. $2y + x \geq -2$

A. **I** and **II** only

B. **I** and **III** only

C. **II** and **III** only

D. **I**, **II** and **III**

36. Consider the following system of inequalities:

$$\begin{cases} y \leq 5 \\ x - y \leq 5 \\ x + y \geq 5 \end{cases}$$

Let R be the region which represents the solutions of the above system of inequalities. If (x, y) is a point lying in R, find the maximum value of the expression $x - 2y + 17$.

A. -10

B. 17

C. 22

D. 47

END OF PAPER