

KOZHIKODE REVENUE DISTRICT MATHEMATICS QUIZ (HSS) 2016-17
Sub District Level - HSS

Trial Qn:

In which quadrant does the terminal side of a 240° angle in standard position lie?

Ans : III Quadrant

1) If A is set of even natural number < 8 and B is the set of prime number < 7 .

Then the number of relation from A to B ?

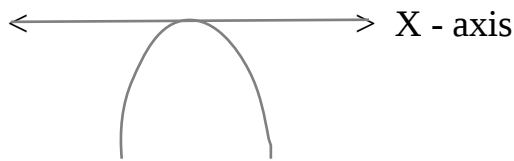
Ans : 2^9 [Hint $2^{3 \times 3}$]

2) If (x,y) is a point on the graph of an even function then which point is on the graph

A) $(-x,-y)$ B) $(x,-y)$ C) $(-x,y)$ D) $(0,y)$

Ans: C

3) The graph of $ax^2 + bx + c = 0$, $a,b,c \in \mathbb{R}$, $a \neq 0$, is given below



Which of the following condition satisfy the given graph.

(where D is discriminant)

A) $a < 0$, $D = 0$ B) $a > 0$, $D = 0$ C) $a < 0$, $D > 0$ D) $a < 0$, $D < 0$

Ans: A

4) Which one of the following cannot be the size of a power set?

A) 32 B) 256 C) 502 D) 2048

Ans: C

5) Find $\sqrt{i} - \sqrt{-i}$, Where $i = \sqrt{-1}$

A) $\pm 2\sqrt{i}$ B) 0 C) $1/i\sqrt{2}$ D) $\pm i\sqrt{2}$

Ans : D [Hint : $i = \frac{1}{2}(i+i)^2$, $-i = \frac{1}{2}(i-i)^2$ Then $\sqrt{i} - \sqrt{-i} = \pm i\sqrt{2}$]

6) In how many ways can 6 beads of different colour form a necklace ?

Ans : 60 [$\frac{1}{2} (n-1)! = \frac{1}{2} (6-1)!$]

7) A is a 2x2 matrix , if $A = \begin{pmatrix} i & 0 \\ 0 & i \end{pmatrix}$, $n \in \mathbb{N}$ then A^{4n}

Ans : $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

8) If $1 + 2 + 3 + \dots + n = 21$,then find $1^3 + 2^3 + 3^3 + \dots + n^3$

Ans : 441

9) What is $(-\infty, 3] \cup (8, +\infty)$?

Give your answer in set builder notation.

A) $\{x \in \mathbb{R} \mid 3 < x \leq 8\}$

B) $\{x \in \mathbb{R} \mid 3 \leq x < 8\}$

C) $\{x \in \mathbb{R} \mid x \leq 3\} \cup \{x \in \mathbb{R} \mid x > 8\}$

D) $\{x \in \mathbb{R} \mid x < 3\} \cup \{x \in \mathbb{R} \mid x > 8\}$

Ans: C

10) T_n denotes the number of triangles which can be formed using the vertices of a regular polygon of n sides, if $T_{n+1} - T_n = 21$,Then find n ?

Ans: 7 [Hint : ${}^{n+1}C_3 - {}^nC_3 = 21$]

11) What is the mean of the given distribution ?

$x : 1 \quad 1/2 \quad 1/3 \quad 1/4 \quad 1/5 \dots\dots\dots 1/n$

$f : 1 \quad 2 \quad 3 \quad 4 \quad 5 \dots\dots\dots n$

Ans : $2/(n+1)$

12) The probability that the 13th day of a randomly chosen month is a Friday is

Ans $1/84$ [Hint : $1/12 \times 1/7$]

13. The radius of a circle is 1 unit. What is the length of an arc that subtends an angle of $\pi/4$ radians?

Ans: $\pi/4$ unit.

14) If a straight line makes the angle α , 60° and 45° with x , y and z axes respectively, then find $\sin^2 \alpha$

Ans : $\frac{3}{4}$ [Hint : $\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma = 1$]

15) How many values of θ ($0 \leq \theta < 2\pi$) are solutions to this equation, $\cos(\theta) = 7/3$?

Ans: 0 [value of $\cos \theta$ is in between -1 and 1]

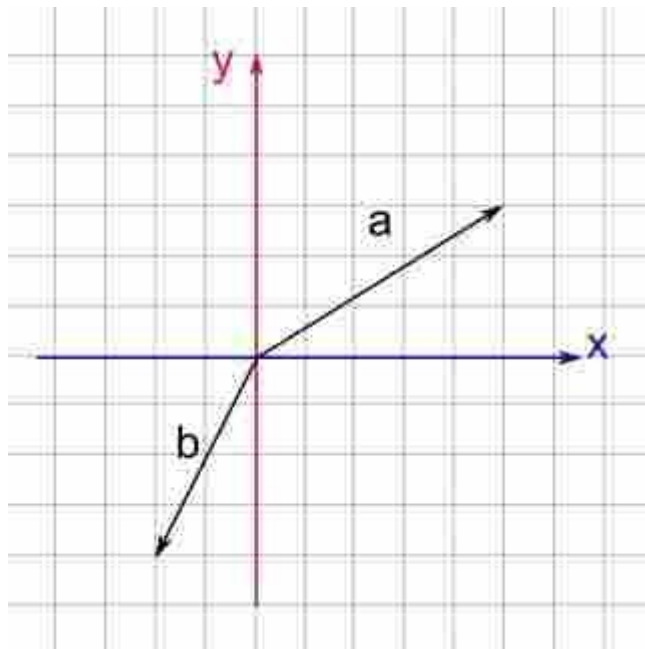
16) If $\sin^{-1}(3/x) + \sin^{-1}(4/x) = \pi/2$, then $x = ?$

Ans : $\sqrt{13}$ [hint : $\sin^{-1} x + \cos^{-1} x = \pi/2$]

17) The area enclosed by the curve $y = |x|$, $y = 0$ and $|x| = 1$

(Ans: 1 sq.unit)

18) In given fig. **a** and **b** are two vectors. Find **a + 2b**



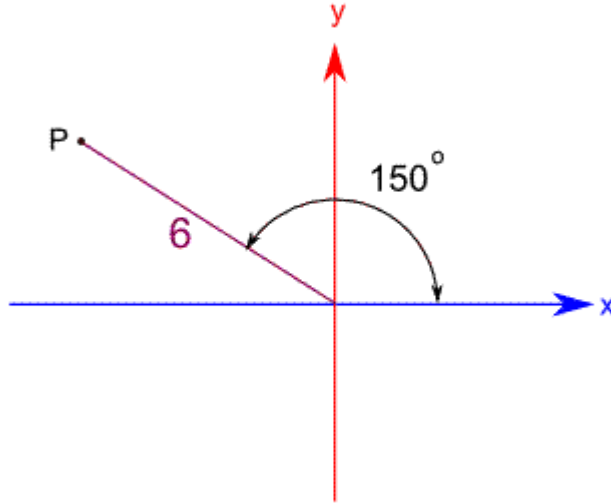
Ans: $\mathbf{i} - 4\mathbf{j}$ [$\mathbf{a} + 2\mathbf{b} = (5\mathbf{i} + 3\mathbf{j}) + 2(-2\mathbf{i} - 4\mathbf{j}) = \mathbf{i} - 4\mathbf{j}$]

19) The functions $f(x)$ and $g(x)$ are differentiable. The function $h(x)$ is defined as $h(x) = f(x) \cdot g(x)$, if $f(-7) = -5$, $f'(-7) = -7$, $g(-7) = 7$ and $g'(-7) = -3$

what is $h'(-7)$

Ans: -34 [Hint $h'(x) = f(x) \cdot g'(x) + g(x) \cdot f'(x)$]

20) In fig. What are the Cartesian coordinates (Rectangular form) of the point P ?



Ans : $(-3\sqrt{3}, 3)$ [Hint : $(6 \cos 150, 6 \sin 150) = (-6 \cos 30, 6 \sin 30)$]

Tie - break

1) The number of diagonal of a polygon is 35, then what is the number of sides ?

Ans. no. of sides =10 [Hint. $n C_2 - n = 35$.]

2) If A and B are two matrices such that $AB = A$ and $BA = B$, then $B^2 =$

Ans : B

3) If a,b,c are positive numbers in A.P such that their product is 64 ,then minimum value of b ?

(Ans: $b = 4$)

4) An object is thrown vertically upwards with a speed of 19.6 meters per second. Its height above the ground at t seconds is given by the function

$f(t) = 19.6t - 4.9t^2$ · How high will it rise, before starting to fall back?

Ans: 19.6 meters

[Hint : At the heighest point, the speed becomes zero; that is $f'(t) = 0$ and $19.6 - 9.8t = 0$ gives $t = 2$ and $f(2) = (19.6 \times 2) - 19.6 = 19.6$]

5) The terminal side of an angle θ in standard position intersects the unit circle at $(12/37, 35/37)$, then what is $\cos(\theta)$

Ans: 12/37
