

AMESA 2026

PRESENTATION

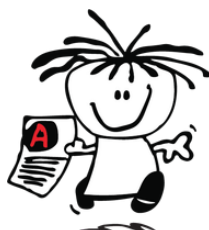
Cross-topic questions in FET

FET



for solutions

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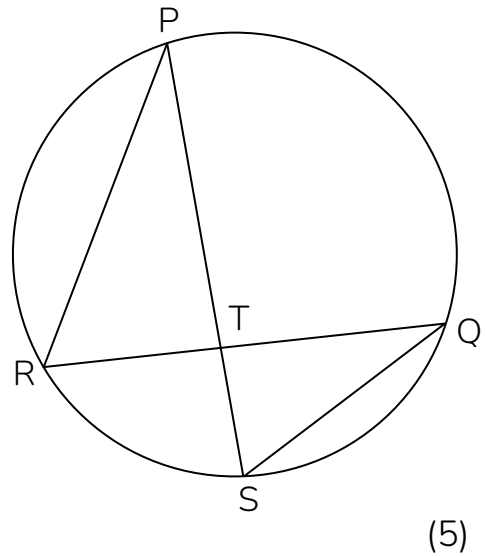
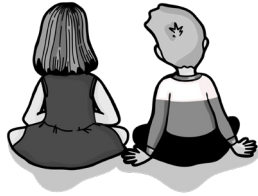
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Question 1

In the diagram, $\hat{P} = 4a + 15$ and $\hat{Q} = 3a^2 - 8a$.

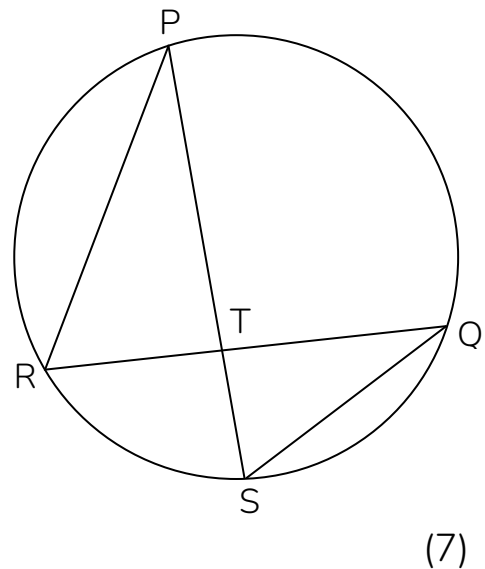
Determine the possible value(s) of $\hat{Q}$.



Question 2

In the diagram, $\hat{R} = \sum_{k=1}^n (8k - 80)$ and $\hat{S} = \sum_{i=1}^4 2 \cdot 3^{i-1}$

Determine the value of n.





Question 3

Solve for x if: $10^{\sin x} + 10^{\sin x + 1} = 110$ for $-360^\circ \leq x \leq 360^\circ$ (4)

Question 4

It is given that $\frac{2^{3 \sin^2 x}}{4 \cdot 2^{\sin x}} = 1$. Determine the general solution for x if $\sin x < 0$. (5)

Question 5

Solve for x :

5.1 $3^x(x - 5) \leq 0$ (2)

5.2 $3^x(\tan x - 1) \leq 0$ with $0^\circ \leq x \leq 180^\circ$ (4)

5.3 $3^x(2 \sin x - 1) \leq 0$ with $0^\circ \leq x \leq 360^\circ$ (4)



Question 6

Determine the range of $y = 2^{2 \cos x + 2}$ (4)

Question 7

If $2 \sin x = a - \frac{1}{a}$, with $-90^\circ \leq x \leq 90^\circ$, and $a^2 + \frac{1}{a^2} = 3$, calculate the values of x without the use of a calculator. (5)



Question 8

It is given that $\sin^2 x$; $\cos^2 x$ and $\frac{1}{2} \sin 2x$ are the first three terms of an arithmetic sequence.

The constant difference of the sequence is not zero. Determine the general solution for x . (7)

Question 9

Find a value for x if $\cos x$; $\sin x$; $\sqrt{3} \sin x$ is a geometric sequence. (3)

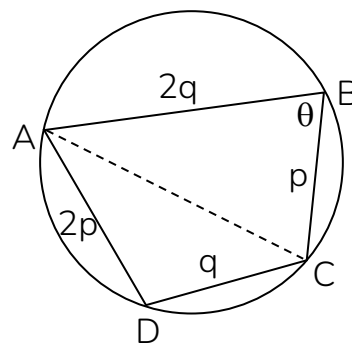
Question 10

Determine the value of: $\sum_{y=43^\circ}^{47^\circ} \sin^2 y$ (4)

Question 11

Show that:

$$\text{Area cyclic quad } ABCD = 2pq \sin \theta$$



(4)

Question 12

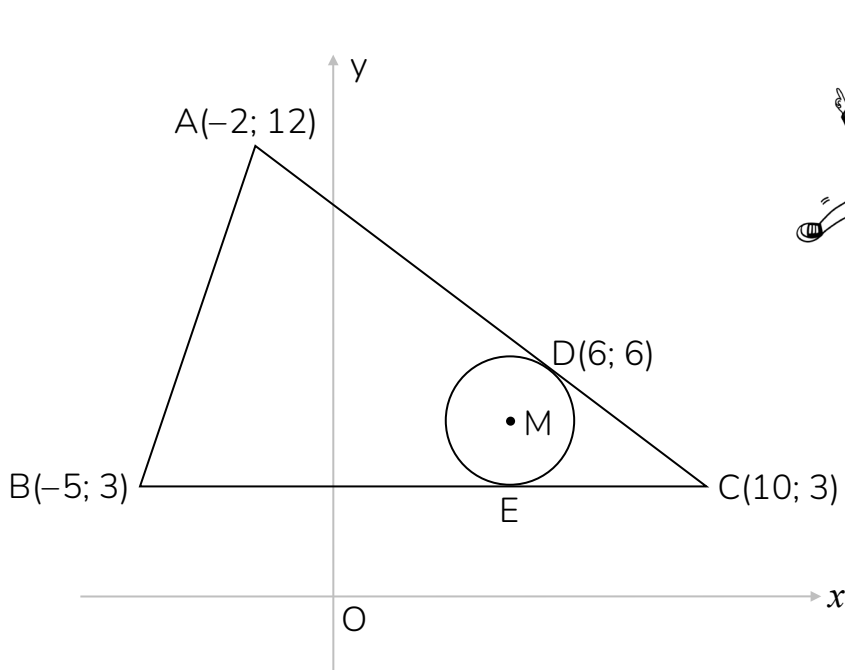
$$\text{Given } f(x) = x^2 - 2x \cos \theta - \sin^2 \theta.$$

12.1 Determine the nature of the roots of $x^2 - 2x \cos \theta - \sin^2 \theta = 0$. (4)

12.2 Determine the range of the graph. (4)

Question 13

Given $\triangle ABC$ with $A(-2; 12)$, $B(-5; 3)$ and $C(10; 3)$. A circle is drawn touching AC at $D(6; 6)$ and BC .



Given that a point lies in $\triangle ABC$, determine the probability that it lies in the circle with centre M. Express your answer as a percentage correct to one decimal place.

(9)

Question 14

Draw the graph of $y = \left(\frac{2x+1}{8x^3-1}\right)(32x^5 - 16x^4 + 8x^3 - 4x^2 + 2x - 1)$

showing all important information.

(8)



Question 15

15.1 An odd function is a function such that $f(-x) = -f(x)$. If $f(x) = \sin x$, then $f(-x) = \sin(-x) = -\sin x = -f(x)$. Thus $\sin x$ is an odd function.

An even function is a function such that $f(-x) = f(x)$.

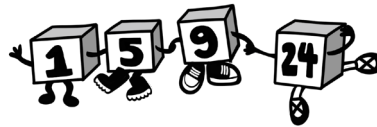
Determine whether the following are odd or even functions.

15.1.1 $f(x) = \cos x$ (1)

15.1.2 $f(x) = \tan x$ (1)

15.2 You are given the following expressions:

- $\sin x$
- $\tan x$
- $\cos 2x$
- $\cos(90^\circ - x)$
- $2 \sin x \cos x$
- $\frac{\sin 2x}{\cos 2x}$
- $\cos(180^\circ + x)$



A Venn diagram has event A as being an odd function and event B has a period of 180° .

Draw a Venn diagram placing all the above expressions in the relevant place and use it to determine $P(B' \text{ and } A)$. (8)