TMUA Homework 1

10 Questions

40 Minutes

请计时并不要使用计算器，完成后请填写线上表格提交作业

Question 1

The sum of the two values of x that satisfy the simultaneous equations $x - 3y + 1 = 0$ and $3x^2 - 7xy = 5$ is

A -8.5

B -7.5

C -1.5

D 3.5

E 4.5

F 5

Question 2

The number of solutions in the interval $0 \leq \theta \leq 4\pi$ of the equation $\sin^2 \theta + 3\cos\theta = 3$ is

A 0

B 1

C 2

D 3

E 4

F 5

G 6

Question 3

It is given that $x + 2$ is a factor of $x^3 + 4cx^2 + x(c + 1)^2 - 6$.

The sum of the possible values of c is

A -10

B -6

C 0

D 6

E 10

Question 4

The roots of the equation $2x^2 - 11x + c = 0$ differ by 2. The value of c is

A $\frac{105}{8}$

B $\frac{113}{8}$

C $\frac{117}{8}$

D $\frac{119}{8}$

Question 5

How many real roots does the equation $x^4 - 4x^3 + 4x^2 - 10 = 0$ have?

A 0

B 1

C 2

D 3

E 4

Question 6

a, b, x, and y are real and positive.

a and b are constants.

x and y are related.

A graph of $\log y$ against $\log x$ is drawn.

For which one of the following relationships will this graph be a straight line?

A $y^b = a^x$

B $y = ab^x$

C $y^2 = a + x^b$

D $y = ax^b$

E $y^x = a^b$

Question 7

Given that c and d are non-zero integers, the expression $\frac{10^{c-2d} \times 20^{2c+d}}{8^c \times 125^{c+d}}$ is an integer if

A $c < 0$

B $d < 0$

C $c < 0$ and $d < 0$

D $c < 0$ and $d > 0$

E $c > 0$ and $d < 0$

F $c > 0$ and $d > 0$

G $d > 0$

H $c > 0$

Question 8

The sequence a_n is defined by the rule:

$$a_n = (-1)^n - (-1)^{n-1} + (-1)^{n+2} \text{ for } n \geq 1.$$

Find the value of

$$\sum_{n=1}^{39} a_n$$

A – 39

B – 3

C – 1

D 0

E 1

F 3

G 39

Question 9

Find the maximum angle x in the range $0° \leq x \leq 360°$ which satisfies the equation

$$\cos^2(2x) + \sqrt{3}\sin(2x) - \frac{7}{4} = 0$$

A $30°$

B $60°$

C $120°$

D $150°$

E $210°$

F $240°$

G $300°$

H $330°$

Question 10

It is given that

$$y = (1 + 2\cos x)\cos 2x \qquad \text{for } 0 < x < \pi$$

The complete set of values of x for which y is negative is

A $0 < x < \frac{\pi}{4}, \quad \frac{2\pi}{3} < x < \frac{3\pi}{4}$

B $0 < x < \frac{\pi}{4}, \quad \frac{3\pi}{4} < x < \pi$

C $0 < x < \frac{2\pi}{3}, \quad \frac{3\pi}{4} < x < \pi$

D $\frac{\pi}{4} < x < \frac{2\pi}{3}, \quad \frac{3\pi}{4} < x < \pi$

E $\frac{\pi}{4} < x < \frac{2\pi}{3}$

F $\frac{\pi}{4} < x < \frac{3\pi}{4}$