



JEE MAIN 2019 (CHALLENGE PAPER & SOLUTIONS)

MATHEMATICS

| JEE MAIN 2019 | DATE : 10 JANUARY 2019 (SHIFT-1) MORNING

9. Question ID : 4165299406

Option 1 ID : 41652937082

Option 2 ID : 41652937085

Option 3 ID : 41652937083

Option 4 ID : 41652937084

Status : Answered

Chosen Option :

If the parabolas $y^2 = 4b(x-c)$ and $y^2 = 8ax$ have a common normal, then which one of the following is a valid choice for the ordered triad (a,b,c)?

(1) (1/2,2,0)

(2) (1/2,2,3)

(3) (1,1,3)

(4) (1,1,0)

Ans. (bonus)

Normal to the parabola

$y^2 = 4b(x - c)$ is

$y = m(x - c) - 2bm - bm^3$ (1)

and normal to the parabola, $y^2 = 8ax$ is

$y = mx - 4am - 2am^3$ (2)

Since (1) and (2) are same

So, $-mc - 2bm - bm^3 = -4am - 2am^3$

$\Rightarrow mc + 2bm + bm^3 = 4am + 2am^3$

$m(c + 2b - 4a) + m^3(b - 2a) = 0$

All option are correct for $m = 0$

11. Question ID : 4165299387

Option 1 ID : 41652937007

Option 2 ID : 41652937006

Option 3 ID : 41652937009

Option 4 ID : 41652937008

Status : Answered

Chosen Option :

Let z_1 and z_2 be any two non-zero complex numbers such that $3|z_1| = 4|z_2|$. If $z = \frac{3z_1}{2z_2} + \frac{2z_2}{3z_1}$ then :

- (1) $\operatorname{Re}(z) = 0$ (2) $\operatorname{Im}(z) = 0$ (3) $|z| = \sqrt{\frac{5}{2}}$ (4) $|z| = \frac{1}{2}\sqrt{\frac{17}{2}}$

Ans. (3)

$$3|z_1| = 4|z_2|$$

$$\Rightarrow \left| \frac{3z_1}{2z_2} \right| = 2$$

$$\text{Let } \frac{2z_1}{2z_2} = P = 2(\cos\theta + i\sin\theta)$$

$$\text{Then } z = P + \frac{1}{P}$$

$$z = (2\cos\theta + 2i\sin\theta) + \frac{(\cos\theta - i\sin\theta)}{2}$$

$$\Rightarrow z = \frac{5}{2}\cos\theta + \frac{3}{2}i\sin\theta$$

| JEE MAIN 2019 | DATE : 11 JANUARY 2019 (SHIFT-2) EVENING

5. Question ID : 4165299566

Option 1 ID : 41652937723

Option 2 ID : 41652937724

Option 3 ID : 41652937725

Option 4 ID : 41652937722

Status : Answered

Chosen Option :

Let a function $f : (0, \infty) \rightarrow (0, \infty)$ be defined by $f(x) = \left| 1 - \frac{1}{x} \right|$. Then f is

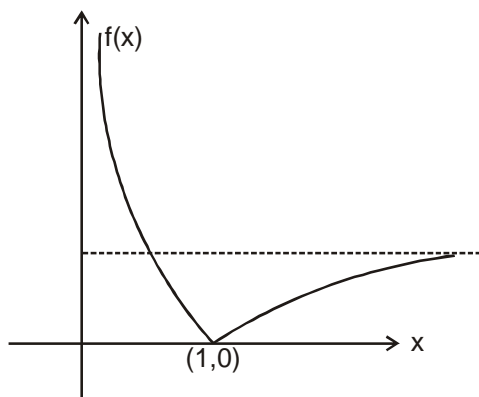
- (1) not injective but it is surjective (2) neither injective nor surjective
(3) both injective as well as surjective (4) injective only

5. (BONUS)

Given function

$f : (0, \infty) \rightarrow (0, \infty)$

Defined as $f(x) = \left| 1 - \frac{1}{x} \right| = \left| \frac{1}{x} - 1 \right|$



Range of $f(x)$ is $[0, \infty)$ which is not a subset of co-domain $(0, \infty)$.

Note: IF co-domain is $[0, \infty)$ then $f(x)$ is many-one (Not Injective) & onto (surjective)