

DRTC-MSLIS: MID-SEM

ELEMENTS OF MATHEMATICS-I

Time: 1.5hrs

Total Marks: 30

Q.1. In a class 40% of the students enrolled for Math and 70% enrolled for Economics. If 15% of the students enrolled for both Math and Economics, what % of the students of the class did not enroll for either of the two subjects? (4)

Q.2. If $A = \{1, 3, 5\}$, $B = \{3, 5, 6\}$ and $C = \{1, 3, 7\}$
Verify that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$. (4)

Q.3. Prove the identity

$$\tan^2(x) - \sin^2(x) = \tan^2(x) \sin^2(x) \quad (4)$$

Q.4. If $\sin(x) = 2/5$ and x is an acute angle, find the exact values of

- a) $\cos(2x)$
- b) $\cos(4x)$
- c) $\sin(2x)$
- d) $\sin(4x)$ (4)

Q.5.

a) In a right triangle ABC, $\tan(A) = 3/4$. Find $\sin(A)$ and $\cos(A)$ (2)

b) In a right triangle ABC with angle A equal to 90° ,

Find angle B and C so that $\sin(B) = \cos(B)$. (2)

Q.6. Rationalize the denominator of the surd $2/(\sqrt{7}-\sqrt{3})$ (3)

Q.7. Simplify:

- a) $(27)^{2/3}$
- b) $(1024)^{-4/5}$ (4)

Q.8. Prove that $\sqrt{2}$ is irrational. (3)