

MATH 3040
Assignment 3

1. False

False

True

True

2. False

False Let $\alpha = -\frac{1}{2}$. Then $\int_1^\infty x^\alpha dx = \lim_{\alpha \rightarrow \infty} \int_1^\alpha x^{-\frac{1}{2}} dx = \infty$.

True

3. Either l or $l + 2$ is not prime.

Both γ and $-\gamma$ are not positive.

Both $\gamma > 0$ and, either γ or γ^3 is not positive.

4. True False True True False False True False

5. (a) False

Converse: If n is divisible by 6, then $4n$ is divisible by 6. True

Contrapositive: If n is not divisible by 6, then $4n$ is not divisible by 6. False

(b) False

Converse: If $a = 0$, then $f(x)$ is continuous. False

Contrapositive: If $a \neq 0$, then $f(x)$ is not continuous. False

(c) True

Converse: If x is irrational, then x^2 is irrational. False

Contrapositive: If x is rational, then x^2 is rational. True

6. There exists some $a \in A$ such that $a > x$.

Either α is not an upper bound of A or there exists an upper bound x of A such that $\alpha > x$.