

PRINT Your Name: _____

Quiz 9 — October 28, 2013 — Section 2 — 4:40 — 5:30

Remove everything from your desk except a pencil or pen.

Write in complete sentences. Explain your work!

The quiz is worth 5 points.

Find the values of x for which the series

$$\sum_{n=0}^{\infty} \frac{\cos^n x}{2^n}$$

converges. Find the sum of the series for those values of x .

Answer: This series is the geometric series $\sum_{n=0}^{\infty} ar^n$ where $a = 1$ and $r = \frac{\cos x}{2}$.

We observe that $-1 < \frac{\cos x}{2} < 1$ for all choices of x . Thus, the geometric series converges to

$$\frac{a}{1-r} = \boxed{\frac{1}{1 - \frac{\cos x}{2}}}$$

for all choices of x .