

Mathematics 300

Quiz 1

Name: _____

You must show your work to get full credit.

1. Let

$$S = a + ar + ar^2 \cdots + ar^n$$

Derive a formula for this sum when $r \neq 1$.

$$S = \underline{\hspace{2cm}}$$

2. Use that $11 \equiv -1 \pmod{10}$ to show that the number with decimal $abcd$ is divisible by 11 if and only if $d - x + b - a$ is divisible by 11.

3. Find the sum of

$$1 + 3 + 3^2 + 3^3 + \cdots + 3^{20}.$$

The sum is _____