

Math 255 - Spring 2022
Induction problems

This homework contains proofs to be completed by mathematical induction. This is good practice for anyone who feels a bit shaky on this. This homework is worth 5 points.

1. Show that the expression

$$\frac{(2n)!}{2^n n!}$$

is an integer for all integers $n \geq 0$.

2. If $r \neq 1$, show that for any positive integer n , we have

$$a + ar + ar^2 + \cdots + ar^n = \frac{a(r^{n+1} - 1)}{r - 1}.$$