

Please complete this worksheet by **September 29th, 2021** by **11:59pm**.

Once you upload a picture of your work ([here](#)), the solutions will become available so you can study for the weekly quizlet, which may draw one problem from this week's worksheets.

Problem 1

- (a) Use induction to prove that, for $n \geq 0$, $n^3 + 2n$ is divisible by 3.
- (b) Use induction to prove that, for $n \geq 0$, $7^n - 2^n$ is divisible by 5.

Problem 2

Use induction to prove the formula for a geometric series:

$$1 + r + r^2 + r^3 + \dots + r^n = \frac{1 - r^{n+1}}{1 - r}$$

$\forall r \in \mathbb{R}, r \neq 1$.