Exercises 2.2

Exercise 7: Decide whether each of the following sequences converges, and if so, find its limit.

d. $z_n = \dfrac{n(2 + i)}{n + 1}$

Solution:
Consider the sequence, after we divide both terms in fraction by n,

$$z_n = \frac{n(2 + i)}{n + 1},$$
$$= \frac{\frac{n(2+i)}{n}}{\frac{n+1}{n}},$$
$$= \frac{(2 + i)}{\frac{n+1}{n}}.$$

This gives us that the limit as $n \to \infty$ is

$$\lim_{n\to\infty} z_n = \frac{(2 + i)}{\frac{n+1}{n}} = 2 + i.$$

e. $z_n = \left(\dfrac{1 - i}{4}\right)^n$

Solution: