

M242 Q7(a) (S. Zhang) (8 points). Name: _____

1. We can show (not required) that the sequence

$$a_1 = 1$$
$$a_{n+1} = \frac{6}{5 - a_n}, \quad n = 1, 2, \dots$$

is increasing and bounded above. Therefore it is convergent. Find the limit.

• **ans:** Take limit on the equation

$$L = \frac{6}{5 - L}$$
$$5L - L^2 = 6, \quad L = 2, 3$$

To find out the unique limit, we check the first few terms:

$$1, \frac{3}{2}, \frac{12}{7}, \frac{42}{23}, \dots$$

The sequence is increasing, but less than 2.

The correct answer for the limit is 2.