The handwritten homework assignment is **due** on Canvas on **Tuesday**, **September 8**, **by 11 pm**. The problems are similar to those from Section 2.2 of our textbook (problems 91 through 118 on p. 80).

When submitting a written homework you will be required to follow these guidelines:

- the document must be in pdf format;
- you must either (a) have all problems in numerical order or (b) start every problem on the left side of the page so that the TA can easily find the problems that s/he chooses to grade.

You will be penalized two points for not following these guidelines on every handwritten assignment.

Problem 1. Consider the sequence recursively defined by the relation

$$a_{n+1} = 3a_n - 2 \qquad a_0 = 1.$$

Compute a_n for n = 1, 2, ..., 5.

Problem 2. Consider the sequence recursively defined by the relation

$$a_{n+1} = \frac{a_n}{1+a_n} \qquad a_0 = 1$$

Compute a_n for n = 1, 2, ..., 5.

Problem 3. Consider the sequence recursively defined by the relation

$$a_{n+1} = \frac{1}{2}a_n + 2.$$

Find all fixed points of $\{a_n\}$.

Problem 4. Consider the sequence recursively defined by the relation

$$a_{n+1} = \frac{4}{a_n}.$$

Find all fixed points of $\{a_n\}$.

Problem 5. Consider the sequence recursively defined by the relation

$$a_{n+1} = \sqrt{5a_n}.$$

Find all fixed points of $\{a_n\}$.

Problem 6. Consider the sequence recursively defined by the relation

$$a_{n+1} = \frac{1}{2}(a_n + 5) \qquad a_0 = 1$$

and assume that $\lim_{n \to \infty} a_n$ exists.

Find all fixed points of $\{a_n\}$, and use a table or other reasoning to guess which fixed point is the limiting value for the given initial condition.

Problem 7. Consider the sequence recursively defined by the relation

$$a_{n+1} = 2a_n(1-a_n)$$
 $a_0 = 0.1$

and assume that $\lim_{n \to \infty} a_n$ exists.

Find all fixed points of $\{a_n\}$, and use a table or other reasoning to guess which fixed point is the limiting value for the given initial condition.

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Problem 8. Consider the sequence recursively defined by the relation

$$a_{n+1} = 2a_n(1 - a_n) \qquad a_0 = 0$$

and assume that $\lim_{n \to \infty} a_n$ exists.

Find all fixed points of $\{a_n\}$, and use a table or other reasoning to guess which fixed point is the limiting value for the given initial condition.

Problem 9. Consider the sequence recursively defined by the relation

$$a_{n+1} = \frac{1}{2} \left(a_n + \frac{4}{a_n} \right) \qquad a_0 = 1$$

and assume that $\lim_{n\to\infty} a_n$ exists. Find all fixed points of $\{a_n\}$, and use a table or other reasoning to guess which fixed point is the limiting value for the given initial condition.

Problem 10. Consider the sequence recursively defined by the relation

$$a_{n+1} = \frac{1}{2} \left(a_n + \frac{9}{a_n} \right) \qquad a_0 = -1$$

and assume that $\lim_{n\to\infty} a_n$ exists. Find all fixed points of $\{a_n\}$, and use a table or other reasoning to guess which fixed point is the limiting value for the given initial condition.