5.1.8 Exam: Application of Newton's method

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Exams due Aug 30, 2023 05:00 IST Completed

Problem: Behavior of Newton's method on this problem

1.0/3.0 points (graded)

Consider the use of Newton's method on the following function:

$$r(x) = x^4 - 3x^3 + 3x^2 - 3x + 2 \tag{5.13}$$

A plot of $r(x)$ is given in Figure 5.1.

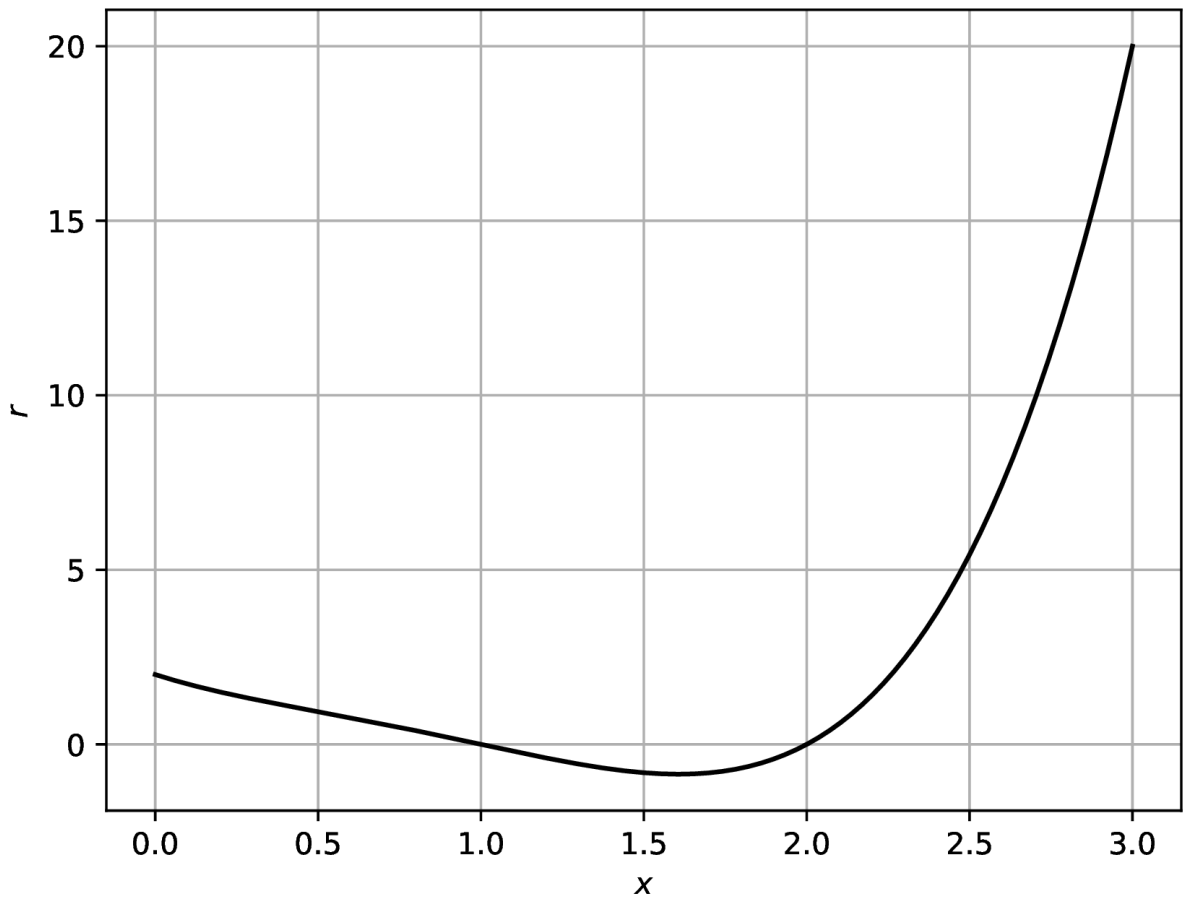

Figure 5.1: Plot of $r(x) = x^4 - 3x^3 + 3x^2 - 3x + 2$

Consider an initial guess of $x^0 = 1.5$. Which of the following is the result of applying one step of Newton's method (for four significant digits) for this initial condition?

- 0.000
- 0.4167 ✔
- 1.000
- 2.000
- 2.202
- 2.583
- 2.798

✖

Consider an initial guess of $x^0 = 2.5$. Which of the following is the result of applying one step of Newton's method (for four significant digits) for this initial condition?

- 0.000
- 0.4167
- 1.000
- 2.000
- 2.202 ✔
- 2.583
- 2.798

✖

What will the behavior of Newton's method be when applied to these two different initial guesses after many iterations:

- Both initial guesses will converge to $x = 1$
- One of the initial guesses will converge to $x = 1$ and the other to $x = 2$
- Both initial guesses will converge to $x = 2$
- None of the answers above are correct.

✔

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Answers are displayed within the problem

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