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### 3.5.1 Finger Exercise: Convergence of Newton's method and impact of initial guess

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Finger Exercises 3 due Aug 17, 2023 05:00 IST   Completed

## Problem: Convergence of Newton's method

1/1 point (graded)

MO2.10

You can find an approximation to  $\sqrt{2}$  by running Newton's method to find the root of the function  $r(x) = x^2 - 2$ . Initialize the iteration with  $x^0 = 1$ . What value  $x$  do you obtain after two iterations of Newton's method (i.e.  $k = 2$ )? Enter the value to four decimal places (1.WXYZ).

1.4167

✓ Answer: 1.4167

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Answers are displayed within the problem

## Problem: A different initial guess

1/1 point (graded)

Now suppose that you choose  $x^0 = -1$ . What happens?

☐ Convergence to  $\sqrt{2}$

☒ Convergence to  $-\sqrt{2}$

☐ Divergence (i.e. no convergence)

☐ Error, division by zero

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☐ Convergence to  $\sqrt{2}$

☒ Convergence to  $-\sqrt{2}$

☐ Divergence (i.e. no convergence)

☐ Error, division by zero

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