

## Applications: Newton's Method

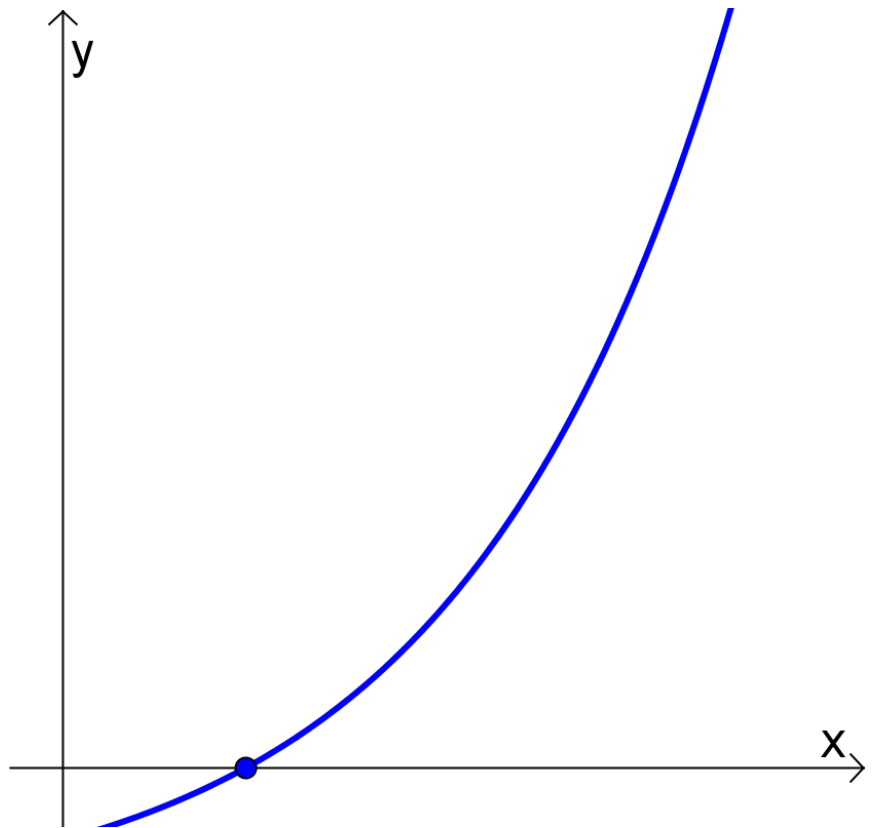
(covers Stewart 4.8)

Newton's method is a way of approximating solutions to  $f(x) = 0$  using tangent lines of  $f$ .

### Newton's Method

1. Guess a first approximation to a solution of the equation  $f(x) = 0$ . This will be an  $x$ -value.
2. Use the first approximation to get a second, the second to get a third, and so on, using this:

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$



### Ex 1.

Use Newton's method to estimate the positive solution of the equation  $x^2 - 2 = 0$ .

Start with  $x_1 = 1$  and then find  $x_4$ .