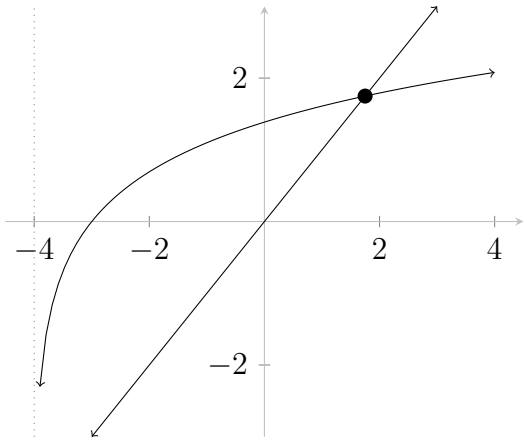
WORKSHEET: NEWTON'S METHOD

Use at least 2 steps of Newton's method to approximate the following.

1. Approximate the solution to $x^4 - 6x^2 + x + 5 = 0$ that is closest to $x_0 = 2$.
2. Approximate the unique positive solution to the equation $\ln(x + 4) = x$.



3. If you deposit P dollars in a retirement fund every year for N years with the intention of then withdrawing Q dollars per year for M years, you must earn interest at a rate $r > 0$ satisfying

$$P(b^N - 1) = Q(1 - b^{-M})$$

   where $b = 1 + r$. Assume \$2000 is deposited each year for 30 years and the goal is to withdraw \$10,000 per year for 25 years. Use Newton's method to approximate b, and then find r.
4. (Challenging) Approximate the coordinates of point P on the graph of $f(x) = \cos(x)$ such that the tangent line at P passes through the origin.