1. Assume inductively that $H^k(\mathbb{C}P^n) = \mathbb{R}$ for $k$ even and $0 \leq k \leq 2n$; $H^k(\mathbb{C}P^n) = 0$ otherwise. Notice this holds for $n = 0$. Then trace the Mayer-Vitores sequence for the covering introduced in the last hw to complete induction.

2. $E$ is homotopy equivalent to $M$ via the obvious retraction.

3. (a) By retraction to the standard 2 sphere, we see that the first space is homotopy equivalent to $S^2$ minus two points, which in turn diffeomorphic to a plane minus a point, homotopy equivalent to a circle. Thus $H^k(M) = \mathbb{R}$ for $k = 0, 1$. Otherwise, it is zero.

   (b) The space is given by intersection of $\mathbb{R}^3$ minus $x$-axis and $\mathbb{R}^3$ minus $y$-axis. By applying the Mayer-Vitores sequence, we find that $H^0(M) = \mathbb{R}$, $H^1(M) = \mathbb{R}^3$. Zero otherwise.