1. Apply either the Boundedness Theorem 5.3.2 to $1/f$, or the Maximum-Minimum Theorem 5.3.4 to conclude that $\inf f(I) > 0$.

Alternatively, if $x_n \in I$ is such that $0 < f(x_n) < 1/n$, then there is a subsequence $(x_{n_k})$ that converges to a point $x_0 \in I$. Since $f(x_0) = \lim(f(x_{n_k})) = 0$, we have a contradiction.

4. Suppose that $p$ has odd degree $n$ and that the coefficient $a_n$ of $x^n$ is positive. By 4.3.16, we have $\lim_{x \to -\infty} p(x) = \infty$ and $\lim_{x \to -\infty} p(x) = -\infty$. Hence $p(\alpha) < 0$ for some $\alpha < 0$ and $p(\beta) > 0$ for some $\beta > 0$. Therefore there is a zero of $p$ in $[\alpha, \beta]$.

5. In the intervals $[1.035, 1.040]$ and $[-7.026, -7.025]$.

6. Note that $g(0) = f(0) - f(1/2)$ and $g(1/2) = f(1/2) - f(1) = -g(0)$. Hence there is a zero of $g$ at some $c \in [0, 1/2]$. But if $0 = g(c) = f(c) - f(c + 1/2)$, then we have $f(c) = f(c + 1/2)$.

11. If $f(w) < 0$, then it follows from Theorem 4.2.9 that there exists a $\delta$-neighborhood $V_\delta(w)$ such that $f(x) < 0$ for all $x \in V_\delta(w)$. But since $w < b$, this contradicts the fact that $w = \sup W$. There is a similar contradiction if we assume that $f(w) > 0$. Therefore $f(w) = 0$.

19. Consider $g(x) := 1/x$ for $x \in J := (0, 1)$. 