Corrections to Root-finding Notes

1/. Page 11 : Monomials with negative coefficients $\boxed{y \sim x^{-\alpha}} \Rightarrow \boxed{\dfrac{dy}{dx} = -\alpha \dfrac{y}{x}}$.

2/. Page 13: Order 3 (at the bottom). $\boxed{p_3'''(0) = f'''(0) = 1}$.

3/. Page 18: ~~Imaginary~~ root $\boxed{a+ib}$. Complex root ✓.

4/. Page 19: If $f(x)$ is exactly divisible by $\boxed{(x-a)^2+b^2}$ then it is also divisible by its factors, $(x-a+ib)$ and $(x-a-ib)$ ⇒ Complex conjugates.

5/. Page 23 : Last Row. $a = 1.1328$, $f(a) = -0.0196$. $c = 1.1338$, $f(c) = -0.0095$. $\boxed{f(a)f(c) > 0}$. $\boxed{\text{Set } a = c}$.

6/. Page 24: At $\boxed{x = x_0}$ (not $x=0$), the first-order Taylor polynomial is $\boxed{p_1(x) = f(x_0) + f'(x_0)(x-x_0)}$.

7/. Page 31 : If $\boxed{\omega = \cos\theta + i\sin\theta}$, then its complex conjugate is $\boxed{\omega^* = \cos\theta - i\sin\theta}$. $\cos\theta = -1/2$ and $\sin\theta = \sqrt{3}/2$.

8/. Page 39: The third root is $\boxed{y\omega^2 + z\omega}$ $\boxed{y=5,\ z=1}$.

$$\therefore \boxed{x_3 = y\omega^2 + z\omega} = 5\left(\frac{-1-\sqrt{3}i}{2}\right) + 1\left(\frac{-1+\sqrt{3}i}{2}\right) = -3 - 2\sqrt{3}i$$

9/. Page 43: Factorising $\boxed{2k^3 + 5k^2 - 4k - 7 = 0}$ ⇒ $\boxed{k = -1}$

$$\Rightarrow 2k^3 + 2k^2 + 3k^2 + 3k - 7k - 7 = 0$$

$$\Rightarrow 2k^2(k+1) + 3k(k+1) - 7(k+1) = 0 \Rightarrow \boxed{(k+1)(2k^2+3k-7) = 0}$$

10/. Page 47: Factorising $\boxed{k^6 - 4k^4 + 16k^2 - 64 = 0}$

$$\Rightarrow k^4(k^2-4) + 16(k^2-4) = 0 \Rightarrow \boxed{(k^2-4)(k^4+16) = 0}.$$

$$\Rightarrow \boxed{k = \pm 2}$$