1. $f(x) = 2\sin^2 x - 5\sqrt{2}\sin x + 4$

   → $2\sin^2 x - 5\sqrt{2}\sin x + 4 = 0 \quad |:2$ → $\sin^2 x - \frac{5}{2}\sqrt{2}\sin x + 2 = 0$

   Subst.: $z = \sin x$ → $z^2 - \frac{5}{2}\sqrt{2}z + 2 = 0$ → $z_{1,2} = \frac{5}{4}\sqrt{2} \pm \sqrt{\frac{25}{8} - \frac{16}{8}} = \frac{5}{4}\sqrt{2} \pm \frac{3}{4}\sqrt{2}$

   → $z_1 = 2\sqrt{2}$ oder $z_2 = \frac{1}{2}\sqrt{2}$ →Rücksubstitution: $\sin x = 2\sqrt{2}$ oder $\sin x = \frac{1}{2}\sqrt{2}$

   → $\sin x = 2\sqrt{2}$ hat keine Lösungen

   → **Nullstellen:** $x_{01} = \frac{\pi}{4} + 2k\pi$ $\qquad x_{02} = \frac{3}{4}\pi + 2k\pi$

2. $f(x) = 4\cos(2x-1) - 2$

   → $4\cos(2x-1) - 2 = 0 \quad |:4$ → $\cos(2x-1) = \frac{1}{2}$

   → $2x - 1 = \frac{\pi}{3} + 2k\pi$ oder $2x - 1 = \frac{5}{3}\pi + 2k\pi$

   → **Nullstellen:** $x_{01} = \frac{1}{2} + \frac{\pi}{6} + k\pi \approx 1{,}02 + k\pi$ $\qquad x_{02} = \frac{1}{2} + \frac{5}{6}\pi + k\pi \approx 3{,}12 + k\pi$

3. $f(x) = 3\sin x - \cos x - 3$

   → $3\sin x - \cos x - 3 = 0$ → Subst.: $\boxed{\cos x = \sqrt{1-\sin^2 x}}$

   → $3\sin x - \sqrt{1-\sin^2 x} - 3 = 0 \quad | + \sqrt{1-\sin^2 x}$ → $3\sin x - 3 = \sqrt{1-\sin^2 x}$ | Quadrieren

   → $9\sin^2 x - 18\sin x + 9 = 1 - \sin^2 x \quad | -1 + \sin^2 x$ → $10\sin^2 x - 18\sin x + 8 = 0 \quad |:10$

   → $\sin^2 x - 1{,}8\sin x + 0{,}8 = 0$ → Subst.: $z = \sin x$

   → $z^2 - 1{,}8z + 0{,}8 = 0$ → $z_1 = 1$ oder $z_2 = 0{,}8$ → Rücksubstitution: $\sin x = 1$ oder $\sin x = 0{,}8$

   → $x_1 = \frac{\pi}{2} + 2k\pi \quad x_2 \approx 0{,}927 + 2k\pi \quad x_3 \approx 2{,}214 + 2k\pi$

   →Probe: für $\frac{\pi}{2}$ → $3\sin\frac{\pi}{2} - \cos\frac{\pi}{2} - 3 = 0$ → $3 - 0 - 3 = 0$ wahre Aussage

   für $0{,}927$ → $3\sin 0{,}927 - \cos 0{,}927 - 3 = 0$ → $2{,}4 - 0{,}6 - 3 = 0$ falsche Aussage

   für $2{,}214$ → $3\sin 2{,}214 - \cos 2{,}214 - 3 = 0$ → $2{,}4 + 0{,}6 - 3 = 0$ wahre Aussage

   → **Nullstellen:** $x_{01} = \frac{\pi}{2} + 2k\pi$ $\qquad x_{02} \approx 2{,}214 + 2k\pi$

4. $f(x) = 2\cos 2x - 2\sin x$

   → $2\cos 2x - 2\sin x = 0 \quad |:2$ → $\cos 2x - \sin x = 0$ → Subst.: $\boxed{\cos 2x = 1 - 2\sin^2 x}$

   → $1 - 2\sin^2 x - \sin x = 0$ → Subst.: $z = \sin x$ → $z^2 + \frac{1}{2}z - \frac{1}{2} = 0$

   → $z_1 = \frac{1}{2}$ oder $z_2 = -1$ →Rücksubstitution: $\sin x = \frac{1}{2}$ oder $\sin x = -1$

   → $x_1 = \frac{\pi}{6} + 2k\pi \quad x_2 = \frac{5}{6}\pi + 2k\pi \quad x_3 = \frac{3}{2}\pi + 2k\pi$

   →Probe: für $\frac{\pi}{6}$ → $2\cos\frac{\pi}{3} - 2\sin\frac{\pi}{6} = 0$ → $1 - 1 = 0$ wahre Aussage

   für $\frac{5}{6}\pi$ → $2\cos\frac{5}{3}\pi - 2\sin\frac{5}{6}\pi = 0$ → $-1 - 1 = 0$ falsche Aussage!!!

   für $\frac{3}{2}\pi$ → $2\cos 3\pi - 2\sin\frac{3}{2}\pi = 0$ → $-2 + 2 = 0$ wahre Aussage

   → **Nullstellen:** $x_{01} = \frac{\pi}{6} + 2k\pi$ $\qquad x_{02} = \frac{3}{2}\pi + 2k\pi$