# ZERNIKE POLINOMIALS (OSA standard)

| 0. | $1$ | Constant |
|---|---|---|
| 1. | $2r\cos(\theta)$ | Tilt |
| 2. | $2r\sin(\theta)$ | Tilt |
| 3. | $\sqrt{6}r^2\sin(2\theta)$ | Astigmatism |
| 4. | $\sqrt{3}(2r^2-1)$ | Defocus |
| 5. | $\sqrt{6}r^2\cos(2\theta)$ | Astigmatism |
| 6. | $2\sqrt{2}r^3\sin(3\theta)$ | Zero curvature Coma (Trefoil) |
| 7. | $2\sqrt{2}(3r^3-2r)\sin(\theta)$ | Pure coma |
| 8. | $2\sqrt{2}(3r^3-2r)\cos(\theta)$ | Pure coma |
| 9. | $2\sqrt{2}r^3\cos(3\theta)$ | Zero curvature Coma (Trefoil) |
| 10. | $\sqrt{10}r^4\sin(4\theta)$ | |
| 11. | $\sqrt{10}(4r^4-3r^2)\sin(2\theta)$ | 5$^{th}$ order Astigmatism |
| 12. | $\sqrt{5}(6r^4-6r^2+1)$ | Spherical |
| 13. | $\sqrt{10}(4r^4-3r^2)\cos(2\theta)$ | 5$^{th}$ order Astigmatism |
| 14. | $\sqrt{10}r^4\cos(4\theta)$ | |
| 15. | $2\sqrt{3}r^5\sin(5\theta)$ | |
| 16. | $2\sqrt{3}(5r^5-4r^3)\sin(3\theta)$ | |
| 17. | $2\sqrt{3}(10r^5-12r^3+3r)\sin(\theta)$ | |
| 18. | $2\sqrt{3}(10r^5-12r^3+3r)\cos(\theta)$ | |
| 19. | $2\sqrt{3}(5r^5-4r^3)\cos(3\theta)$ | |
| 20. | $2\sqrt{3}r^5\cos(5\theta)$ | |
| 21. | $\sqrt{14}r^6\sin(6\theta)$ | |
| 22. | $\sqrt{14}(6r^6-5r^4)\sin(4\theta)$ | |
| 23. | $\sqrt{14}(15r^6-20r^4+6r^2)\sin(2\theta)$ | |
| 24. | $\sqrt{7}(20r^6-30r^4+12r^2-1)$ | |
| 25. | $\sqrt{14}(15r^6-20r^4+6r^2)\cos(2\theta)$ | |
| 26. | $\sqrt{14}(6r^6-5r^4)\cos(4\theta)$ | |
| 27. | $\sqrt{14}r^6\cos(6\theta)$ | |
| 28. | $4r^7\sin(7\theta)$ | |
| 29. | $4(7r^7-6r^5)\sin(5\theta)$ | |
| 30. | $4(21r^7-30r^5+10r^3)\sin(3\theta)$ | |
| 31. | $4(35r^7-60r^5+30r^3-4r)\sin(\theta)$ | |
| 32. | $4(35r^7-60r^5+30r^3-4r)\cos(\theta)$ | |
| 33. | $4(21r^7-30r^5+10r^3)\cos(3\theta)$ | |
| 34. | $4(7r^7-6r^5)\cos(5\theta)$ | |
| 35. | $4r^7\cos(7\theta)$ | |