4. $\int (x^2(x-3))\,dx$

$= \int (x^3 - 3x^2)\,dx$

$= \frac{x^{3+1}}{3+1} - 3 \cdot \frac{x^{2+1}}{2+1} + C$

$= \frac{x^4}{4} - 3 \cdot \frac{x^3}{3} + C$

$= \boxed{\frac{1}{4}x^4 - x^3 + C}$

5. $\int (5x^3 - 7x^2 + 3x - 2)\,dx$

$= 5 \cdot \frac{x^{3+1}}{3+1} - 7 \cdot \frac{x^{2+1}}{2+1} + 3 \cdot \frac{x^{1+1}}{1+1} - 2x + C$

$= 5 \cdot \frac{x^4}{4} - 7 \cdot \frac{x^3}{3} + 3 \cdot \frac{x^2}{2} - 2x + C$

$= \boxed{\frac{5}{4}x^4 - \frac{7}{3}x^3 + \frac{3}{2}x^2 - 2x + C}$

6. $\int (\sqrt[5]{x^2} - 2)\,dx$

$= \int (x^{\frac{2}{5}} - 2)\,dx$

$= \frac{x^{\frac{2}{5}+1}}{\frac{2}{5}+1} - 2x + C$

$= \frac{x^{\frac{7}{5}}}{\frac{7}{5}} - 2x + C$

$= \boxed{\frac{5}{7}x^{\frac{7}{5}} - 2x + C}$

7. $\int \frac{x^2 + 5x - 2}{x^5}\,dx$

$= \int \left(\frac{x^2}{x^5} + \frac{5x}{x^5} - \frac{2}{x^5}\right) dx$

$= \int \left(\frac{1}{x^3} + \frac{5}{x^4} - \frac{2}{x^5}\right) dx$

$= \int (x^{-3} + 5x^{-4} - 2x^{-5})\,dx$

$= \frac{x^{-3+1}}{-3+1} + 5 \cdot \frac{x^{-4+1}}{-4+1} - 2 \cdot \frac{x^{-5+1}}{-5+1} + C$

$= \frac{x^{-2}}{-2} + \frac{5x^{-3}}{-3} - \frac{2x^{-4}}{-4} + C$

$= \frac{1}{-2x^2} + \frac{5}{-3x^3} - \frac{2}{-4x^4} + C$

$= \boxed{\frac{-1}{2x^2} - \frac{5}{3x^3} + \frac{1}{2x^4} + C}$