1. $\int x^4 - 3x^2 + 2 \, dx$

$\dfrac{x^5}{5} - \dfrac{3x^3}{3} + 2x + C$

$\dfrac{x^5}{5} - x^3 + 2x + C$

2. $\int 3x^3 - 2x \, dx$

$\dfrac{3x^4}{4} - \dfrac{2x^2}{2} + C$

$\dfrac{3x^4}{4} - x^2 + C$

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

$U = x^3 - 2$

$du = 3x^2 \, dx$

$\int u \, du = \dfrac{u^2}{2} + C$

$= \dfrac{(x^3-2)^2}{2} + C$

4. $\int \cos x \, dx$

$\sin x + C$

5. $\int \dfrac{1}{x-2} \, dx$

$U = x-2 \qquad \int \dfrac{1}{U} \, du = \ln|u| + C$

$du = 1 \, dx$

$\ln|x-2| + C$

6. $\int \dfrac{2x}{x^2-4} \, dx$

$\int \dfrac{1}{U} \, du = \ln|u| + C = \ln|x^2-4| + C$

$U = x^2 - 4$

$du = 2x \, dx$

7. $\int \sin(2x) \, dx$

$U = 2x$

$\dfrac{du}{2} = \dfrac{2dx}{2} \qquad \int \dfrac{\sin(u) \, du}{2} = \dfrac{1}{2}\int \sin(u) \, du$

$dx = \dfrac{du}{2}$

$= -\dfrac{1}{2}\cos(u) + C = \dfrac{-\cos(2x)}{2} + C$

8. $\int \sqrt{x^5 - 3x} \, dx$

$\int \dfrac{\sqrt{U} \, du}{5x^4-3}$

$U = x^5 - 3x$

$\dfrac{du = (5x^4 - 3)dx}{5x^4-3} \quad \dfrac{}{5x^4-3}$

$dx = \dfrac{du}{5x^4-3}$

$\rightarrow U = x^5 - 3x$

$\dfrac{U}{x} = x(x^4-3)$

$\dfrac{U}{x} = x^4 - 3$

$\dfrac{U}{x} + 3 = x^4$

$\dfrac{U+3x}{x} = x^4$

$U + 3x = x^5$

$\int \sqrt{x-2} \, dx$

$U = x-2 \qquad \int \sqrt{U} \, du = \int U^{1/2} \, du = \dfrac{U^{3/2}}{3/2}$

$du = 1 \, dx$

$= \dfrac{2U^{3/2}}{3} = \dfrac{2(x-2)^{3/2}}{3} + C$