Use the following table of integrals to evaluate the integral.

$$\int \sec^3 u \, du = \frac{1}{2}\sec u \tan u + \frac{1}{2}\ln|\sec u + \tan u| + C \qquad \int \frac{\sqrt{a^2 - u^2}}{u^2} du = -\frac{1}{u}\sqrt{a^2 - u^2} - \sin^{-1}\left(\frac{u}{a}\right) + C$$

$$\int \frac{du}{u^2\sqrt{u^2 - a^2}} = \frac{\sqrt{u^2 - a^2}}{a^2 u} + C \qquad \int u\cos^{-1} u \, du = \frac{2u^2 - 1}{4}\cos^{-1} u - \frac{u\sqrt{1 - u^2}}{4} + C$$

$$\int \frac{u \, du}{\sqrt{a + bu}} = \frac{2}{3b^2}(bu - 2a)\sqrt{a + bu} + C \qquad \int \frac{\sqrt{u^2 - a^2}}{u} du = \sqrt{u^2 - a^2} - a\cos^{-1}\left(\frac{a}{|u|}\right) + C$$

1) $\displaystyle\int \frac{\sqrt{7 - 2x^2}}{x^2} dx$ $\boxed{-\dfrac{1}{x}\sqrt{7 - 2x^2} - \sqrt{2}\sin^{-1}\left(\sqrt{\dfrac{2}{7}}x\right) + C}$

2) $\displaystyle\int_2^3 \frac{1}{x^2\sqrt{4x^2 - 7}} dx$ $\boxed{\dfrac{\sqrt{29}}{21} - \dfrac{3}{14}}$

3) $\displaystyle\int \sqrt{e^x - 1}\, dx$ $\quad$ $\boxed{\sqrt{e^{2x} - 1} - \cos^{-1}(e^{-x}) + C}$

4) $\displaystyle\int \frac{3x}{\sqrt{3 - 2x}}\, dx$ $\quad$ $\boxed{-(x + 3)\sqrt{3 - 2x} + C}$

5) $\int \sec^3(\pi x)\, dx$ $\boxed{\dfrac{1}{2\pi}\sec(\pi x)\tan(\pi x) + \dfrac{1}{2\pi}\ln\left|\sec(\pi x) + \tan(\pi x)\right| + C}$

6) $\int_0^1 2x\cos^{-1} x\, dx$ $\boxed{\dfrac{\pi}{4}}$