Integration via Trig substitutions "Answer key"

1. $\int \frac{x^2}{\sqrt{9-x^2}}\,dx = \frac{9}{2}\arcsin(x/3) - \frac{x}{2}\sqrt{9-x^2} + E$

2. $\int \frac{1}{\sqrt{x^2-9}}\,dx = \ln\left(x+\sqrt{x^2-9}\right) + F$

3. $\int \sqrt{12+4x^2}\,dx = x\sqrt{x^2+3} + 3\ln\left(\frac{x}{\sqrt{3}} + \sqrt{1+\frac{x^2}{3}}\right) + G$

4. $\int \frac{1}{\sqrt{t^2-5}}\,dt = \ln\left(t+\sqrt{t^2-5}\right) + H$

5. $\int \frac{1}{y^2\sqrt{5-y^2}}\,dy = \frac{-\sqrt{5-y^2}}{5y} + I$

6. $\int \frac{1}{t\sqrt{t^2-4}}\,dt = \frac{-1}{2}\arctan\left(\frac{2}{\sqrt{t^2-4}}\right) + J$

7. $\int \frac{1}{\sqrt{25+x^2}}\,dx = \ln\left(\frac{x}{5} + \sqrt{1+\frac{x^2}{25}}\right) + K$

8. $\int \frac{x^2}{(x^2-4)^{3/2}}\,dx = \ln\left(x+\sqrt{x^2-4}\right) - \frac{x}{\sqrt{x^2-4}} + L$

9. $\int x^3\sqrt{9-x^2}\,dx = \frac{-1}{5}(9-x^2)^{3/2}(x^2+6) + M$

10. $\int \frac{x^2}{\sqrt{x^2+1}}\,dx = \frac{1}{2}x\sqrt{x^2+1} - \ln\left(x+\sqrt{1+x^2}\right) + N$

11. $\int \frac{x^2}{(\sqrt{x^2+1})^3}\,dx = \ln\left(x+\sqrt{1+x^2}\right) - \frac{x}{\sqrt{x^2+1}} + O$

12. $\int \frac{1}{(x^2-4)^2}\,dx = \frac{-x}{8(x^2-4)} - \frac{1}{32}\ln(2-x) + \frac{\ln(x+2)}{32} + P$