1. $\int \left(x^2 - 10e^x + \frac{9}{\sqrt{1-x^2}}\right)dx = \int x^2 dx - \int 10e^x dx + \int \frac{9}{\sqrt{1-x^2}} dx =$

$= \frac{x^3}{3} - 10e^x + 9\arcsin(x) + C$

2. $\int \left(e^{3x} + \sin\frac{x}{2}\right)dx = \int e^{3x} dx + \int \sin\frac{x}{2} dx = \frac{1}{3}e^{3x} - 2\cos\frac{x}{2} + C$

3. $\int \sin^2 x \cdot \cos x dx = \int \sin^2 x \, d(\sin x) = \frac{1}{3}\sin^3 x + C$

4. $\int (\operatorname{tg} 5x + \operatorname{ctg} x)dx = \int \operatorname{tg} 5x dx + \int \operatorname{ctg} x dx = \int \frac{\sin 5x}{\cos 5x} dx + \int \frac{\cos x}{\sin x} dx =$

$= -\frac{1}{5}\int \frac{1}{\cos(5x)} d(\cos 5x) + \int \frac{d(\sin x)}{\sin x} = -\frac{1}{5}\ln(\cos(5x)) + \ln(\sin x) + C$

5. $\int \frac{4x+6}{x^2+3x+4} dx = \int \frac{d(2x^2+2\cdot 3x+2\cdot 4)}{x^2+3x+4} = 2\int \frac{d(x^2+3x+4)}{x^2+3x+4} = 2\ln|x^2+3x+4| + C$

6. $\int xe^x dx = \left| \begin{matrix} u = x & dv = e^x dx \\ du = dx & v = e^x \end{matrix} \right| = xe^x - \int e^x dx = xe^x - e^x + C$

$$7.\ \int \cos(\ln x)\,dx = \left| \begin{array}{l} u = \cos(\ln x)\ ;\ dv = dx \\ du = \frac{-\sin(\ln x)}{x}dx\ ;\ v = x \end{array} \right| = x\cdot\cos(\ln x) +$$

$$+\int \cancel{x}\,\frac{\sin(\ln x)}{\cancel{x}}\,dx = \left| \begin{array}{l} u = \sin(\ln x)\ ;\ dv = dx \\ du = \frac{\cos(\ln x)}{x}dx\ ;\ v = x \end{array} \right| = x\cdot\cos(\ln x) +$$

$$+x\cdot\sin(\ln x) - \int \cancel{x}\,\frac{\cos(\ln x)}{\cancel{x}}\,dx$$

$$\int \cos(\ln x)\,dx = x\cdot\cos(\ln x) + x\cdot\sin(\ln x) - \int \cos(\ln x)\,dx$$

$$\int \cos(\ln x)\,dx + \int \cos(\ln x)\,dx = x\cdot\cos(\ln x) + x\cdot\sin(\ln x) + C$$

$$2\int \cos(\ln x)\,dx = x\cdot\cos(\ln x) + x\cdot\sin(\ln x) + C$$

$$\int \cos(\ln x)\,dx = \frac{x\cdot\cos(\ln x) + x\cdot\sin(\ln x)}{2} + C$$