(10) See from (*) on in #9.

(11) $I = \int \frac{\sqrt{t+9}}{t}\,dt$ $\qquad u = t+9 \qquad t = u-9$

$du = dt$

$= \int \frac{\sqrt{u}}{u-9}\,du \qquad w = \sqrt{u} \qquad u = w^2$

$du = 2w\,dw$

$= \int \frac{w}{w^2-9}\,2w\,dw$

$= 2\int \frac{w^2}{w^2-9}\,dw$

$= 2\int \left(1 + \frac{9}{w^2-9}\right)dw$

$= 2w + 2\cdot 3\int\left(\frac{-1/2}{w+3} + \frac{1/2}{w-3}\right)dw$

$= 2w + 2\cdot 3\left(-\frac{1}{2}\ln|w+3| + \frac{1}{2}\ln|w-3|\right) + C$

$= 2w + 3\ln\frac{|w-3|}{|w+3|} + C$

$= 2\sqrt{u} - 3\ln\left|\frac{\sqrt{u}-3}{\sqrt{u}+3}\right| + C$

$= \boxed{2\sqrt{t+9} - 3\ln\left|\frac{\sqrt{t+9}-3}{\sqrt{t+9}+3}\right| + C}$

$\frac{A}{w+3} + \frac{B}{w-3}$

$\frac{A(w-3)+B(w+3)}{w^2-9}$

$A+B=0$

$3B-3A=9$

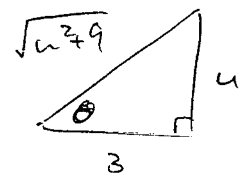
$B-A=3$

$A=-\frac{3}{2} \qquad B=\frac{3}{2}$

(11)

$$\int \frac{\sqrt{t+9}}{t}\,dt \qquad \begin{aligned} u &= \sqrt{t} \\ t &= u^2 \\ dt &= 2u\,du \end{aligned}$$

$$= \int \frac{\sqrt{u^2+9}}{u^2}\cdot 2u\,du = 2\int \frac{\sqrt{u^2+9}}{u}\,du$$



$$= 6\int \frac{\sec^3\theta}{\tan\theta}\,d\theta = 6\int \frac{1}{\sin\theta\cos^2\theta}\,d\theta$$

$$= 6\int \csc\theta\cdot\sec^2\theta\,d\theta$$

$$= 6\int \csc\theta\cdot(1+\tan^2\theta)\,d\theta$$

$$= 6\int \csc\theta\,d\theta + 6\int \sec\theta\tan\theta\,d\theta$$

$$= 6\ln|\csc\theta-\cot\theta| + 6\sec\theta + C$$

$$= \quad \vdots$$

$$= \boxed{6\ln\left|\frac{\sqrt{t+9}-3}{\sqrt{t}}\right| + 2\sqrt{t+9} + C} \left(= 3\ln\left|\frac{\sqrt{t+9}-3}{\sqrt{t+9}+3}\right| + 2\sqrt{t+9} + C\right)$$

$$6\ln\left|\frac{\sqrt{t+9}-3}{\sqrt{t}}\right| = 3\ln\left|\frac{(\sqrt{t+9}-3)^2}{t}\right| = 3\ln\left|\frac{(\sqrt{t+9}-3)(\sqrt{t+9}-3)(\sqrt{t+9}+3)}{t(\sqrt{t+9}+3)}\right|$$

$$= 3\ln\left|\frac{(\sqrt{t+9}-3)\cancel{(t+9-9)}}{\cancel{t}(\sqrt{t+9}+3)}\right| = 3\ln\left|\frac{\sqrt{t+9}-3}{\sqrt{t+9+3}}\right|$$