11. $\int x\sqrt{x^2-8}\ dx$

$u = x^2-8 \qquad du = (2x)\ dx$

$= \frac{1}{2}\int 2x\ \sqrt{x^2-8}\ dx$

$= \frac{1}{2}\int \sqrt{u}\ du$

$= \frac{1}{2}\int u^{\frac{1}{2}}\ du$

$= \frac{1}{2}\cdot\frac{u^{\frac{1}{2}+1}}{\frac{1}{2}+1}+C$

$= \frac{1}{2}\cdot\frac{u^{3/2}}{\frac{3}{2}}+C$

$= \frac{1}{2}\cdot\frac{2}{3}u^{3/2}+C$

$= \boxed{\frac{1}{3}(x^2-8)^{3/2}+C}$

12. $\dfrac{dQ}{dX} = \dfrac{0.94}{(X-24\,999)^{0.06}}\ ,\quad X \geq 25000$

$Q = \int \dfrac{dQ}{dX}$

$Q = \int \dfrac{0.94}{(X-24999)^{0.06}}\ dX$

$Q = 0.94 \int \dfrac{1}{(X-24999)^{0.06}}\ dX$

$u = X-24999 \quad du = 1\cdot dX$
$\qquad\qquad\qquad du = dX$

$Q = 0.94 \int \dfrac{1}{u^{0.06}}\ du$

$Q = 0.94 \int u^{-0.06}\ du$

$Q = 0.94\cdot\dfrac{u^{-0.06+1}}{-0.06+1}+C$

$Q = 0.94\cdot\dfrac{(X-24999)^{.94}}{.94}+C$

$Q = (X-24999)^{.94}+C$

$25000 = (25000-24999)^{.94}+C$

$25000 = 1^{.94}+C$

$25000 = 1+C$

$25000-1 = C$

$24999 = C$

$\boxed{Q = (X-24999)^{.94}+24999}$