27

$$\int (x^2+1)(x^3+3x)^4 \, dx \qquad \int (x^2+1) \, v^4 \left(\tfrac{1}{3} dv\right)$$

$$U = x^3 + 3x$$
$$dU = 3x^2 + 3$$
$$dU = 3(x^2+1)$$
$$\tfrac{1}{3} dU = x^2 + 1$$

$$\tfrac{1}{3}\left[\tfrac{U^5}{5}\right] \qquad \tfrac{1}{3}\left[\tfrac{1}{5}(x^3+3x)^5\right] \qquad \boxed{\tfrac{1}{15}(x^3+3x)^5 + C}$$

29.

$$\int 5^t \operatorname{sen}(5^t) \, dt \qquad \int v \operatorname{sen}(v) \left(\tfrac{1}{\ln(5)} dv\right)$$

$$U = 5^t$$
$$dU = 5^t \ln(5)$$
$$\tfrac{1}{\ln(5)} \, dv = 5^t$$

$$\tfrac{1}{\ln(5)}(-\cos(v))$$

$$\tfrac{-1}{\ln(5)}(\cos(5^t)) + C$$

31.

$$\int \frac{(\arctan x)^2}{x^2+1} \qquad \int \frac{(u)^2}{x^2+1}(dv^{-1})$$

$$U = \arctan x$$
$$du = \frac{1}{1+x}$$
$$dv^{-1} = 1+x^2$$

$$\tfrac{1}{3}\left[\arctan x\right]^3 + C$$