$$f(x)=\frac{ax+b}{cx+d} \quad \Rightarrow \quad f^{-1}(x)=\frac{-dx+b}{cx-a}$$

Proof

$$y=\frac{ax+b}{cx+d}$$

$$x=\frac{ay+b}{cy+d}$$

$$cxy+dx=ay+b$$

$$cxy-ay=-dx+b$$

$$(cx-a)y=-dx+b$$

$$y=\frac{-dx+b}{cx-a}$$

$$\boxed{f^{-1}(x)=\frac{-dx+b}{cx-a}} \quad \surd$$

$$A=A_0e^{kt} \quad \Rightarrow \quad kT=\ln\frac{A}{A_0}$$

Proof

$$A=A_0e^{kt}$$

$$\frac{A}{A_0}=e^{kt}$$

$$\ln\frac{A}{A_0}=\ln e^{kt}$$

$$\boxed{\ln\frac{A}{A_0}=kt} \quad \surd$$

$$a^{mx+n} = b^{px+q} \quad \Rightarrow \quad x = \frac{q\ln b - n\ln a}{m\ln a - p\ln b}$$

Proof

$$\ln a^{mx+n} = \ln b^{px+q}$$

$$(mx+n)\ln a = (px+q)\ln b$$

$$mx\ln a + n\ln a = px\ln b + q\ln b$$

$$mx\ln a - px\ln b = q\ln b - n\ln a$$

$$x(m\ln a - p\ln b) = q\ln b - n\ln a$$

$$\boxed{x = \frac{q\ln b - n\ln a}{m\ln a - p\ln b}}$$