Integrals of the day: Part 1

1. Compute
$$\int_{1/\sqrt{3}}^{\sqrt{3}} \frac{\arctan(x^2)}{1+x^2} dx.$$
Hint: Substitute $u = \frac{1}{x}$, and show that if I is the integral above, then
$$I = \frac{\pi}{2} \int_{1/\sqrt{3}}^{\sqrt{3}} \frac{1}{1+x^2} dx - I.$$

2. Compute
$$\int \frac{1}{1+\sin x} dx.$$
Hint: Multiply by $\dfrac{1-\sin x}{1-\sin x}$ (or use t-substitution, i.e. substitute $t = \tan \dfrac{x}{2}$)

End