1.

$$\int_0^{3/2} \frac{dx}{\sqrt{9-x^2}} = \left[\sin^{-1} \tfrac{x}{3}\right]_0^{3/2} = \sin^{-1} \tfrac{1}{2} - \sin^{-1} 0 = \tfrac{\pi}{6} - 0 = \tfrac{\pi}{6}$$

2.

$$\int_0^{\infty} \frac{dx}{(1+x)\sqrt{x}}\,;\ \begin{bmatrix} u = \sqrt{x} \\ du = \frac{dx}{2\sqrt{x}} \end{bmatrix} \rightarrow \int_0^{\infty} \frac{2\,du}{u^2+1} = \lim_{b \to \infty} \int_0^{b} \frac{2\,du}{u^2+1} = \lim_{b \to \infty} \left[2\tan^{-1} u\right]_0^b$$

$$= \lim_{b \to \infty} \left(2\tan^{-1} b - 2\tan^{-1} 0\right) = 2\left(\tfrac{\pi}{2}\right) - 2(0) = \pi$$

3.

$$\int_4^8 sin20°sin35° \sin 45° + cos25°cos45°cos80°\, d\theta$$

$$= \frac{\sqrt{2}}{2}\int_4^8 (sin20°sin35° + cos25°cos80°)\, d\theta$$

$$= \frac{\sqrt{2}}{2}\int_4^8 \left[\frac{1}{2}(\cos(-15°) - \cos 55°) + \frac{1}{2}(\cos(-55°) + \cos 105°)\right] d\theta$$

$$= \frac{\sqrt{2}}{4}\int_4^8 [\cos 15° + \cos 105°]\, d\theta$$

$$= \frac{\sqrt{2}}{4}\int_4^8 [\cos(45-30)° + \cos(60+45)°]\, d\theta$$

$$= \frac{\sqrt{2}}{4}\int_4^8 [\cos(45-30)° + \cos(60+45)°]\, d\theta$$

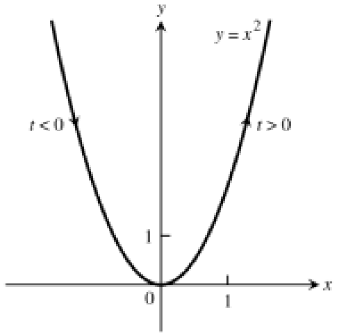
$$= \frac{1}{4}\theta|_4^8 = \frac{1}{4}(8-4) = 1$$

4.

$$f(x) = 1 + x + \frac{1}{2}x^2 + \frac{1}{6}x^3$$

5.

$x = 3t,\ y = 9t^2,\ -\infty < t < \infty \ \Rightarrow\ y = x^2$



6.

$t = \frac{2\pi}{3} \ \Rightarrow\ x = \cos \frac{2\pi}{3} = -\frac{1}{2},\ y = \sqrt{3} \cos \frac{2\pi}{3} = -\frac{\sqrt{3}}{2};\ \frac{dx}{dt} = -\sin t,\ \frac{dy}{dt} = -\sqrt{3} \sin t \ \Rightarrow\ \frac{dy}{dx} = \frac{-\sqrt{3} \sin t}{-\sin t} = \sqrt{3}$
$\Rightarrow\ \left.\frac{dy}{dx}\right|_{t=\frac{2\pi}{3}} = \sqrt{3}$; tangent line is $y - \left(-\frac{\sqrt{3}}{2}\right) = \sqrt{3}\left[x - \left(-\frac{1}{2}\right)\right]$ or $y = \sqrt{3}\,x$; $\frac{dy'}{dt} = 0 \ \Rightarrow\ \frac{d^2y}{dx^2} = \frac{0}{-\sin t} = 0$
$\Rightarrow\ \left.\frac{d^2y}{dx^2}\right|_{t=\frac{2\pi}{3}} = 0$