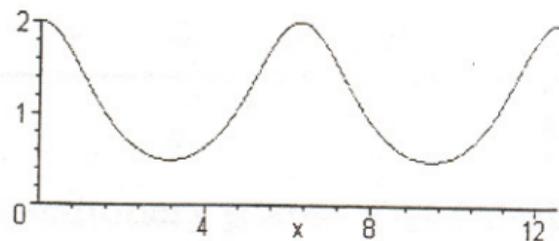16.

(a) yes, periodic of period 2π

(b) $y = 2^{\cos x} = e^{(\ln 2)\cos x} \Rightarrow$

$y' = e^{(\ln 2)\cos x}(\ln 2)(-\sin x) = 0 \Leftrightarrow \sin x = 0 \Leftrightarrow x = k\pi$

We have maximum of $y = 2^1 = 2$ and

minimum of $y = 2^{-1} = \frac{1}{2}$

17.(a) $D(x) = \sin x - (-\cos x) \Rightarrow D'(x) = \cos x - \sin x = 0 \Leftrightarrow \tan x = 1 \Rightarrow x = \frac{\pi}{4}$

Hence the maximum distance is $D(\frac{\pi}{4}) = \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} = \sqrt{2}$

(b) Tangent lines to these two curves are parallel at $\frac{\pi}{4}$. This is not surprising as if they were not parallel, then movement in one of the directions would make the curves move further apart.

18. At $t = 2$ the wheel will have completed 14 revolutions so the point will be back on the positive x axis. Movement is vertical so the horizontal component to its velocity will be zero.