10

$a_0 = \frac{1}{2\pi}\int_0^{2\pi} \frac{1+\cos 2\phi}{2}\, d\phi = \frac{1}{4\pi}\left[\phi + \frac{\sin 2\phi}{2}\right]_0^{2\pi}$

8/10 $= \frac{1}{2}$ 1 X $a_0 = 1$.

So $u(r,\theta) = \frac{1}{2} + \frac{r^2}{2}\cos 2\theta$

I would prefer a direct verification, by eval. $\int$'s, that $a_n = 0$, $n \neq 0, 2$ and $b_n = 0$, $\forall n$.

You may put $\cos^2\theta = \frac{1+\cos 2\theta}{2}$ and in the fourier expansion for u put $r=1$. By idenfying coefficients of $\cos n\theta$, $\sin n\theta$ on both sides we find

$a_0 = \frac{1}{2}$ $a_2 = \frac{1}{2}$?

0/5 Not clear.