Hence we have the expression in the form x + iy, where x = cos(6θ) and y = sin(6θ).

To find the modulus of z, we can use Euler's formula:
$|z| = \sqrt{[\cos^2(6\theta) + \sin^2(6\theta)]} = \sqrt{1} = 1$

The modulus of z is 1.

To find the amplitude (argument), we can use the formula:
arg(z) = arctan(y/x) = arctan(sin(6θ)/cos(6θ)) = arctan(tan(6θ)) = 6θ

The amplitude of z is 6θ.

3. A. Solve: $\int_0^{\pi/2} \sqrt{1 + \sin sin\, 2x}\, dx.$

Integrating the given function:
∫(1 + sin(2x)) dx

Integrating 1 with respect to x gives x, and integrating sin(2x) gives (-1/2)cos(2x) using the chain rule. So we have:
∫(1 + sin(2x)) dx = ∫1 dx + ∫sin(2x) dx
= x - (1/2)cos(2x) + C, where C is the constant of integration.

Now, further evaluating the definite integral for the given limits :
∫[0 to π/2] (1 + sin(2x)) dx = [x - (1/2)cos(2x)] [0 to π/2]
= [π/2 - (1/2)cos(2(π/2))] - [0 - (1/2)cos(2(0))]
= [π/2 - (1/2)cos(π)] - [0 - (1/2)cos(0)]
= [π/2 - (1/2)(-1)] - [0 - (1/2)(1)]
= [π/2 + 1/2] - [0 - 1/2]
= π/2 + 1/2 - (-1/2)
= π/2 + 1/2 + 1/2
= π/2 + 1
= π/2 + 2/2