Rotational with Constant Angular Acceleration

AKA "angular suvat equations"
AKA "$\theta\omega_1\omega_2\alpha t$ equations"

We have seen the *suvat* equations concerning *linear motion* with constant acceleration:

$$v = u + at$$
$$s = ut + \frac{1}{2}at^2$$
$$v^2 = u^2 + 2as$$
$$s = \frac{1}{2}(u + v)t$$

where s = Displacement (metres, m)
u = Initial velocity (metres per second, ms^{-1})
v = Final velocity (metres per second, ms^{-1})
a = Acceleration (metres per second squared, ms^{-2})
t = Time (seconds, s)

We could define a similar set of equations concerning ***angular motion*** with constant acceleration:

$$\omega_2 = \omega_1 + \alpha t$$
$$\theta = \omega_1 t + \frac{1}{2}\alpha t^2$$
$${\omega_2}^2 = {\omega_1}^2 + 2\alpha\theta$$
$$\theta = \frac{1}{2}(\omega_1 + \omega_2)t$$

where θ = Angular displacement (radians, rad)
ω_1 = Initial angular velocity (radians per second, rad s^{-1})
ω_2 = Final angular velocity (radians per second, rad s^{-1})
α = Angular acceleration (radians per second squared, rad s^{-2})
t = Time (seconds, s)

Multiplying by the radius, *r*, takes us from an angular variable to its linear equivalent:

$s = r\theta$ $\qquad$ $v = r\omega$ $\qquad$ $a = r\alpha$

nb: what distance do we travel if our angular displacement is 2π?