A grinding wheel starts from rest and has a constant angular acceleration of 5 rad/sec². At t = 6 seconds, find the centripetal and tangential accelerations of a point 75 mm from the axis. Determine the angular speed at 6 seconds, and the angle the wheel has turned through.

First of all let's find an angular speed:

$$\omega = \beta t$$

$$\omega = 5 rad/s^2 * 6s = 30 rad/s$$

Where β - angular acceleration
Centripetal acceleration:

$$a_n = \omega^2 R = (30 rad/s)^2 * 0.075m = 67.5 m/s^2$$

Tangential acceleration:

$$a_t = \beta R$$

$$a_t = 5 rad/s^2 * 0.075m = 0.375 m/s^2$$

And finally, angle the wheel has turns trough:

$$\varphi = \frac{\beta t^2}{2}$$
$$\varphi = \frac{5 rad/s^2 * (6s)^2}{2} = 90 rad$$

Answer: $\varphi = 90 rad, \omega = 30 rad/s, a_n = 67.5 m/s^2, a_t = 0.375 m/s^2$