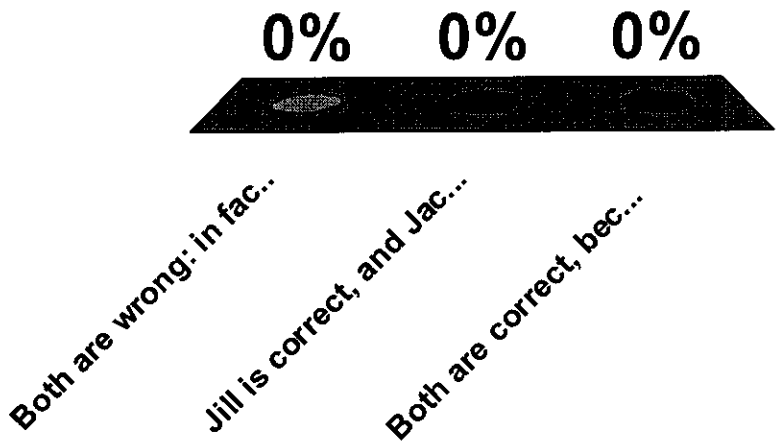
#6 9/27

John claims that the centripetal acceleration, $a_{Centrip}$ is equal to $R\omega^2$, but Jill says it is v^2/R.

1. Both are wrong: in fact, $a_{Centrip} = v/r^2$
2. Jill is correct, and Jack is wrong.
3. Both are correct, because $v = R\,\omega$ implies $R\,\omega^2 \equiv v^2/R$.



The correct answer is #3

- …because the tangential speed, $v = R\,\omega$, is in fact equal to the radius, R, times the angular velocity ω. Then $v^2/r = (R\,\omega)^2/R = R\,\omega^2$.
- Dimensionally, $[\omega] = 1/T$, (units radians/sec)
  $[R] = L$, (unit meters) and
  $[v] = L/T$ (units: m/sec);
  Therefore, $[v^2/r] \equiv [R\,\omega^2]$, so that the L/T^2 dimensionalities are consistent, as they must be in a physically true equation.
- Note that a radian is an arc length divided by a radius, and is dimensionless.