Unit 5: Circular Motion and Gravity Work Packet

I. Circular Speed and Centripetal Acceleration

1. A car travels around a circular track (radius of 100 m) 15 times in a time of 180 s.
A. Find the period of the car.

$r = 100 m$
$t = 180s$
15 TIMES

$T = \dfrac{t}{\text{\# OF ROTATIONS}} = \dfrac{180s}{15} = \boxed{12 s}$
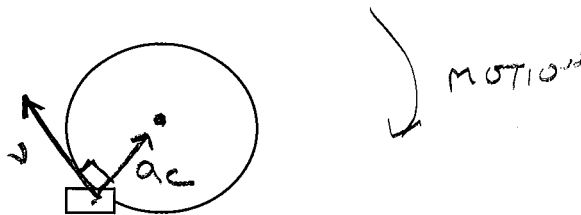
B. Find the circular speed of the car

$V = \dfrac{2\pi r}{T} = \dfrac{2\pi(100m)}{12s} = \boxed{52.4 m/s}$

C. Find the centripetal acceleration of the car

$a = \dfrac{v^2}{r} = \dfrac{(52.4 m/s)^2}{100 m} = \boxed{27.5 m/s^2}$

D. If the car hits an oil patch while moving **clockwise** in circular motion and flies out at the point indicated below, draw the direction of the car's velocity and acceleration at location.

MOTION

V IS ALWAYS PERPENDICULAR TO a_c