Name: ___ANSWER KEY_____Date: _____   #: _____
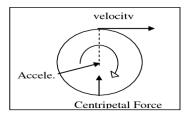
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<tr><td>GRADE:</td></tr>
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- Uniform circular motion
  - circular motion at a constant speed
    - speed = the circumference of a circle / time to complete one cycle around the circle
      - $speed = \dfrac{2\pi r}{T}$
      - tangential to circle at radius
    - centripetal acceleration = change in velocity
      - $a = \dfrac{v^2}{r}$
      - points to center
    - NOTE: The reason that acceleration is not zero (even though speed is constant is because the DIRECTION of the speed, aka the velocity, is constantly changing since it's circular).
  - Force
    - An object which experiences an acceleration must also be experiencing a net force.
      - Centripetal force: $F = ma = \dfrac{mv^2}{r}$
        - points to center
      - "Centrifugal" force is opposite centripetal force
        - points outward
        - almost like a normal force
  - Horizontal Circle (on the ground)
    - Centripetal force is equivalent to
      - Tension
      - Friction
    - Force keeping object on ground = normal force = mg
    - Coefficient of friction
      $F_f = \mu F_N$
      - $\mu = \dfrac{F_f}{F_N} = \dfrac{ma_{centripetal}}{mg} = \dfrac{a_{centripetal}}{g}$
  - Vertical circle
    - Top: Heaviest (gravity and centripetal added)
    - Bottom: Lightest (gravity and centripetal subtracted).
- Law of Universal Gravitation
  - $F = \dfrac{Gm_1 m_2}{r^2}$ $m_1 = $ mass of object 1 $m_2 = $ mass of object 2
    $G = 6.67 \times 10^{-11} Nm^2 / kg^2$ $r = $ distance between two masses
  - Gravitational interactions exist between all objects with an intensity which is directly proportional to the product of their masses.

velocity

Accele.

Centripetal Force