Physics 112

Tuesday, January 12/16

http://mvhs-sherrard.weebly.com/

Textbook - ISBN

1. Review Problem #2
2. Exam - Review Problems (84)
3. Boundary Behaviors
4. Reflection - P1
5. Diffraction - P3

6. Refraction

P112 - Rev. Prob #2.

Space pirates kidnap an earthling and hold him prisoner on a distant planet. With nothing else to do, he amuses himself by dropping his shoe, from eye level, 170cm to the floor of his cell. He observes that the shoe takes 0.62s to fall. Determine the acceleration of gravity, $\vec{g}$, of the planet.

Freely Falling Body

100cm = 1m

$\vec{v}_i = 0 m/s$ (1)

$\vec{d} = \ominus 170 cm = \ominus 1.70 m$ (1)

$t = 0.62 s$

$\vec{d} = \vec{v}_i t + \frac{1}{2}\vec{a}t^2$ (1)

* no air resistance

$\vec{g} = \vec{a} = ?$

$2\vec{d} = \vec{a}t^2$

$\vec{a} = \frac{2\vec{d}}{t^2}$ (1)

$\vec{a} = \frac{(2)(\ominus 1.70)}{(0.62)^2}$

$\vec{a} = \ominus 8.8 \ m/s^2$ (1)

The acceleration due to gravity is $8.8 m/s^2$, down.

Physics 122

http://mvhs-sherrard.weebly.com/

Tuesday, January 12/16

---

1. Experiment 8.1 - Kepler's Laws -> 5 Days Late
   Worksheets - Planetary Motion
   Text: Page 608, #1-4
   Page 623, #23-27, 30
   Text: Page 614, #5-8
   Page 623, #28, 29
   Worksheet - SHM

] Mass on a Spring
] Pendulum

2. Test - Unit 2 -> Horizontal Projectile
   Projectile Fired At an Angle
   Circular Motion, Banked/Unbanked
   Planetary Motion
   SHM - Mass on a Spring
   Pendulum
   * Wednesday, Jan. 13/16

} Problems only

3. Review Problem

4. Charging by Induction - Continue

5. Law of Conservation of Electric Charge

6. Electric/Electrostatic Force - To Be Continued

---

7. Coulomb's Law - Two Charges

8. Handout: Charge and Coulomb's Law
   Textbook: Page 638, #4-5

9. Coulomb's Law - Three Charges

10. Textbook: Page 640, #7, 8

Circular Motion.

$$V = \frac{2\pi r}{T} = 2\pi r f$$

$$a_c = \frac{V^2}{r} = \frac{4\pi^2 r}{T^2} = 4\pi^2 r f^2$$

$T = \frac{1}{f}$

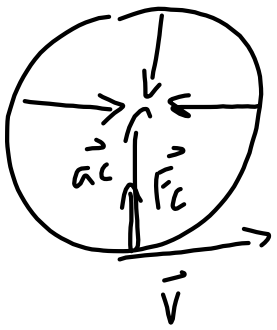
$f = \frac{\#}{t}$

$$F_c = ma_c$$

$$F_c = m\left(\frac{v^2}{r}\right)$$

$$F_c = m\left(\frac{4\pi^2 r}{T^2}\right)$$

$$F_c = m\left(4\pi^2 r f^2\right)$$



Unbanked Curve

$F_c = F_s$ ⇐

$$v = \sqrt{rg\mu_s}$$

banked curve

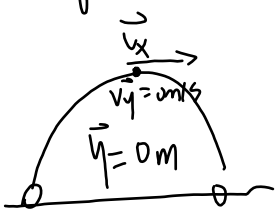
frictionless

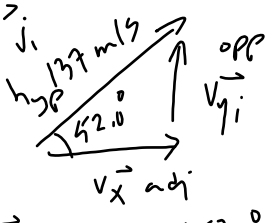
$F_c = N_x$

$$v = \sqrt{rg\tan\theta}$$

Projectile.

1. A cat is launched at a velocity of 137 m/s at an angle of 52.0° from the horizontal.





$\vec{a} = -9.8\ m/s^2$

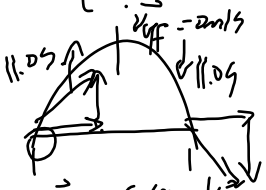
$\vec{v_x} = +137\cos 52.0°$

$\vec{v_{yi}} = +137\sin 52.0°$

a) How long does it take the cat to reach his maximum height?

$t = ?$

horizontal motion: $\vec{v_x} = \vec{x}$ (E)



vertical motion: choices

$\vec{a} = -9.8\ m/s^2$

$v_{yf} = 0$ m/s

$\vec{v_{yi}} = 137\sin 52.0°$

$t = ?$

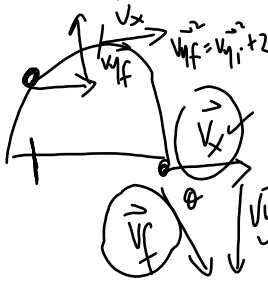
$\vec{a} = \dfrac{v_{yf} - v_{yi}}{t}$

$t = \dfrac{-v_{yi}}{\vec{a}}$

$t = \dfrac{-137\sin 52.0°}{-9.80}$

$t = 11.0\ s$

b) find the velocity of the cat when it lands.



$\vec{v_x} = 137\cos 52.0°$

$\vec{v_{yf}} = \vec{v_{yi}} + \vec{a}t$

$137\sin 52.0° \quad -9.8\ m/s^2 \quad 11.0\ s$

$\Rightarrow \vec{v_{yf}} = -\ m/s$

$v_f = \sqrt{v_x^2 + v_{yf}^2}$ | $\tan\theta = \dfrac{v_{yf}}{v_x}$

Science 10

http://mvhs.nbed.nb.ca/

Tuesday, January 12/16

---

1. Assignment: Oh, What a Tangled Web We Weave
   3 Days Late

2. Article: Keeping Threatened Amphibian Species Afloat
   1 Day Late

3. The Carbon Cycle - To Be Continued

4. The Nitrogen Cycle

5. The Oxygen Cycle

6. Fertilizers and Their Effects on Ecosystems

---

7. Paradigm Shifts