1) Displacement is the difference between where he started and where he ended
Since he starts and ends in the same place his displacement is zero

---

2) Court is 30 m long $\quad V = \frac{d}{t}$

$\Rightarrow d = 6 \times 30\,m$

$d = 180\,m$

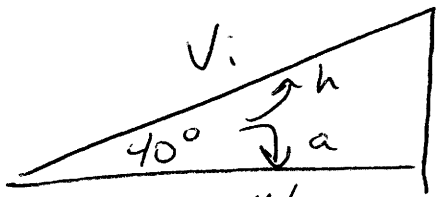
$t = 60\,s$

$= \frac{180\,m}{60\,s}$

$3\,m/s$

---

3)



SoH CAH ToA $\quad \cos\theta = \frac{A}{H}$

$V_i = \frac{V_{ix}}{\cos\theta}$

$= \frac{12\,m/s}{\cos 40°} \Rightarrow 15.7\,m/s$

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4) A Particle has to have a multiple of $1.6 \times 10^{-19}\,C$

1) $.8 \times 10^{-19}\,C \Rightarrow \frac{1}{2}$ of an $e \Rightarrow$ not allowed

2) $1.2 \times 10^{-19}\,C \Rightarrow$ fraction of an $e \Rightarrow$ not allowed

* 3) $3.2 \times 10^{-19}\,C \Rightarrow 2\,e \Rightarrow$ allowed

4) $4.1 \times 10^{-19}\,C \Rightarrow 2.56\,e \Rightarrow$ not allowed

5) inertia is based on mass ⟹ object with greatest mass will then have the greatest inertia

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6) $V_i = 5\ m/s$ east

$a = 2\ m/s^2$ east

$t = 10\ s$

$d = ?$

$$d = V_i t + \frac{1}{2} a t^2$$

$$d = 5\frac{m}{s}(10\ s) + \frac{1}{2}\left(2\frac{m}{s^2}\right)(10\ s)^2$$

$$= 50\ m + 100\ m$$

$$= 150\ m$$

$$= 1.5 \times 10^2\ m$$

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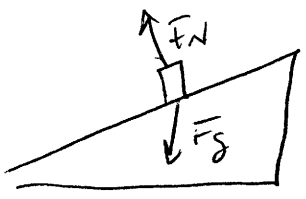
7) no unbalanced force means all forces are balanced

1) apple in free fall — F_g ↓ — not balanced ⟹ apple accelerates

2) satellite in orbit — F_g → (curved path) — unbalanced force keeps it in orbit

* 3) hockey puck at constant velocity on ice — F_N ↑, F_g ↓ — balanced ⟹ no acceleration

4) lab cart down frictionless incline.



NOT Balanced

8) $V_i = 15\ m/s$

$a = -3\ m/s^2$

$t = 4\ s$

$V_f = ?$

$V_f = V_i + at$

$= 15\ m/s + (-3\ m/s^2)(4\ s)$

$= 15\ m/s + -12\ m/s$

$= 3\ m/s$

---

9) $F = 40\ N$

$m = 5\ Kg$

$r = 2\ m$

$V = ?$

object is moving in a circle
=> centripetal force / accel formulas apply

$F_c = ma_c$ ✓ ✓

solve for a_c

$a_c = \frac{F_c}{m}$

$a_c = \frac{V^2}{r}$ ✓

$\frac{F_c}{m} = \frac{V^2}{r}$

Solve for V

$\frac{F_c r}{m} = V^2$

$\frac{(40\ \cancel{Kg}\ m/s^2)(2\ m)}{5\ \cancel{Kg}} = V^2$

$16\ \frac{m^2}{s^2} = V^2$ take square root

$4\ m/s = V$