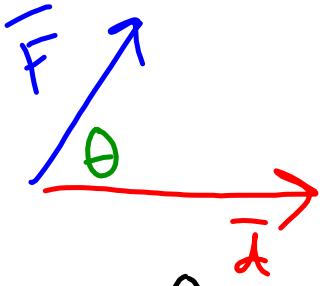
Work

- Equation:



$$W = F\,d\,\cos\theta$$

W → work
F → force
d → displacement
θ → angle between vectors

Units → Joules (J)

Net Work

$$W_{net} = (\Sigma F)\,d\,\cos\theta$$

Power

$$P = \frac{W}{t} = \frac{E}{t}$$

W: work; E: energy; t: time; t: time

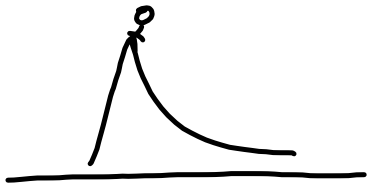
units → Watts ($W \equiv J/s$)

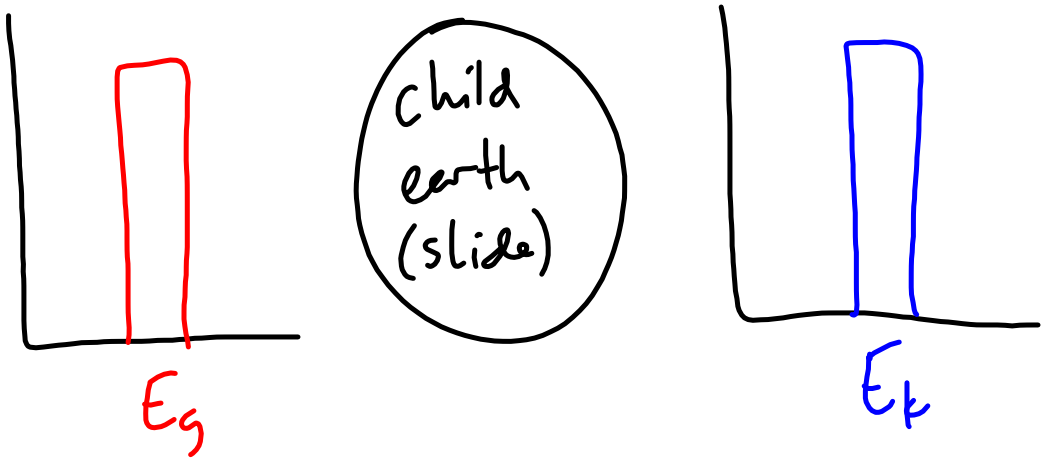
Work – Energy Theorem

$$W = \Delta E$$

3B.1 Level 2 #1 ⇒ COE PS #1

1)





$$E_g = E_k$$

$$mg h_i = \frac{1}{2} m v_f^2$$

$$v_f = \sqrt{2 g h_i}$$

$$= \sqrt{2(9.8\ m/s^2)(4\ m)}$$

$$= 8.85\ m/s$$

2)

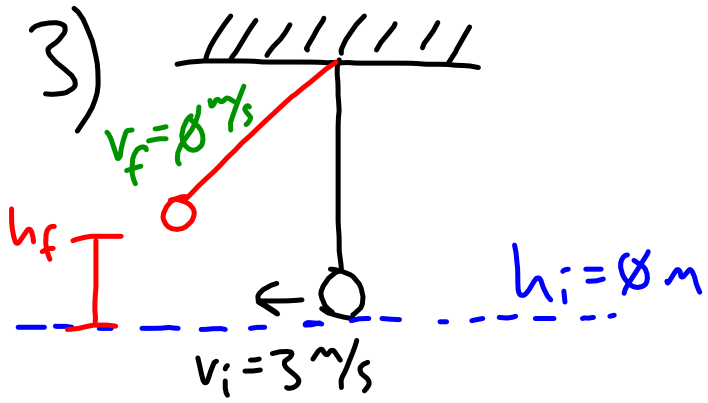
$$E_{el} = E_k$$

$$\cancel{\frac{1}{2}} k(\Delta x)^2 = \cancel{\frac{1}{2}} mv^2$$

$$v = \sqrt{\frac{k(\Delta x)^2}{m}}$$

$$= 2.06 \text{ m/s}$$

3)



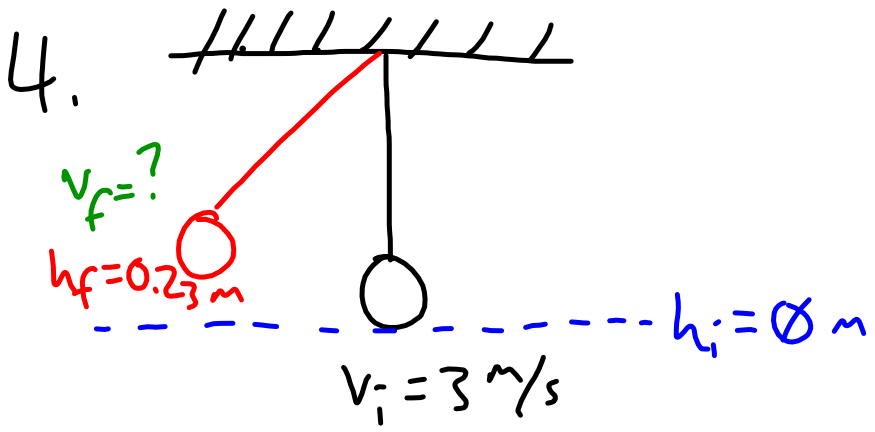
$$E_k = E_g$$

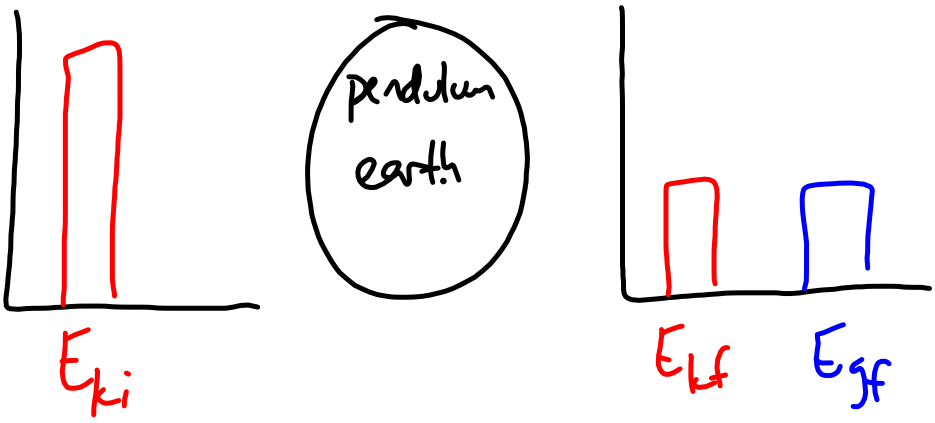
$$\frac{1}{2}mv^2 = mg_g h$$

$$h = \frac{v^2}{2g_g}$$

$$= 0.46\ m$$

4.



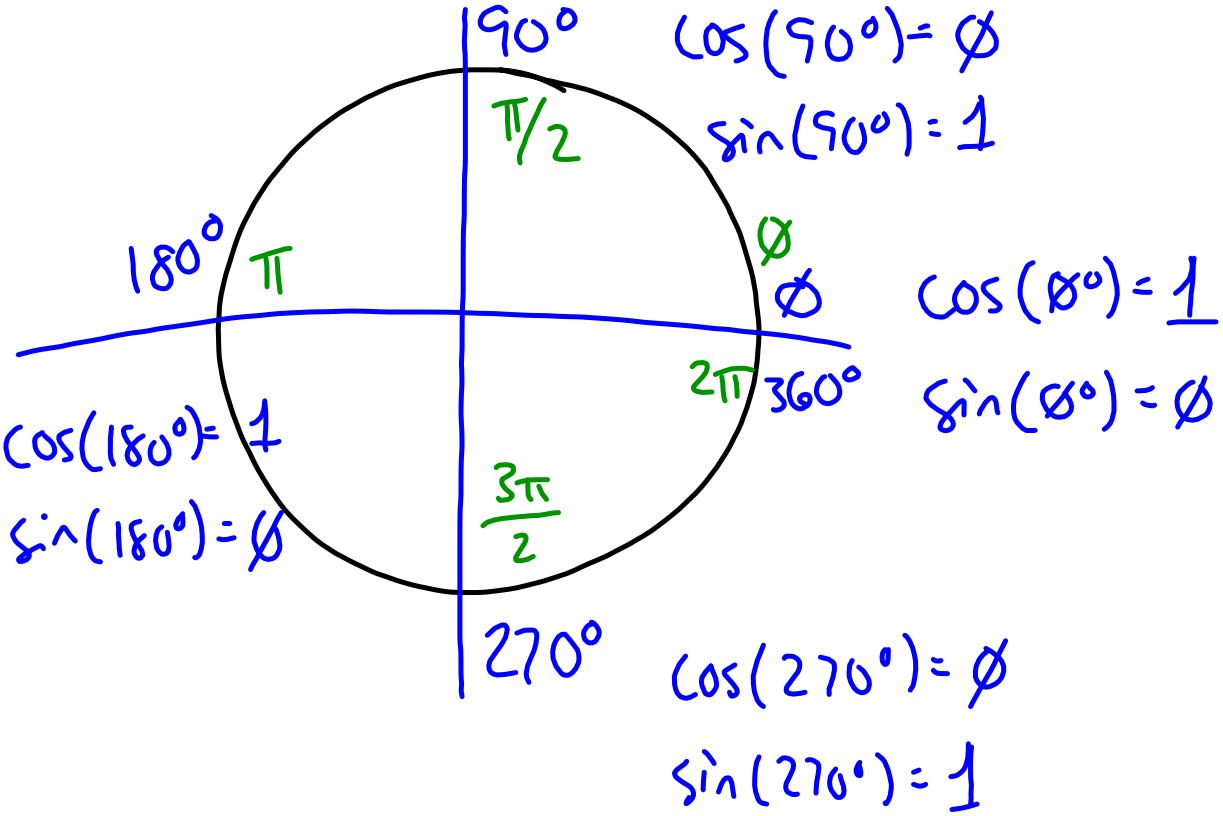


$$E_{ki} = E_{kf} + E_{gf}$$

$$\frac{1}{2}mv_i^2 = \frac{1}{2}mv_f^2 + mg h_f$$

$$v_f = \sqrt{\frac{1}{2}v_i^2 - g h_f}$$

$$= 2.12\ m/s$$


90°
π/2
180°
π
0
0
2π
360°
3π/2
270°
cos(90°) = 0
sin(90°) = 1
cos(0°) = 1
sin(0°) = 0
cos(180°) = -1
sin(180°) = 0
cos(270°) = 0
sin(270°) = -1