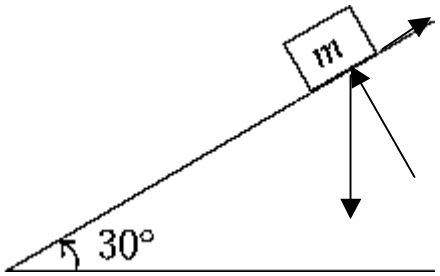
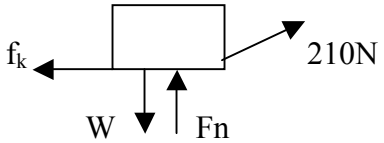
Answer Key

1. B equal (no acceleration)
2. A $(1.3\text{kg}\cdot 9.81\text{m/s}^2\cdot\sin 30^o)/1.3\text{kg}=4.9\text{m/s}^2$
3. D The body's mass remains constant, and its weight decreases
4. D The weight, friction and normal forces are shown. Parallel to the surface is the friction force f_s up the plane and the weight component mg sin 30º down the plane, which must be equal and opposite: $f_s = mg$ sin 30º



5. D $(60\text{cm/s})^2/50\text{cm}=72\text{cm/s}^2$
6. B $(m_1+m_2)g=(m_1+m_1/2)g=3m_1g/2$
7. A $mv^2/2\rightarrow 1.2^2\times 10^5\text{J}=1.44\times 10^5\text{J}$
8. D $\theta=\sin^{-1}(12/45)=15.5^o$ $W=(45\text{N})(4\text{m})\cos 15.5^o=173\text{J}$
9. C $\frac{1}{2}\cdot 1500\text{kg}(96^2-56^2)\text{m}^2/\text{s}^2=4.56\times 10^5\text{J}$
10. C $P=F\cdot v\rightarrow 3\times$
11. A)



    B) $F_x=210\text{N}\cdot\cos 23^o=193\text{N}$
    C) $F_y= 210\text{N}\cdot\sin 23^o=82.0\text{N}$
    D) $F_x\cdot\Delta x=193\text{N}(6\text{km/h})(10^3\text{m/km})(35\text{min})(1\text{h}/60\text{min})=6.75\times 10^5\text{J}$
    E) $(6.75\times 10^5\text{J}/35\text{min})(1\text{min}/60\text{s})=322\text{W}$

12. A) $5\text{kg}(9.81\text{m/s}^2)(10.0\text{m})=491\text{J}$
    B) $h=(10.0-5.00-1.50)\text{m}=3.50\text{m}$, $5\text{kg}(9.81\text{m/s}^2)(3.50\text{m})=172\text{J}$
    C) $K=0\text{J}$
    D) $\frac{1}{2}\cdot 200\text{N/m}(1.5\text{m})^2=225\text{J}$
    E) $(491-172-225)\text{J}=94.0\text{J}$