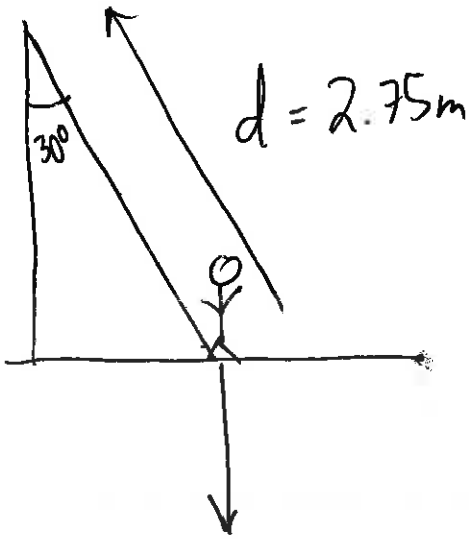
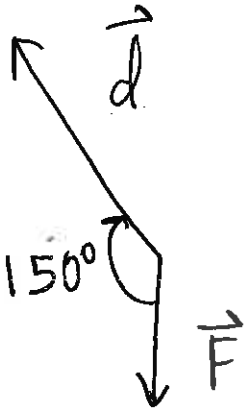
6.5





a) $W = \vec{F} \cdot \vec{d} = Fd\cos\theta$

$= mgd\cos\theta$

$= 75 \cdot 9.8 \cdot 2.75 \cos 150°$

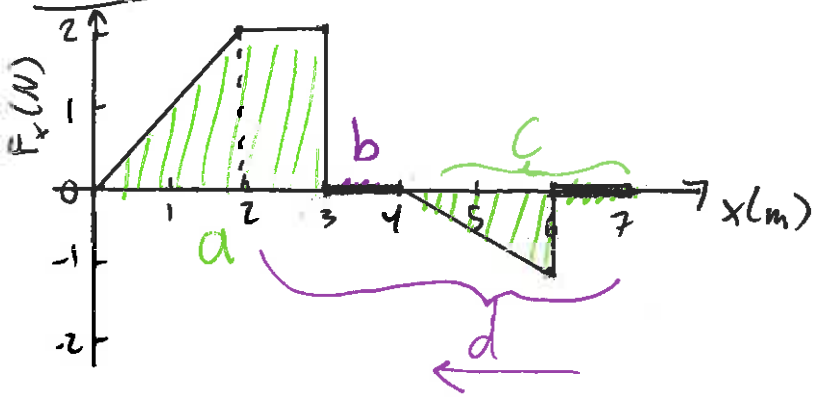
$= -1750.45\ldots$

$= \boxed{-1750\ \text{J}}$

Sanity Check: Negative because moves up.

b) No, accel isn't in the formula.

6.41



$m = 2.0\,kg$

$W = \int F_x\,dx$

= area under curve!

a) Area labeled a

$A_{\text{triangle } 0\to2} + A_{\text{rect } 2\to3} = W_{\text{part a}}$

$\frac{1}{2}\,\text{base}\cdot\text{height} + \ell \times w = W_a$

$\frac{1}{2}\cdot 2m\cdot 2N + 1m\cdot 2N$

$2Nm + 2Nm = \boxed{4\,J} = W_a$

b) No area in b, $W_b = \boxed{0\,J}$

c) $\frac{1}{2}\cdot 2m\cdot(-1N) + 0 = \boxed{-1\,J}$

↳ upside down!

d) $A_{7\to6} + A_{6\to4} + A_{4\to3} + A_{3\to2} = W_d$

$W_d =$

$0 + \frac{1}{2}(-2m)(-1N) + 0 + (-1m)(2N) = +1J - 2J = \boxed{-1J}$

upside down

right to left!

6.69

This question talks about work & speed. Speed should make you think KE, so you'll use $W = \Delta K$ (work-energy theorem).

Givens: $W = 8.0\,J$

$\Delta t = 10.0\,ms = 10^{-2}\,s$

$m_{head} = 5.0\,kg$ $\qquad V_0 = 0$

a) $W = \Delta K$

$= \frac{1}{2} m (v_f^2 - \cancel{v_0^2}^{\,0})$

$W = \frac{1}{2} m v_f^2 \rightarrow v_f^2 = \frac{2W}{m} \rightarrow v_f = \sqrt{\frac{2W}{m}}$

$= \sqrt{\frac{2 \cdot 8}{5}}$

$= 1.7888\,s$

$= \boxed{1.8\,m/s}$

$= \boxed{4\,mi/hr}$

b) $a = \frac{\Delta v}{\Delta t} = \frac{1.7888\,s}{10^{-2}} = 178.885 = \boxed{180\,m/s^2} \pm 9.8\,m/s^2$

$= 18.2536 = \boxed{18\,g's}$