HW 23 # 1, 3, 8, 9, 44 Alexkesh

1) $Flux = BA\cos(\theta) = BA\cos(90) = 0$

8) $V = N\frac{\Delta\Phi}{\Delta t} = -N\cdot\Delta(BA)/\Delta t = -N\cdot B\cdot\Delta A/\Delta t = -50\cdot1.5\cdot(0-0.25)/0.1 = 187.5\,V$

direction: clockwise

9)a) $V = \frac{\Delta\Phi}{\Delta t} = \frac{BA-BA}{t} = \frac{A(B-B)}{t} = \frac{\pi(0.022/2)^2(2-0)}{0.25} = 0.003\,V$

b) $P = \frac{Q}{t}$, $Q = P\cdot t = \frac{V^2}{R}\cdot t$

$R = \frac{\rho\pi d}{\pi\cdot d^2/4} = \frac{4\cdot2.44e{-}8\cdot0.022}{(2\cdot e{-}3)^2} = 2.39e{-}4\,\Omega$

$Q = \frac{(3.04e{-}3)^2}{2.39e{-}4}\cdot0.250 = 0.097\,J$

$Q = mS\Delta t$

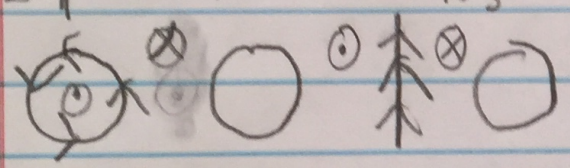
$\Delta t = \frac{q}{mS} = \frac{0.097}{m\cdot129}$ (assuming gold)

$m = \$5000\left|\frac{1\,kg}{4759.99}\right. = 0.105\,kg$ (assuming the average between 10 yr high and 10 yr low)

$\Delta t = \frac{0.097}{0.105\cdot129} = 7.13e{-}4\,^\circ C$, negligable change in temp.

44a) $\frac{V_s}{V_p} = \frac{N_s}{N_p}$, $N_s = \frac{N_p\cdot V_s}{V_p} = \frac{400\cdot9}{120} = 30$ loops

b) $\frac{I_s}{I_p} = \frac{N_p}{N_s}$, $I_s = \frac{I_p\cdot N_p}{N_s} = \frac{1.3\cdot400}{30} = 17.33\,A$

3) 

(Into and out of page icons denote mag fields created by nearest current)

a) Counter clockwise

b) clockwise

c) No induced current (assuming coil 1 and wire are equidistant from coil 2 and have the same current, their mag fields cancel out)