1. a) $\text{Evap} = \frac{6\text{ mm}}{12\text{ h}} = 0.5\text{ mm h}^{-1} = \boxed{12\text{ mm d}^{-1}}$

b) $V = A_s(\text{depth of evaporated } H_2O) = (100\text{ m}^2)(10^{-3}\text{ m}) = \boxed{0.10\text{ m}^3}$

(depth of evaporated H_2O = 1 mm; 10^{-3} m = 1.0 mm)

In liters $V_{evap} = (0.10\text{ m}^3)(10^3\text{ L m}^{-3}) = \boxed{100\text{ L}}$

c) $\text{Answer} = \frac{100\text{ L/mm-evap}}{100\text{ m}^2} = \boxed{1\frac{\text{L}}{\text{m}^2}}$ (per mm evap'n)

d) $\frac{\left(\frac{\text{L}}{\text{m}^2\text{ mm}}\right)(\rho_w)(\text{Evap Rate})}{\text{sec/day}} = \frac{\left(1\frac{\text{L}}{\text{m}^2\cdot\text{mm}}\right)\left(1000\frac{\text{g}}{\text{L}}\right)\left(12\frac{\text{mm}}{\text{d}}\right)}{(86{,}400\text{ s/d})}$

$\text{Evaporative mass flux} = \boxed{0.14\frac{\text{g}}{\text{m}^2\cdot\text{s}}}$

e) This mass flux corresponds to $Q^{Heat}_{evap} = \left(0.14\frac{\text{g}}{\text{m}^2\text{s}}\right)\left(589\frac{\text{cal}}{\text{g}}\right)$

$= \boxed{82\frac{\text{cal}}{\text{m}^2\cdot\text{s}}}$

f) $\text{Heat flux (Joules)} = \left(82\frac{\text{cal}}{\text{m}^2\text{s}}\right)\left(4.1\frac{\text{J}}{\text{cal}}\right) = \boxed{335\frac{\text{J}}{\text{m}^2\text{s}}}$

g) Yes $= \boxed{335\frac{\text{W}}{\text{m}^2}}$

h) Sun must provide **AT LEAST $335\frac{\text{W}}{\text{m}^2}$.**

Note, we'll see in a few weeks that mid-summer, mid-day sunlight provides about $1000\frac{\text{W}}{\text{m}^2}$

So the pond could easily get an average of at least 335 W/m^2.

2.) $T = 82°F = \frac{5}{9}[(82°F) - 32] = 28°C$

F° → °C

RH = 62%

a) $T_d = T - \frac{100 - RH}{5}$ (from class lecture)

$= 28°C - \frac{100-62}{5} = 28 - 7.6 = \boxed{20.4°C = 20°C}$

°F: $\frac{9}{5}(20.4°C) + 32 = \boxed{68°F}$

b) At T = 82°F = 28°C, values not in the table; use linear interpolation between 25°C & 30°C.

T	SAT'D V.P.
25°	= 23.76
[28°]	= ?
30°	= 31.8

← Find v.p. that is $\frac{3°}{5°}$ (3/5 ths) from value at 25° to that of 30°

SAT v.p. @ 28°C = [v.p. @ 25°] + $\left(\frac{3°}{5°}\right)$(31.8 - 23.8)

= 23.8 + (0.6)(8.0 mm-Hg)

= 23.8 + 4.8

SAT'D V.P. = 28.6 mm-Hg

But air is NOT saturated (100% RH) but is 62% of saturation

$P_{H_2O} = 0.62(28.6) = 17.7$ mm-Hg = $\boxed{18 \text{ mm-Hg}}$ 2 sig. digits

c) 1 atm = 760 mm-Hg ⇒ $P_{H_2O} = \frac{18 \text{ mm-Hg}}{760 \text{ mm-Hg/atm}} = \boxed{0.023 \text{ atm}}$

d). Lin. interpolate off Table: Sat. Vap Density @ 28° = $23 \frac{g}{m^3} + \frac{3°}{5°}(30.4 - 23)$

$= 27.4$ g/m³

At 62% RH Vap. Density $= 0.62(27.4 \frac{g}{m^3}) = \boxed{17.0 \text{ g/m}^3}$

e) 1 mm Evap = $(100 L)(1000 \frac{g}{L}) = 10^5$ g-H_2O ⇒ VOL. AIR = $\frac{10^5 \text{ g-}H_2O}{17 \text{ g-m}^{-3}}$ = $\boxed{5{,}900 \text{ m}^3 \text{ AIR}}$