1. $\dfrac{1}{5}x + 10y + 3z = 210 + \dfrac{1}{5}\ln 5$

2. HINT: Find $T(x, y)$, the linear approximation of the function $f(x, y) = x\sqrt{x + \cos^2(y)}$ at the point $(8, 0)$.

   ANSWER: $f(8.03, 0.04) \approx T(8.03, 0.04) = 24.13$

3. local max at $(0, 0)$, local min at $(0, 2)$, saddle points at $\left(\pm\sqrt{\frac{3}{8}}, \frac{3}{2}\right)$

4. (a) $\displaystyle\int_0^4 \int_0^x h(x, y)\, dy\, dx + \int_4^{\sqrt{32}} \int_0^{\sqrt{32 - x^2}} h(x, y)\, dy\, dx$

   (b) $256$