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1) $f(x) = \cos x + x^5 + 2x^2 - 7x - 9$

I) $g(x) = \cos x + x^5 - x^2 + 5x + 6$

$f(x) - g(x) = 0$

$\therefore \cos x + x^5 + 2x^2 - 7x - 9 - (\cos x + x^5 - x^2 + 5x + 6) = 0$

$\cancel{\cos x} + \cancel{x^5} + 2x^2 - 7x - 9 - \cancel{\cos x} - \cancel{x^5} + x^2 - 5x - 6 = 0$

$\therefore 3x^2 - 12x - 15 = 0$

$\Delta = 324$

$x = \frac{12 \pm \sqrt{324}}{2 \cdot 3}$ → $x' = 5$

→ $x'' = -1$

II) $A = \int_{-1}^{5} [g(x) - f(x)]$

$\int_{-1}^{5} (-3x^2 + 12x + 15)$

$A = \int_{-1}^{5} \left( \frac{-3x^{2+1}}{2+1} + \frac{12x^{1+1}}{1+1} + \frac{15x^{0+1}}{0+1} \right)$

$\int_{-1}^{5} (-x^3 + 6x^2 + 15x)$

$A = [-x^3 + 6x^2 + 15x]_{-1}^{5} \Rightarrow (-125 + 150 + 75) - (1 + 6 - 15)$

$100 - (-8) = 108$

$\therefore$ logo $\boxed{A = 108}$

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→ (2) (II) $A(x,y) \rightsquigarrow x \cdot y = 1000$

$\therefore y = \frac{1000}{x}$

$C(x,y) = 8x + 5y$

$C(x) = 8x + 5 \cdot \frac{1000}{x} \rightsquigarrow 8x + \frac{5000}{x} \rightsquigarrow \frac{8x^2 + 5000}{x}$

(II) $C'(x) = \frac{16x \cdot x - (8x^2 + 5000) \cdot 1}{x^2} \rightsquigarrow \frac{8x^2 - 5000}{x^2}$

$C'(x) = 0 + 8x^2 - 5000 = 0$

$\hookrightarrow C'(x) = 8x^2 = 5000$

$C'(x) = x^2 = \frac{5000}{8} \rightsquigarrow x^2 = 625 \therefore x = \sqrt{625}$

$\boxed{x = 25}$

(III) $y = \frac{1000}{25} \rightsquigarrow \boxed{y = 40}$

Logo $\therefore C_{\text{mín}} = 8 \cdot 25 + 5 \cdot 40$

$\boxed{C_{\text{mín}} = 400}$