Start here for Question Number: 2

a) $\frac{\cos x}{x}$

$= \frac{\cos x \cdot 1 - x \cdot -\sin x}{x^2}$

$= \frac{\cos x + x \sin x}{x^2}$

b) $x^2 - x - 12 < 0$

$(x+3)(x-4) < 0$

$x+3 < 0$ or $x-4 < 0$

$x < -3$ $x < 4$

c) $y = \ln(3x)$

$y' = \frac{3}{3x}$

$f'(2) = \frac{3}{3(2)}$

$= \frac{1}{2}$

d) i) $\int \sqrt{5x+1}\, dx$

$= \int (5x+1)^{\frac{1}{2}}\, dx$

$= \frac{(5x+1)^{\frac{3}{2}}}{3/2}$

$= \frac{2(5x+1)^{\frac{3}{2}}}{3} + C$

ii) $\int \frac{x}{4+x^2}\, dx$ $f'(x) = 2x$ $\times \frac{1}{2}$ x

$\frac{1}{2}(4+x^2) + C$

e) $\int_0^6 (x+k)\, dx = 30$

$= \left[\frac{x^2}{2} + kx\right]_0^6$

$= \left[\frac{6^2}{2} + k(6)\right] - \left[\frac{0^2}{2} + k(0)\right]$

$= [18 + 6k] - 0$

$30 = 18 + 6k \rightarrow 6k = 12$

$k = 2$