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

$= \dfrac{x . \sin x \; \text{+-} \; \cos x .1}{(x)^2}$

$= \dfrac{x\sin x \; - \cos x}{(x)^2}$

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

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

$\begin{array}{cc} x+3 < 0 & x - 4 = 0 \\ -3 \quad -3 & +4 \end{array}$

$x = -3 \qquad\qquad x = 4$

c) $y = \ln(3x) \qquad\qquad x = 2$

$y' = \dfrac{1}{x} * 3$

at $x = 2$

$= \dfrac{1}{2} * 3$

$y = \dfrac{3}{2}$

$\left(2, \dfrac{3}{2}\right)$

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

$\sqrt{3x+1}$

$\frac{5x^2}{\cdot 2} + x + c$

$= \cancel{} \frac{5x^{-2}}{2} + x + C$

ii) $\int \frac{x}{4+x^2}$

$\frac{x}{x^2+9}$

$1 + \frac{x^3}{3} + 4x + C$

$= \cancel{}$

$= 1 + \frac{x^3}{3} + 4x + c$

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

$= \left[x+k \right]_0^6$

$x=6$ $\qquad\qquad$ $x=0$

$6+k=0$
-6
$\qquad k=-6$ $\qquad\qquad$ $k=0$

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